

HAROLD CLIFTON URSCHEL, JR., MD, LLD(HON), DS(HON): a conversation with the editor

Hal Urschel (*Figure 1*) was born in Toledo, Ohio, and he grew up primarily in Bowling Green, 20 miles away. After public schools, he went to Princeton University on a football scholarship and graduated cum laude in 1951. The Princeton team was undefeated during his freshman and senior years. He also had a scholarship to Harvard University School of Medicine, where he again graduated cum laude in 1955. His internship, residency, and chief residency in general, vascular, cardiac, and thoracic surgery were at the Massachusetts General Hospital (MGH) in Boston. After serving in the US Navy as chief of experimental surgery at the National Naval Medical Research Center in Bethesda, Maryland, he and his young family moved to Dallas and have been here ever since.

In addition to his practice at Baylor University Medical Center (BUMC), Dr. Urschel has taught extensively and is clinical professor of cardiovascular and thoracic surgery at the University of Texas Southwestern Medical School. He has published over 300 articles in medical journals or chapters in books and has been an editor of and major contributor to 7 books. He has been visiting professor at a number of medical centers in the USA and abroad and is an honorary member of the thoracic surgery faculty of the University of Toronto and the Harvard Medical School. He has been president of 5 major surgical societies, the Society of Thoracic Surgeons, American College of Chest Physicians, International Academy of Chest Physicians, Southern Thoracic Surgical Association, and Texas Surgical Society. He has received a number of honors for his achievements, including 2 honorary doctorates. He and his lovely and brilliant wife, Betsey, are the proud parents of 5 offspring, all of whom are graduates of Princeton University. He is also a good guy and fun to be around.

William Clifford Roberts, MD (hereafter, WCR): *I am with Dr. Urschel in his office at BUMC on March 19, 2003. Dr. Urschel, I appreciate your willingness to talk to me and therefore to the readers of BUMC Proceedings. Could you talk about some of your early memories, your parents, and your siblings?*

Harold Clifton Urschel, Jr., MD (hereafter, HCU): I was born in Toledo, Ohio, in 1930 and grew up mainly in Bowling Green, a small college town just south of Toledo. My father was an engineer, the third generation in the Urschel Engineering Company. Both sets of grandparents lived a block away from us in each direction. We lived in Bowling Green for approximately 4 years, and then my father tried a lead and zinc mining expedition for the company in northwest Arkansas on the Buffalo River,



Figure 1. Dr. Hal Urschel.

where the national park is now. It was the mid 1930s, during the Depression, and it was a hard 4 years for him in the mining business, but it was great for the family. My mother taught English and Greek. She taught us all to read and write. We were 52 miles from an indoor toilet, law and order, a physician, or schools. We were out in the boondocks where Bob Burns, the Arkansas traveler, came from, the same hollow (*Figure 2*). It was a great time, though. I hunted or fished every day with my parents. It was a great family experience. After 4 years, we went back to Bowling Green, where our grandparents were very strong influences on me.

My father was primarily an inventor. The company made front-axle quenching machines for General Motors. (We were just south of Detroit.) I grew up in the machine shop. I was in the drafting room when I was 6 years old, and I learned every machine in the company. It was assumed that my brother and I,

From Baylor Heart and Vascular Institute, Baylor University Medical Center, Dallas, Texas.

Corresponding author: Harold C. Urschel, Jr., MD, 3600 Gaston Avenue, Suite 1201, Dallas, Texas 75246.



Figure 2. At age 6 in Arkansas.

who were the only 2 boys in the family, would be the fourth generation in the Urschel Engineering Company (Figure 3).

My father invented the tubular railway axle, which lightened railroad cars significantly. He also worked on the M-1 rifle and made significant contributions to that. He was a consultant for US Steel and Pittsburgh Steel and spent a lot of time in Pittsburgh. In 1943, at the age of 42, he had his third heart attack and died. My mother was left with 3 children; I was the oldest. My brother was 4 years younger and my sister 8 years younger than I was. She has Down's syndrome and is still alive and doing well, but she was a "care" problem for my mother.

WCR: *How old were you when your father died?*

HCU: I was 13. At that time, my mother went to my grandfather and my uncles, who were all in the Urschel Engineering Company, where the patent rights for all the inventions were held, and asked what she could expect for help. My grandfather Urschel, a good German competitor, told her, "Corporations aren't interested in widows or orphans." He used to wrestle with my father, who had been captain of the wrestling team at Ohio Wesleyan. My father would get him in a grapevine hold, and my grandfather would never "give." He'd crack his ribs before giving up. It was a very competitive German environment. That's the way my grandfather looked at it. My mother said, "Okay, that's fine. My boys are not going into the Urschel Engineering Company." She saw to it that we went into the medical profession.

My mother's father was a Methodist minister and became a bishop. He also became a state senator and changed Bowling Green State Normal School into a college and then into a university. He did a lot to improve the size of the university. It now has about 20,000 students. Most of the teachers in the public school system had PhDs in order to supervise student teachers from the university. We had a great relationship with the university. The professors' children were all in our school. We sang in *The Messiah* at the university. Eva Marie Saint was a student



Figure 3. Four generations of Urschels.

who acted in the university drama department. We were in plays at the university with people like that. It was a great experience growing up in a small town. We had not only very good music and art but also good athletics because the university coaches influenced the high school. The 2 Cleveland pro football teams trained in Bowling Green. The Cleveland Rams, with Bob Waterfield and Jane Russell, trained there initially, followed by the Cleveland Browns. The Cleveland Browns' coach, Paul Brown, was the mentor to my high school coach, and he really had a great influence on all of us football players. Football was a big thing in our schools, as was track and basketball.

WCR: *What was home life like when your father was alive?*

HCU: He was gone a lot to Pittsburgh, Chicago, New York, and other cities, but when he was home, we all went hunting. We'd all go, including my mother, who was a great shot. We'd go to Camp Perry for the National Rifle Championship and to Vandalia, Illinois, for the National Trapshooting Championship. My mother would frequently win the trapshooting championship; she shot as well as my father. In those days, we had only radio. The Hit Parade was popular in my family. The family always had dinner together and washed the dishes together, a much different environment than today. Our closeness was fostered by the Arkansas experience, where there wasn't anything but the family. There were no outside relationships whatsoever. It carried over in Bowling Green.

Because my father was away a lot, my mother spent a lot of time with us. She read to each child constantly. We went to school a block away; our grandparents lived a block away.

After my father died, we moved in with my mother's parents, Elizabeth Ann and Rush Augustus Powell. My grandparents influenced me as much as my mother did. Women were the strong force as far as day-to-day contact. Both my mother and my grandmother were very strong. My grandparents both had college degrees, which was unusual in those times. In addition, my grandfather had a PhD and my grandmother had a master's degree. They also supervised the Otterbein Home, a church orphanage outside Columbus, Ohio. My grandmother was in charge of raising money for it. (When Tocqueville studied the successful American experiment in 1840 after the "unsuccessful" French Revolution, he was asked, "What is the single most significant

reason for America's success?" He replied, "It's obvious. It's the strength of their women." In my life, it's always been that kind of a situation.)

WCR: *What do you remember about your father?*

HCU: He was a gregarious, loving, sensitive, wonderful guy who always challenged me to ask the right question, never giving the answer or telling me how to do something (Figure 4). He took me to the machine shop when I could barely walk, and I "lived" in his working environment. In the 1930s, both the Japanese and the Russians visited his factory to learn his production techniques. I was always there with my father whenever he was in town, but he was away a lot. I spent much more time with my mother than with my father. We'd all spend a month in the summer at our rented lake cottage in Indiana, which was right across the Ohio state border. I often went duck and goose hunting and fishing with my father. We had a very friendly home. There was no alcohol in the home; however, my father smoked heavily.

WCR: *There was no fussing in your home?*

HCU: Correct. I spent a lot of time in church. We'd go to church 3 times on Sunday, to prayer meeting on Wednesday, and to choir practice on Thursday night (because of my maternal grandparents). A lot of outside athletics and school activities were spent at the university and at church. It was a pleasant time. You couldn't do anything without everyone in town knowing about it.

WCR: *How big was Bowling Green?*

HCU: The population was about 7000. The university started with about 1000 students and gradually grew. When I left, it was about 9000, bigger than the town. (Now it is >20,000.)

WCR: *When did your father live?*

HCU: He was born in 1901 and died in 1943.

WCR: *He had his first heart attack at what age?*

HCU: Around 39. He went from Ohio Wesleyan, where he graduated with an AB degree, to Carnegie Tech to get his graduate engineering degree. When we'd go to Pittsburgh, we'd always go to Pittsburgh Stadium. The steel dust then was always an inch thick on the seats. (They've cleaned up Pittsburgh since then.) Going up the stadium ramp in 1939, I remember Dad having to stop maybe 4 times to get his breath. He went to the Henry Ford Clinic in Detroit, which was about 60 miles from us. They didn't tell him to stop smoking, to lose weight, or to stop using butter. Nobody considered them significant atherosclerotic risk factors at that time. The night my father died, the doctor came by our home and said to him, "You know you've had a heart attack. There's nothing I can do for it." (He was never taken to the hospital.)

WCR: *When did your mother live?*

HCU: She was also born in 1901 and she died in 2001, so she lived almost 100 years.

WCR: *What was your mother like?*

HCU: She was great (Figure 5). She was a very sweet school-teacher whom my father protected. They had a great relationship. After he died, my father's "friends" took advantage of her economically. Eventually, she became pretty "hard-nosed." She went to work and became the supervisor for the state program for old folks and ran it from Bowling Green. Grandmother and Grandfather Powell took care of me because my mother worked much of the time. We all lived in the same house. When World



Figure 4. With father, Harold Urschel, Sr., and siblings, Bill and Ann.



Figure 5. With mother, Loma Powell Urschel, and brother, Bill.

War II started, my aunt (my mother's younger sister by 12 years) moved in with us because her husband had gone into the service. When my grandmother died, my grandfather, mother, and aunt remained. It was a wonderful heterogeneous environment.

WCR: *It sounds like it was a very comfortable environment.*

HCU: Very comfortable, very supportive, and very loving. My grandfather and father always kissed me.

WCR: *Do you remember any dinner table conversations when your father was alive? Was dinner a big deal?*

HCU: Dinner was always a big deal because that's when we'd all get together. We'd wind up washing and drying the dishes together and then spending the rest of the evening together until bedtime. People worked on different projects in the same room. It was a great environment. Those were the days of Franklin Delano Roosevelt, but we were strong Republicans. The name Roosevelt on the radio was always a "bad omen"; my family thought of him as if he had caused the Depression, not cured it.

My grandfather was a great minister and orator. He never used notes. That was his great strength. I still see very few people who can preach or speak as well as he did. He spent a lot of time on Saturdays preparing his sermons. He gave me elocution lessons (Figure 6). I think that the university helped our education. Our grade school and high school teachers, most of whom were single women and most of whom had their PhDs, gave their lives for our education. In the summer, they'd go to Europe together. I knew each one of them well; several of them lived to be 100. Bowling Green is still a very close personal force in my life, even though I no longer have relatives there. Now I simply make rounds at the cemetery.

WCR: *Not only did you have your mother's parents and your father's parents there, you had the siblings of both your mother and your father. How big was this extended family?*

HCU: It was fair sized. My father had a brother and a sister. His sister was the head of the math department at the University of Wisconsin for a while. When she married, they came back to Bowling Green, and her husband joined the Urschel Engineer-



Figure 6. At age 8, preparing to preach the children's day sermon, "And a little child shall lead them," with Grandfather Powell, a Methodist bishop.

ing Company. They had a child who was a librarian. My father's brother had 2 children, and we were fairly close. My mother's sister had 2 children. The Depression cut into the number of children families had.

WCR: *How big was the Urschel Engineering Company?*

HCU: It wasn't gigantic. However, it was one of the 2 "production" businesses in Bowling Green. The other was called Daybrook, which made the lifts on the back of pickup trucks. We were fairly close to Detroit. The manufacture of small parts was "farmed out" to small towns like Bowling Green.

WCR: *I gather there was adequate money in your family to be comfortable.*

HCU: Before the Depression, my grandfather made a million dollars a year, but they lost everything in the Depression and started all over again. (The mid 1930s was when my family moved to Arkansas for lead and zinc mining in an effort to find a new venture, but then the engineering company started up again.) My family had a tough time of it after the 1929 crash. In the minister family there was never much money, but it didn't make any difference. We didn't worry about money until my father died, but my mother made it all right. We didn't have to worry about paying rent. We always had college students, as many as 10, who rented rooms upstairs in my grandparents' house. When it came time for me to go to college, I received a scholarship.

WCR: *Did the renters eat dinner with you at night?*

HCU: No. They'd go out to dinner, but they roomed there. They were a pretty powerful influence on me. A few of them would always end up on the university faculty. A couple of the students who stayed at our house are still in Bowling Green. These students were very close to us.

WCR: *Education was stressed in your household, I presume.*

HCU: Right.

WCR: *In Arkansas, your mother did all the teaching? There were no schools nearby?*

HCU: Correct. This was about age 3 or 4 until about age 6½. I went back to finish first grade. My mother didn't like it in Arkansas without schools. She sent me back to Bowling Green and then subsequently we all came back. I lived with my grandparents for about a year or so before my parents returned to Ohio.

WCR: *In Bowling Green, you did extremely well in school academically and also had a lot of extracurricular activities?*

HCU: I was stimulated by the terrific female teachers, who always had 2 student teachers each from the university, and they provided us with a variety of viewpoints. It was exciting. It was never overcrowded. The student-teacher ratio was great, and this was true all the way through school. Most people liked school and did pretty well. I got one B in high school; all other grades were A's.

WCR: *Did grades come easy for you, or did you have to work fairly hard?*

HCU: I had to work, but it was also fairly easy. The lifestyle was good. I had always worked and had always been involved with my father in intellectual things outside of school. I always was expected to look for the critical questions, not just for the answers. That approach was put into me by both my parents. School really was a pleasure for me.

WCR: *It sounds like you were a pretty good athlete, not only in high school but also in college. What were your athletics like in high school?*

HCU: In high school during World War II, we had the terrific influence of professional football and Paul Brown. Athletes did not smoke or drink alcohol; the focus was on good, clean, athletic living. We always had great track and football teams. I made the all-state team in football. It wasn't that I was so great, but we had a great group of kids developed through good coaching and good models. To have a pro football team working in your environment was like going into cardiology and having Paul Dudley White hanging around with you all the time. Excellence in football was passed from the pro team to the college team to the high school team. It was part of the environment there. All the people were committed. Paul Brown was a great innovator and a great motivator; he was the first to send in plays from the sideline. It was an exciting time in football.

At the university, we also had a good basketball team. We had the second very tall player, Don Otten, who was 6'11". (George Mikan was the first.) They were always at the top of the National Invitation Tournament or the National Collegiate Athletic Association (NCAA) in those days. Track was a part of the football program, and we always had a competitive state-championship track team. Ohio was very good in football and track. We supplied virtually all the players for Michigan as well as Ohio State, just like Texas supplies Oklahoma.

WCR: *Paul Brown was not your high school coach.*

HCU: No, but one of his students was. Paul Brown started at Massilon High School, near Youngstown, Ohio, and the steel mills. He'd move players' families in and give them jobs in the steel mills so their children could play for Massilon. On Friday nights, 50,000 people out of a town of 60,000 would come to the football game. Everybody lived for football. Then Paul Brown moved to Ohio State, where he was undefeated. They had

Heisman Trophy winners galore. He trained the coaches where we were and around the state. He took over the Cleveland Rams and renamed them the Cleveland Browns. They stayed in Cleveland and trained in Bowling Green. My grandfather proudly officiated at the weddings of half of them, great players like Otto Graham, Marion Motley, Bob Waterfield. It was like being in Hollywood; football made growing up in a little town a bigger event.

WCR: *How far is Cleveland from Bowling Green?*

HCU: About 90 miles.

WCR: *What position did you play in high school football?*

HCU: I played guard, tackle, and blocking back. We played the single-wing formation, as we did in college. I played the same positions in college.

WCR: *And your team in high school was a championship team?*

HCU: We were champions of the Buckeye League. We didn't have a state tournament, but we were always ranked high.

WCR: *High school football players were local heroes in Bowling Green?*

HCU: They were. The person who had a great voice was a local hero as well, so it wasn't just football. Bowling Green was a supportive town. If the Glee Club gave a concert, everybody would be there. Everyone came to the football games. It's what you'd like to have for your own children.

WCR: *You were a member of the track team also?*

HCU: Yes. I threw the shot put and discus and ran in various relays. I wasn't the fastest guy, but I wasn't the slowest, so I would substitute in relays.

WCR: *How big were you in high school?*

HCU: I was 185 lb and about 5'11".

WCR: *How did it come about that you went to Princeton?*

HCU: I was recruited fairly well, and my mother had made the decision that I wasn't going into engineering. I graduated from high school in 1947, so it was right after the war. I was recruited strongly by Army, Navy, and Alabama. I could have gone to Ohio State or Michigan, but my mother felt that studying in another part of the country was an important part of education. Jim Donnell, who owned the Marathon Oil Company, based in Findlay (20 miles south of Bowling Green), and A. Gillmore Flues (a lawyer from Toledo) had gone to Princeton, and they told my mother that Princeton had the highest teacher-to-student ratio and endowment per student. Charley Caldwell had played at Princeton in the 1920s and also pitched for the New York Yankees before becoming a coach at Williams College. He then moved back to Princeton to be the head football coach. There he mobilized his classmates across the USA, including Donnell and Flues, to recruit "smart" players for Princeton. Donnell brought me to Princeton with my mother. There we met an individual who was in Caldwell's class at Princeton and was a very successful lawyer in Boston named S. Lang Mukrauer. He was the trustee for a foundation to educate medical students. My mother and I took a train to Boston and toured MGH. I was introduced to Hugh McMillan, the chief resident in surgery, who was an all-American end at Princeton. I was told that if I went to Princeton and did well academically, the foundation would pay my way through Princeton and through medical school. (Today, the NCAA wouldn't allow it.) My mother thought that was terrific, so it was decided. It worked out great all the way around.

WCR: *Had you thought about being a physician before that time?*

HCU: Not particularly. I knew engineering like the back of my hand. I was always good in math and chemistry, but I hadn't really thought about what I wanted to do. My grandfather wanted me to be a minister. (However, I cursed a little too much in the locker room, but that would have been okay for the Methodists.)

WCR: *Did you have any contact with physicians in Bowling Green before you went off to Princeton?*

HCU: I did. They were good people. When I got to Princeton, I got to know the doctors in Bowling Green and worked with them at the hospital in the summers. However, I really went into medicine because of the scholarship opportunity, quite frankly. I always asked myself, "Do I really want to do this?" and I did. I had distant uncles who were doctors, but I wasn't close to them.

WCR: *I presume that growing up during the Depression, there wasn't a lot of money to go on vacations in the summertime.*

HCU: Right. My dad would take us to Clear Lake, Indiana, for a month during the summer. My high school football team wound up training there in the summer as well. It was a hundred miles from Bowling Green, and you could stay there for a small amount of money. It was a great vacation. We didn't travel around the country though.

WCR: *When you went off to Boston and then to Princeton, and I presume you saw New York City during that period, that must have been quite eye-opening for you.*

HCU: When I went to Princeton, I was a real "hayseed." I wore my high school letter sweater, and I "didn't know where the bathroom was." The boy who was co-captain with me in high school football went to Columbia and played for Lou Little. I'd go to New York City to visit him and stay at the Sigma Chi fraternity house at Columbia. We'd go up to Harlem to Small's Paradise and hear great music. New York was just incredible. However, I was very homesick at Princeton. The weather was bad and the work was hard. All I wanted to do was leave. I liked the academic part and loved the football, but there were no women. The football players were just like I was. They were from all over the country, they were poor, and they were great. They became the closest friends I have. A lot of them came from Ohio. We were undefeated our freshman year and then again my senior year (*Figure 7*). It was a great time for football. That's what really saved me.

The academic work was easy. I worked, don't get me wrong, but it was very pleasant. I made good friends with the professors; it was a small school with no graduate schools. I finally got used to it after about 3 years. After that, I went to Harvard Medical School, and that was not a problem. A lot of students who went to Harvard Medical School from Missouri and Oklahoma had the same problem I had at Princeton. They were just miserable. I'd had a broad liberal arts education at Princeton, so when I got to medical school, I didn't have much of an adjustment.

WCR: *You must have been incredibly impressed with the beauty of Princeton. It's just a gorgeous place.*

HCU: I loved it there and I still do. We sent all of our children to Princeton because we think it's the best education and the most beautiful place in America. It has the largest endowment per student by a factor of 100%; in other words, it has twice as much per student as Harvard does, which has a much larger endowment. Princeton has only undergraduates—no medical



Figure 7. At the 50th anniversary of the undefeated Princeton football team. Hal Urschel is on the left, and the president of Princeton, Shirley Tilghman, is in the middle. Teammate Dick Kazmaier, the last Heisman Trophy winner from the Ivy League, is the fourth from the right.

school. If you live in Texas particularly, it provides you a different part of the country and a different way of looking at things. I told my children they could go to any college they wanted, but I would pay for it only if they went to Princeton.

WCR: How many students were in your graduating high school class at Bowling Green?

HCU: A hundred and twenty-five.

WCR: And you were the top student in your graduating class?

HCU: Yes.

WCR: How many were in your graduating class in Princeton?

HCU: Seven hundred and eleven.

WCR: Do you have any idea where you stood in your class there?

HCU: I don't know. Only 3 men were accepted at Harvard Medical School from Princeton, and I was one of them, so I must have done all right.

WCR: What did you major in at Princeton?

HCU: I majored in biology, chemistry, and the arts, including music.

WCR: Did you play a musical instrument in high school?

HCU: I played clarinet and piano and sang.

WCR: Do you have a good voice?

HCU: I won the bass solo contest in Ohio. I was not that good, but I was coached well.

WCR: Who coached you?

HCU: The head of the music department at the university had a son who was born the same day I was and was my best friend. He eventually received a PhD in music at Indiana and headed the music department at Arizona State. He is still a very good friend of mine. His mother was a concert pianist who was my mother's best friend. I was coached by both my good friend and his father.

WCR: Did your mother play the piano?

HCU: Yes, very well. Not as well as her friend, but she was very good.

WCR: What was your relationship with your siblings as you were growing up? You said your brother was 4 years younger and your sister 8 years younger than you.

HCU: My brother and I were very close, but I was more like a father to him than a brother (4 years apart in age but 5 years apart in school). We were far enough apart that we didn't go double dating and do things like that together. We worked together a lot. I'd coach him and advise him. He played football and ran track. He wanted to go to Oberlin instead of Princeton; it was a great music school. He was tired of my reputation and wanted to have his own. He played varsity football as a freshman and then transferred to Princeton. He could have gone to Princeton with the same scholarship I had, but he didn't do it. He ended up at Columbia Medical School and then went into urology.

WCR: Where is he now?

HCU: He lived in Santa Barbara for 35 years. However, he died about 2 years ago, the same time as Maruf Razzuk, my partner, and they had a similar tumor. (Baylor has had only 6 of them in its history.) It was a very unusual liposarcoma that had neural elements in it. They died at nearly the same time.

WCR: So your brother was born in 1934 and died in 2000. What about your sister?

HCU: My sister was born in 1937, is 67 now, and is in Indiana in a home where my mother lived. She works helping to give aid for the aged. Although she has Down's syndrome, she is very happy and has a good environment, living in a suburb of Cincinnati on the Indiana side.

My mother remarried after being widowed for 20 years. She married the widowed husband of her college roommate. They were together for 20 years, and then he died. My stepfather was one of the great guys of all time. He went to DePaul, earned a PhD there, and was Phi Beta Kappa. He was an extraordinary athlete, the only person who was in both the football and basketball halls of fame in Indiana. He was an outstanding speaker and a great humanitarian. It's a fortunate thing; my mother really had 2 fabulous husbands, which are hard to find.

WCR: Your mother married at what age?

HCU: She married my father at age 23 and lived with him roughly 20 years. She remarried at 63, and Dutch died at 84.

WCR: How did they meet?

HCU: He was the husband of her college roommate. He stopped by one day to see her when she was a dorm mother and dean at Bowling Green State University. He was the athletic director and taught philosophy at Hanover College, a small school in southern Indiana. My mother moved to Hanover, and they had a great life. Dutch gave speeches all over the country to all kinds of groups. They were outstanding Christians and had a very productive life together.

WCR: What was Dutch's last name?

HCU: Struck. His first name was Frederick, and he was German (Deutsch), so they called him "Dutch." He's the "alumnus of all time" from DePaul University—one of those people who "walked on water" wherever he was. It was like having another great father. I was at an age where I could have a much better philosophical relationship with Dutch than I could with my own father when I was a young child.

WCR: You were established in practice here when you met him. Tell me a little bit more about your Princeton football team. You mentioned that your freshman and senior teams never lost a game. You

played there from 1947 to 1951. That was a period when the Ivy League football teams were fantastic.

HCU: They were good. The Heisman Trophy award was initiated in 1936, and the second and third winners were at Yale in 1936 and 1937. The next Ivy League player to win it was our teammate, Dick Kazmaier. There's never been a Heisman Trophy winner from the Ivy League since Kazmaier. I "brought" him to Princeton. He was a "little" guy at 170 lb, but he just happened to fit into our system. He was a tailback; he could pass, run, punt. He was fast—not a track star but with the coordination and the timing.

Our coaches were our best friends and mentors. We played the single wing, and all our opponents used the "T" formation. They never knew what happened to them. We beat Harvard 66 to 20 and Yale 47 to 12. During the war, Army and Navy had great teams. The Ivy League did well in my time, but that was the end of the great football teams in the East. Bud Wilkerson had his great teams at Oklahoma the same time—they won 47 consecutive games.

All my children played athletics at Princeton, and all were better athletes than I. None of them ever had a great coach in the same sense that I did. My coaches were our "professors." J. M. T. Finney at Hopkins was asked to be the president of Princeton and turned it down. He went from Princeton to Harvard Medical School to MGH and then back to Hopkins. His grandson, Reddy Finney, an all-American center on my team, was in our wedding. The Finneys were always in the locker room telling me what was great about medicine and why I should go to Johns Hopkins. Fordyce St. John, chief of surgery at Columbia Medical School, Joe V. Meigs of the Meigs syndrome, a gynecologist from Harvard, and Howdy Gray of the Mayo Clinic would also come to our locker room at Princeton and encourage us about medicine. They all had previously played football at Princeton (Gray had been all-American).

Our Princeton football team drew more fans than the New York Giants in those days. We were right between Philadelphia and New York. We never dressed for less than 70,000 fans. I still wake up at night thinking about that. It was more fun to watch a college than a pro game in those days. College football was really more exciting. We were especially fun to watch at Princeton because we used a different formation than all our opponents or most other US teams. Reddy Finney, in my class, the grandson of J. M. T. Finney, was the only all-American in both football and lacrosse ever (except for Jimmy Brown at Syracuse). We had 4 consensus all-Americans and a Heisman Trophy winner on our team.

These players went to Harvard after Princeton. Kazmaier went to Harvard Business School and was associate dean for 8 years. McGillicuddy went to Harvard Law School and became chief executive officer of J. P. Morgan–Chase Bank in New York. Many of us were together in Boston at Harvard. My football teammates were smart and worked hard. We all had a good work ethic because of going through the Depression and World War II with the rationing. We never wasted anything. All of us went



Figure 8. With victorious Princeton teammates.

into military service. Playing football at Princeton was very important in my life, and our football coaches were our role models (Figure 8). We were very lucky.

WCR: Some of your best friends today were your teammates at Princeton. I understand that you had a neck injury or pain right after your freshman year of college.

HCU: It started in high school when my neck was hit on one side; my arm would become "paralyzed" for a short time. The chiropractors would give me an "adjustment." I received 1 or 2 "adjustments" after every game my senior year in high school, but I never thought much about it. In college as a freshman, my neck was hit and my right arm was paralyzed for about 3 days. Our team doctor sent me to see George Bennett (an orthopaedic surgeon who had operated on DiMaggio's knee) at Johns Hopkins. I went to Baltimore on the train, and he said I had a cervical rib. I could either have surgery or they'd build a steel brace on my shoulder pad. I chose the brace. It worked well. They covered it with leather, and it was perfect. In those days, however, we didn't have facemasks, so people would "lose a nose" from the brace. The NCAA outlawed the brace after the first year and they built me a "donut," which many football players wear now. I had the first one and it worked. I finished playing football, and I still have my cervical rib with thoracic outlet syndrome (TOS).

WCR: It certainly tuned you in to the cervical rib problem.

HCU: In medical school, I learned about the vascular injuries and poststenotic aneurysms of the artery distal to the cervical rib and TOS, as well as the Paget-Schroetter syndrome (PSS) (effort thrombosis of the axillary subclavian vein). Many weight lifters, baseball pitchers, and other athletes develop TOS. For PSS we use thrombolytic agents immediately to dissolve the clot and then operate to remove the external constriction.

When I came to Dallas from MGH, there were 3 thoracic operations that I had never seen. The first was bronchoplasty of the lung, in which you cut out the cancer, take out a lobe, and then reattach the distal lobe, preserving the lung tissue. Shaw and Paulson did the first bronchoplasties here at BUMC. The

second was resection of superior sulcus cancer that grew into the brachial plexus from the lung. Shaw did this operation successfully after preoperative irradiation, and we have performed >500 of them. The third was resection of mucoid impaction of the bronchus. We have among the largest series in the world of each of these operations here at Baylor.

WCR: *How many TOS operations have you done?*

HCU: Over 5000. Krusen and Caldwell at BUMC designed the first diagnostic test for it here in the 1960s. They performed >8000 nerve conduction tests per year.

WCR: *Let me go back a little bit. Were there teachers in high school or people other than your parents and grandparents who had a major impact on you?*

HCU: My grade school teachers, the principal of my junior high school, and my senior high school teachers really cared about me. A handful of professors at Princeton and the football coaching staff were very close and contributed much to my education.

WCR: *You were always, I assume, an extrovert. You talk openly. You wanted to get to know your teachers, you were a nice kid, you didn't cause any trouble.*

HCU: I was a nice kid, primarily groomed in a strong female environment. All of my children are the same way. When the boys go out for football, the coach says, "Now, you're your mother's boy. You've got to get over this. You've got to enjoy 'hitting.'"

But I wasn't a great extrovert. I was friendly and kind, brave, clean, and reverent. I didn't always have great confidence. I became more of an extrovert at Princeton. It happened when I got over being homesick, made the adjustment of being on my own completely, and developed the confidence that ensues. I had the confidence and the personality to become successful in high school—I was president of my senior class, captain of most sports teams, and good in music—but real confidence occurred when I became self-sufficient in college. When I went to medical school, there was nothing to it.

WCR: *At Princeton, who were some of the outstanding people?*

HCU: We had a professor of biology named Bonner, who is still alive. He's an Englishman and always had his students over for tea. My junior paper was on the genetics of the blood. My senior thesis was on the life cycle of the *Chondromyces crocatus*, the slime mold, the "connecting" organism between animal and plant. I documented the life cycle. For 3 months, I'd sleep every night in the biology lab and take pictures through a microscope, 1 frame every hour for 3 months. Thus, we made a movie of the reproductive cycle. Bonner was my mentor, and he has shown the movie every year since that time. My 5 children at Princeton have seen it. He became world-class famous because of this life cycle.

The advisors for medicine were Alan Whipple of the Whipple operation, Finney, and the other surgeons who came for the football games. They're the ones who wound up advising me most. The advisors for medicine at Princeton were mediocre because they often were the individuals who couldn't get into medical school themselves and subconsciously may have resented doctors. I finally said to Dr. Whipple, "After you quit practicing surgery, come down to Princeton and provide advice and insight for the premeds." He did, and it made a big difference. At one point, I said that I didn't like living in the East and that I wanted

to go to the University of Michigan to medical school. My football coach, Caldwell, took me aside and said, "Urschel, if you can get into Harvard, go to Harvard." Finney told me the same thing. The coaches were the ones who encouraged me to go to Harvard Medical School.

WCR: *Tell me a little more about day-to-day football at Princeton. You would practice every afternoon during the season, I presume?*

HCU: We started at a camp in the mountains about 4 weeks before the season began. It was at Blairstown in northwest New Jersey. There's an academy there. It's about 2 hours from Princeton, a good prep school up in the hills. We'd have football practice twice a day and academic sessions with movies at night. Our team was the first to employ the computer. We computerized before any pro teams did. We used it for play assessment. In other words, how many 40 yard right tackle O's were successful, what was the average? We thought the coaches were crazy. We got a rigorous physical and mental workout.

WCR: *The movies were football movies. You saw the science of football in operation.*

HCU: Right. It was a different kind of science than almost anybody else used. Caldwell was a true genius at this, but it took a lot of time. When classes started, we practiced every afternoon, 5 days a week, unless we were having trouble with our studies, and then the coach wouldn't let us practice.

WCR: *When was practice?*

HCU: It was from about 3:00 to 6:00 PM. We ate together at the training table every night during football. That lasted through the second week of November. We were together for meals and physical contact every day. For 6 weeks in the spring, we'd have football practice every afternoon after class. Then we'd scrimmage on Saturdays. It took many practices to learn the new "buck-lateral" single-wing formation. "The T formation is for guys whose IQ is lower than 100," we were told. Anybody can run a T formation. In the single wing, the quarterback isn't behind the center. He's moved over to the right. The wingback is outside the end and there are 2 backs deep. The ball is centered, either to the tailback or to the fullback, who runs forward; the quarterback spins around and faces his back to the line. He can take the ball from the back or pretend to take it; he can pitch it out to somebody going around the end, throw it out the other way, pass it, or keep the ball himself. The secret is that nobody knows where the ball is. However, this formation requires a great deal of practice.

Chuck Bednarik, who played for the University of Pennsylvania against us for 2 years, was the most outstanding football player I've ever seen. He said that the single wing was the best formation that he'd observed anywhere. He was a great all-pro linebacker and center for the Philadelphia Eagles for years. Other Pennsylvania players told us that they loved to play Princeton because it was a whole different ball game than when they played against the T formation.

WCR: *What was your playing weight in college?*

HCU: About 220 lb at 5'11".

WCR: *Were you on the track team as well at Princeton?*

HCU: I was. I threw the hammer and the shot put. I wasn't fast enough to run any relays in college. The football team played 6 weeks of spring football, and then we were expected to go out for track to stay in shape.

WCR: You had about 3 hours of football for about 4 months of each college year.

HCU: Yes.

WCR: Did you sleep much during that time?

HCU: I was always tired. I did a few things at night, but I would go to bed early and get up about 3:00 or 4:00 AM. I did my studying in one of the church basements on campus early in the morning.

WCR: Did you have an athletic dorm at Princeton?

HCU: No. We didn't have fraternities or sororities either. Everybody was equal. Woodrow Wilson, when president of Princeton, did away with fraternities, sororities, and cars. Incidentally, Woodrow Wilson said about football: "It's different than any other sport." He said that all sports require precision, decision, timing, excellence, competition—including football. But in addition, unlike other sports, football requires that you totally subvert yourself for the team. If you try to excel individually without working with the team, you're not going to win.

WCR: What did you do during the summertime in college? You spent 1 month in football training. What did you do during the other 2 months?

HCU: At first, I worked the night shift at Libby-Owens Ford in Toledo, the glass capital of the world. They made all the windshields for the cars in Detroit. The safety glass has the plastic between 2 sheets of glass, which is why it doesn't shatter. During the day I painted houses for about 2 years. The last 2 summers I worked with surgeons at Bowling Green. I'd deliver babies as kind of an extern. I continued that for a year or two when in medical school.

WCR: You decided as you entered college that you were going to take the Harvard people up on their offer, and your goal was to get into medical school.

HCU: When I went to Princeton, I accepted the scholarship to go to medical school if I could get in. That was the idea. If I had changed my mind, though, they would have understood.

WCR: How did Boston and Harvard Medical School hit you? You said earlier that you adjusted there very well. That was simple compared with going from high school to Princeton. What were some surprises for you in medical school?

HCU: In medical school, I had absolutely no academic adjustment. It was an exciting time. At Harvard Medical School, all the medical students lived together at Vanderbilt Hall. This was a great experience. I became very close to the students in the different classes. Vanderbilt Hall was set up so that you lived, ate, studied, did everything together with all 4 classes. This was 1951, and it was a golden time. We had students from Arizona, China, Nigeria, from all places and of all ages. It was an intellectual and physical delight. It was the best. Whereas I was miserable at Princeton for 2 years, I couldn't believe how great it was at Harvard. We lived, ate, and breathed medicine. To this day, my great friends outside of Princeton football are Roman DeSanctis, Jerry Austen, and Quent Stiles—the students I lived with. These guys were not only bright but also the nicest people in the world. Wherever you go, Harvard Medical School has great people there. There's always a Harvard physician that you know who is in a position to help anyplace in the world. That system has been exercised for Ross Perot's employees at Elec-



Figure 9. With friend Joe Murray, a teacher at Harvard Medical School and a Nobel Prize winner for transplantation surgery.

tronic Data Systems (EDS) and Perot Systems, wherever they were in need of medical assistance worldwide.

WCR: When you started going to classes in medical school, what surprised you? You didn't really know much about what medicine was all about when you got to Harvard.

HCU: That's right. On the first day of the first class, the teacher brought in an elderly lady in a wheelchair and said, "Now class, I'd like you to meet Mrs. Jones. This lady is sick—S-I-C-K." The teacher was Francis Daniel Moore. The teachers were creative. Cliff Barger in pathophysiology was wonderful. They emphasized total dedication to individual patient care founded on a solid base of research.

Harvard emphasized bench-to-bedside research that constantly improved clinical care. Each new specialty was exciting. For me, outside of my residency, which was the greatest time for me in medicine, medical school was just fabulous.

WCR: How many were in your medical school class?

HCU: There were 200 in the class.

WCR: How long did it take before you decided that surgery was for you? Was picking a specialty easy for you or not?

HCU: I loved it all. I loved neurology, obstetrics, and infectious disease. We had world-class professors. Every area was stimulating. I had absolutely no idea that I wanted to be a surgeon until the end of my second year. Surgery appealed to me because it fit my lifestyle. I'd get up early and work and would be tired by the end of the day. It was the same kind of physical experience as in football. It fit my nature. More importantly, it combined all the fun of medical diagnosis with the added dimension of physical therapeutic intervention.

WCR: It seems to me that more athletes go into surgery than go into internal medicine.

HCU: That may be true in general. One resident (Giles Toll) in surgery with me after 5 years of training went in to our chief, Dr. Churchill, and said, "I love everything about surgery except the operating room." He ended up going into pathology. He's still a fabulous guy. He loved surgery, but he didn't recognize that it wasn't for him.

WCR: Who in medical school had a major impact on you?

HCU: Joe Murray—who later won the Nobel Prize for his kidney transplants between identical twins, a related donor, and

finally a cadaver during my third and fourth years of medical school—became a great friend and mentor (Figure 9). I drove for Dwight Harken, heart surgeon, for a month my fourth year. We'd operate on a patient at the Brigham, and I'd drive about 70 miles to the Veterans Affairs hospital at Rutland while he sat in the back dictating to his secretary. We'd operate on another heart and then have the state highway patrol escort us back to the Brigham to reoperate on the first heart patient who was bleeding, and then we'd go back and redo the case at Rutland for the same reason. Drs. Denny Brown and Ray Adams in neurology; Chester Jones in gastroenterology; J. Howard Means and John Stanbury in the thyroid; Fuller Albright in endocrinology; Max Finland in infectious disease; J. Englebert Dunphy, Oliver Cope, Claude Welch, and Richard Sweet in surgery; and many other great physicians had an impact.

Paul Dudley White was outstanding with the medical students. He'd take us up the stairs 2 at a time. We would sit down for lunch, and he'd have half a glass of tomato juice and 1 Rye Krisp cracker. He'd take a half an hour to eat that, talking the whole time. He was involved with everything. However, Edward Delos Churchill was probably the most powerful person in medical school for me because of his vision and dedication to "framing the proper question"—both for patient care and research.

WCR: *What did you do in the summertimes during medical school?*

HCU: The first 2 years I worked in Ohio with the surgeons. I delivered the first set of triplets in Bowling Green as a medical student! That's where I really got the feel for the practice of medicine. I loved it all.

WCR: *Your entire way was paid during medical school. What about your room and board?*

HCU: Everything was paid by my scholarship. I also made some money in the summertime.

WCR: *Did many of your colleagues have their way paid in medical school?*

HCU: Probably 50% had some kind of scholarship or loan, but none to the extent of mine. I took out a loan for travel and worked to augment the grant.

WCR: *How did you end up in your medical school class? Do you have any idea?*

HCU: This is how they put it: You ask the dean, "Where do I stand in my class?" And he replies, "All Harvard men are in the upper third." You never received grades at Harvard. You knew when you were Alpha Omega Alpha and you knew if you had failed, but nobody ever knew what their grades were.

WCR: *I thought Harvard didn't have Alpha Omega Alpha. When you applied for internship, did you apply to several places, or were you pretty assured that you would go to MGH?*

HCU: Nobody was assured of MGH. It had only 8 places, and 6 of them were filled from Harvard and 2 from the outside. Both the Brigham and MGH had 2-day interviews. You met initially with a group of 15 and then a second group of 15 and subsequently a group of 30. The Brigham wasn't really that good at that time in surgical training. John Mannick, who was in my group at MGH, became surgical chief at the Brigham and made it a much better surgical training experience. I looked at Johns Hopkins, Barnes (Washington University), Physicians and Surgeons (Columbia), and MGH. I didn't interview at the Brigham



Figure 10. Wife Betsey Urschel.

or anyplace else in Boston. Every place was good. I wouldn't have been unhappy to be at any of them.

WCR: *Let me get to the social aspects a little bit. Did you date much in high school?*

HCU: Yes.

WCR: *Where did you meet Betsey?*

HCU: At Harvard. I dated more at Harvard than I ever did at Princeton. She came into the dorm one Sunday with my friend Quentin Stiles. Students brought their girlfriends there for Sunday lunch. Subsequently, I took a group skiing; one of my friends at Princeton, a roommate and all-American tackle, had a place at Wolfboro, New Hampshire, on Lake Winnepesaki. Betsey and her boyfriend came, and I took my girlfriend. Roman DeSanctis brought his girlfriend, and another couple came along. Because of icy conditions, I put a ski pole into my femur, and the ambulance wouldn't leave until the weather cleared. Betsey stayed back and helped me while I recovered, and I got to know her a bit. That was all it took.

My mother always said that you don't just "fall in love" with somebody. If you're going to spend 20 years learning to be a physician, you'd better spend a little time looking for your future wife because she's going to have the genetic input to your output. You've got to have the mind, body, and spiritual connection because when you hit the "bumps in the road" each week, the outcome will not be good if the basic essentials are not in place. You have to prepare as much for marriage as you do for your profession. In fact, it's probably more important to you.

WCR: *Your mother was a wise counselor for you in that regard. What were the features or characteristics of Betsey that attracted you?*

HCU: Her mother and father were both physicians, so she really understood medicine. She was debating whether to go into medicine herself. She was in college at Wellesley, outside of Boston; I was in medical school. First, she's beautiful; second, she's nice; third, she's got a great mind, body, and spiritual countenance. She's a great athlete herself. But mainly, she cares (Figure 10).

Betsey understood the stress of medicine. Her dad went to the South Pacific in World War II for 5 years—hit every beach-

head with the marines. Then the Japanese would retake the beachhead. She never knew whether her dad was alive or not. Her mother was a doctor and a good person also. Betsey is an outstanding person.

WCR: *Where was Betsey from?*

HCU: When I courted her, her dad was the commanding officer of Oak Knoll Naval Hospital, the largest hospital on the West Coast in San Francisco. He graduated from the University of Virginia School of Medicine in Charlottesville and entered the navy as an internist. He subsequently became commanding officer at the National Naval Medical Center in Bethesda as well as at Oak Knoll.

WCR: *What was his name?*

HCU: Bruce Bradley. He was the deputy surgeon general of the navy. Subsequently he became the medical director of Bankers Trust for about 25 years. He was one of the great gentlemen of all time.

WCR: *What kind of physician was Betsey's mother?*

HCU: She was an internist. That's why she was so gentle.

WCR: *How many siblings does Betsey have?*

HCU: One, a brother who's 4 years younger. He is an orthopaedic surgeon in Seattle.

WCR: *Betsey was not only a good athlete but a good student too.*

HCU: She was an excellent student. She moved 18 times in 12 years before college and always had to catch up. She was on the Amateur Athletic Union swimming team at Walter Reed when they won the national championship and made the cover of *Life* magazine. (Betsey wasn't on the cover, but the team was.) She swam the 100- and 200-meter backstroke. She's still a great swimmer and a great runner—a good athlete in every regard.

WCR: *When did you get married?*

HCU: In 1954, between my third and fourth years at Harvard Medical School, the weekend before Betsey graduated from Wellesley (Figure 11). I had moved from Vanderbilt Hall to 22 Embankment Road on the Charles River (right next to MGH) in my third year, and we got married at the end of that year. I worked at the basal metabolism laboratory at MGH for J. Howard Means and John Stanbury, performing those tests from about 5:00 until 6:30 every morning. Josh Jurkevitch, the chief of plastic surgery at Emory and president of the American College of Surgeons, lived with us, along with Art Baue and Dave Hickok.

WCR: *After Betsey graduated from Wellesley and you got married, she went to Harvard to get a postgraduate degree?*

HCU: No—not then, but later. She taught second grade at the Weston School near Wellesley. She taught Dr. Charles Janeway's children in the class. I was selected for my internship at MGH, and she continued to teach until 1957. We then went to Bethesda, Maryland, for research in the navy, and she taught for a year there. Then we had our first child after she had taught second grade for 4 years.



Figure 11. Marriage at Wellesley College.

While she was at Weston her first year, her principal encouraged her to go to Harvard to get her master's degree in education. She went in the evenings. She did it over a period of 8 years. Her principal then became the principal of Pittsburgh and then of the New York City public schools. The dean of the education school at Harvard, Francis Keppel, became the secretary of education under John F. Kennedy. He revolutionized education by initiating team-teaching and nongrading—the way schools are doing it today. Betsey was at the forefront of the intellectual education revolutionary movement. It was an amazing time and very exciting for her.

WCR: *What was your residency in surgery like? You interned and then you did a first-year residency and then you went into the navy. What were those first 2 years like?*

HCU: It was the greatest, most challenging, and most exciting experience of my life (Figure 12). Residents coming back from the Korean War, including Hermes Grillo and E. Stanley Crawford, were my senior residents. They were used to the mobile army surgical hospital units—16 cases a day, 7 days a week in Korea. Here I was, just out of medical school, dying to operate. At MGH, you operated right away; interns excised gallbladders, repaired hernias, etc., and the senior residents assisted them. Hermes Grillo would say, "Okay, Urschel, you've got a pretty good-looking technique, but you're too damn slow. Have you ever thought about pathology?" He became a world-class tracheal surgeon and is still a dear friend.

The surgical interns did a tremendous amount of surgery. We stayed up day and night. We ran the emergency room jointly with the medical service, alternating every 12 hours. John Knowles, my medical "Gowleiter," became chief of pulmonary medicine



Figure 12. The last internship group at Massachusetts General Hospital to complete the program with Dr. Edward Churchill (back row right). Hal Urschel is second from the right on the front row; Jerry Austen, chief of surgery at the Massachusetts General Hospital, is to his left.

and the head of MGH. He and C. Richard Gorlin designed the formula for calculating the aortic valve area when they were in the navy. John Knowles was one of the great people. He roomed with Jack Lemmon, the actor, at Harvard College. Both of them were great piano players. John guided me through my surgical internship even though he was a medical resident.

The medical service at MGH was equal to the surgical service. It wasn't like Southwestern, where medicine has always dominated. Churchill and Walter Bauer were always very equal. J. Howard Means, Stanbury, Paul Dudley White, Bland—all those greats were intimately involved with surgeons. (There's a Bland-Sweet operation.) Paul Dudley White always was pushing people to do cardiac surgery. DeSanctis, the great cardiologist, rotated on my service when I was chief resident. He'd be on my service, not on the medical service. He'd see all the surgical patients with us; it was a wonderful relationship. Roy Vagelos, who ended up running Merck, and Sam Their and Ken Shine, both presidents of the Institute of Medicine, were there as were many other "greats." We were much closer to the medical residents than in many other hospitals. We would respect their opinion, and they would respect the surgeons—it made a much better environment than at many places. Although it was very hard physically, it was a great intellectual experience.

We spent a lot of time on neurosurgery. William Sweet was chief of neurosurgery, and Ray Adams was head of neurology. Adams could dictate a chapter in a textbook straight away without writing a note; he was a genius. Miller Fisher wrote extensively about stroke—he'd sit and watch a stroke patient for 48 hours. It was a fabulous service. We built an operating room at the Massachusetts Institute of Technology under the cyclotron so we could bombard brain tumors with neutrons for both diagnosis and treatment. We'd operate over there with William Sweet.

WCR: *How did it come about that you got to Bethesda at the National Naval Medical Center?*

HCU: Hume, Egdahl, and Zimmerman came out of Harvard and started the lab there. Charlie Huggins and various people from Harvard were invited there. It's like the surgery associates in the cardiac surgery branch at the National Heart, Lung, and Blood Institute of the National Institutes of Health (NIH) com-

ing from Johns Hopkins. The MGH surgical housestaff "rotated" as chief of experimental surgery in the navy. We also traveled the world. The first paper I ever wrote was on electronically controlled coronary arteriography. We designed a system to inject into the aortic root with dye, keyed off the R wave. At that time we didn't have cine coronary arteriography. The navy pilots were grounded if they had chest pain; there wasn't any way to tell if they actually had coronary artery disease. It was a great technique. Cordis (later Johnson & Johnson) was started based on my apparatus!

In those days, we never thought of patenting anything. We built the heart-lung machine that was used in the navy. We built it in our laboratory, and Charles Hufnagel performed the cardiac surgery while we performed the perfusion. (We were the first perfusionists.) We developed the hypothermic cardiac arrest, and that was in the beginning—it was a great experience.

My years in the navy marked the first time I ever made any money (I made only \$25 a month at MGH). In the navy, Betsey and I bought our first car, had our first child, and finally had time together. We went to Europe for the first time and realized a little of "normal living."

WCR: *You entered the service in 1957. Where did you live in the Bethesda area?*

HCU: We lived on Montrose Road, just north of Bethesda, in a little apartment building. Betsey taught in an elementary school about 5 blocks from the NIH.

WCR: *The research laboratory is on the campus of the National Naval Medical Center right across the road from the NIH?*

HCU: It was at the back of the Naval Medical Center. They also did submarine research work there and produced the first freeze-dried blood as well.

WCR: *Did you meet Glenn Morrow?*

HCU: I saw Morrow once a week. Jerry Austen had been there and gone; he went a year ahead of me. We had John Waldhausen, Lawrence Weldon, John Ross, and Ted Cooper as the 4 cardiac surgeons at the NIH. Both Ross and Cooper later went into cardiology.

WCR: *My first paper was with Cooper.*

HCU: Cooper was great. All of them were great. It was an interesting experience. We spent a lot of time with Morrow, and he helped us a lot. Hufnagel performed our clinical surgery. He was a fair surgeon, but most heart surgeons in those days weren't experts. A guy like John Kirklin was a different breed. I went to Rochester, Minnesota, and watched him perform 2 double-outlet right ventricle operations, one right after the other. He was an outstanding technical surgeon. Bob Wallace, who played football for Columbia against me, also was in Rochester. We've always been good friends. Morrow was a big influence on us. He guided us and told us what he thought was worth doing and what wasn't. We always had a great relationship with the NIH. Bob Brown was chief of surgery at Bethesda. Later, he became surgeon general. He was from the University of Pennsylvania and was an academic surgeon. We wrote scientific papers with him on nonsuture small blood vessel anastomoses. We put an internal mammary artery into the left circumflex artery in a beating dog heart at Bethesda with a nonsuture Vitalium Blakemore tube. You put the internal mammary artery through the little tube and rolled the intima back so that it was intima to intima. We didn't

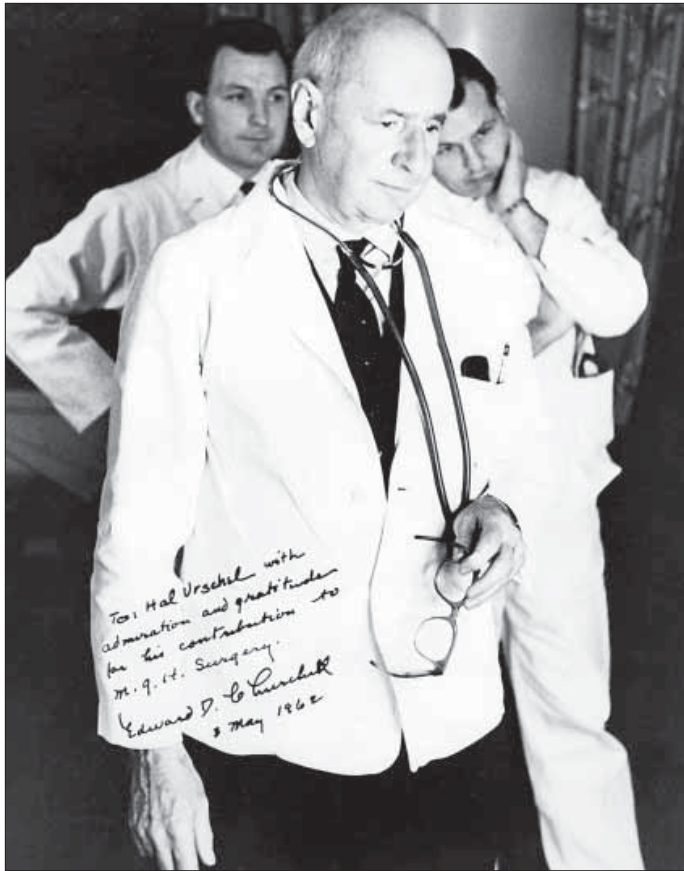


Figure 13. The cover of *Life* magazine featuring Dr. Edward Churchill, chief of surgery at the Massachusetts General Hospital. Hal Urschel, on the right, was chief resident in surgery.

need a heart-lung machine; it worked perfectly. That was 45 years ago. There have been great advances in certain areas but little progress in nonsuture anastomoses.

WCR: After the 2 years in Bethesda, you returned to Boston to finish your residency at MGH. I gather that Churchill had quite an influence on you.

HCU: I was his last chief resident. Churchill was chief of the European Theater during World War II. He was like my father: "What's the question here? What's important?" He was a philosophical thinker and cared about his residents. I spent a month with him as a fourth-year student, and that's when I got to know him. Every day we'd read and talk. You don't get that much time with people very often.

WCR: What were the characteristics of Churchill that made him such an outstanding man?

HCU: His vision, number one. He always could see far ahead. He was the youngest professor Harvard had ever appointed. Secondly, he had a wonderful way to make tough decisions. You think it out, do your homework, study it, go to bed, and let the 80% of your brain—the unconscious portion—work all night. In the morning, you wake up and do whatever your "gut tells you." This technique allows you to take advantage of your unconscious thought. That's the way to make tough decisions. It's never failed me. He was the philosophical mentor for me. I wasn't old enough to get it from my father. My stepfather had it in spades, and Churchill really shared it with me. I haven't seen his equal anywhere (Figure 13).



Figure 14. With Dr. Judah Folkman, father of angiogenesis. Dr. Folkman was Hal Urschel's junior resident who followed him to the navy laboratory in Bethesda.

Einstein was at Princeton in my time and he talked to us often but couldn't get through as well as Churchill. The professor who taught all my children on "human nature," Ashley Montague, was the same kind of a thinker as Churchill. He wrote *The Elephant Man*, *The Art of Swearing*, and *The Natural Superiority of Women*, a magnificent book.

WCR: You were surrounded during your training not only by the best in faculty but also by the best in training: Jerry Austen, Roman DeSanctis. . . .

HCU: Judah Folkman, George Zuidema. Judah Folkman also followed me to my lab at Bethesda. That's where he made many of his discoveries (Figure 14). George Zuidema later was chief of surgery at Johns Hopkins; John Mannick, chief at the Brigham; and Dave Skinner, chief of surgery at the University of Chicago and then the negotiator of the merger of the Cornell and Columbia medical school hospitals in New York City.

WCR: Of the faculty that you encountered at Harvard Medical School and during your training, who would you put up there at the top?

HCU: Churchill would be at the top as far as I'm concerned. Paul Dudley White had to be up there very high. DeBakey visited annually for a week and was excellent. George Nardi, Bob Shaw, Bob Linton, Richard Sweet, Bill McDermott, Claude Welch, and many others.

WCR: Were they great men?

HCU: They were great men, without question.

WCR: Of the people that you trained with, your contemporaries, who would be in the "great" category?

HCU: Certainly Judah Folkman, Dave Skinner, George Zuidema, John Mannick, Jerry Austen, and Roman DeSanctis. The rest of them were outstanding.

WCR: After you finished your training or during your last year, how did you come to grips in deciding what you were going to do?

HCU: Of the 8 residents, 2 became chief residents, and I was one of them. The other was Jerry Austen. That position gave me the chance to think better about it. I looked around at all the leaders in surgery at MGH—Leland McKittrick, Richard Sweet, Bob Linton, Bill McDermott—all successful in academic surgery.

WCR: What about Welch?

HCU: He was a great influence on me as well—outstanding. "The surgeon walks down the road with death all the time.



Figure 15. As chairman of the Residency Review Committee for Thoracic Surgery.

When the surgeon gets ready to die, he is not afraid.” Dr. Welch put this poem in his book *A Twentieth-Century Surgeon: My Life in the Massachusetts General Hospital*.

When I started my chief residency on New Year’s Day 1962, the first case I had was a bleeding ulcer in an 87-year-old woman who came into the emergency room. I operated on her. She was close to death and had had a Bilroth I operation performed about 6 weeks before by Henry Edmunds. She had a large ulcer of the pancreatic head that had eroded into the duodenum. Claude Welch was chief on my service. His protégé, Grant Rodkey, came into the operating room, looked at it, and said, “Urschel, let me feel that thing.” We went through all the options. “This is a perfect case for a Whipple,” he said. I said, “Come on. You’ve got to be kidding. This lady is 87. This isn’t malignant disease.” He said, “They do best when it’s not malignant.” We performed a Whipple, and that lady “never turned a hair” postoperatively. Later, he told me: “Urschel, I had a call in the operating room that I didn’t take because I was with you, and it was Marlene Dietrich at the Parker House. She was having abdominal pain. I had been called in to see her and I missed it.” I’ll never forget that. Welch was great.

WCR: *How did you decide what to do?*

HCU: I looked at all these surgeons. Churchill and Frannie Moore were happy because they were the chiefs. Oliver Cope and the others spent their lives in “quiet desperation.” I had multiple opportunities to stay. Quiet desperation was not my *modus operandi*. I wanted to operate, have an academic association, and pursue the research that I chose.

If somebody had said, “Do you want to be chief of surgery at X, Y, and Z?” I’d have said yes. But you don’t start out that way. You start out at the bottom and work up. If you make it, great; if you don’t make it, it’s not so great. Whereas if you go someplace where you can pretty much do what you want to do and nobody can fire you, it’s a better overall situation. I became a director and examiner of the American Board of Thoracic Surgery younger than any of my colleagues. I was chairman of the Residency Review Committee for cardiovascular and thoracic surgery (Figure 15), and most of the rest never made that. I always preserved the intellectual experience and association, but I don’t have to worry about the hierarchy.

WCR: *How did you end up in Dallas, Texas?*

HCU: I courted my wife in San Francisco. We were contemplating working with Ben Roe, chief of cardiovascular and thoracic surgery at the University of California at San Francisco. Comroe had the Cardiovascular Institute there for research, and it was terrific. It was a great opportunity and was in a place we would have liked to live. The chief of surgery, Leon Goldman, was Senator Diane Feinstein’s father. He went “psychotic on steroids” for regional ileitis for 3 months and couldn’t sign my contract. We had looked for houses and were all ready to go. However, I hadn’t seen these 3 operations in Texas that I told you about, so I decided to stop off and spend a little time with Don Paulson. Bob Shaw, the senior partner, was going to Afghanistan for 6 months. (He performed >1000 closed mitral commissurotomies in Kabul in the early 1960s.) We brought surgeons back from there to BUMC and trained them. The minister of health in Afghanistan, before the Taliban, trained at BUMC as a cardiovascular surgeon.

I went to Dallas. Shaw went to Afghanistan, and I ended up at BUMC. Leon Goldman finally got better, but I never left Dallas to go to San Francisco. We had the surgical residency at BUMC. Baylor’s thoracic surgery was outstanding. We had 10,000 lung cases in the 1950s and 1960s—more than M. D. Anderson and Memorial Sloan-Kettering. I performed the surgery for the oncology cases. BUMC was a bonanza for lung cancer. Then in 1972, I had an offer from the University of Chicago with Dave Skinner to be the chief of cardiac surgery. We loved the University of Chicago. It was like Princeton in that you could have lunch with a Nobel Prize winner in economics. But the university didn’t have a football team in the lab school for our boys. We decided not to leave Dallas. Our children were happy, I was very busy professionally, and we liked Dallas. Chicago would have been a whole new lifestyle. After that, we decided that Texas was good; Betsey liked it.

WCR: *When you came here, neither of you had ever lived in Texas.*

HCU: Correct.

WCR: *But you felt very comfortable in Dallas right away.*

HCU: Right. Dallas is very conservative, to the right of John Birch. In Boston, we were “right-wing Republicans.” Down here, we were “left-wing liberals” and hadn’t changed our position. The public school director in Dallas had been trained at Harvard. He knew Betsey, and he had the same team-teaching, nongrading philosophy. It was a much smaller town then. You could walk downtown safely. People were nice to us.

WCR: *You came to Dallas when?*

HCU: The first day of 1963.

WCR: *How many children did you have then?*

HCU: Two.

WCR: *Where did you live?*

HCU: We rented a house from Gordon Teal, who was chief of research at Texas Instruments in North Dallas. He was in Paris for 2 years and came to Texas Instruments from Bell Labs. We rented his house for 6 months and then moved into Highland Park. We lived there for about 6 years. Betsey ran for school board and lost. Then in 1969 Ross Perot offered us some land adjacent to his home. (I was on his EDS board.) We moved and have lived there ever since.



Figure 16. With best friend H. Ross Perot.

WCR: *How did you meet Ross Perot?*

HCU: Betsey and Margot met because young Ross and Hal were in the same class at Lamplighter School. We'd go to lunch at El Chico every Sunday after church, and the Perots often were there. He said, "I've been with IBM. I'm going to start a company. It's going to take good care of its clients and good care of the people that work there." I said, "Ross, why don't you go into the ministry? Your dream will never work. I've lived in business environments. There's no way that you can do this." I was wrong. Perot always wanted to be a doctor. In the eighth grade, he wrote a magnificent paper about wanting to be a physician when he grew up. It's a fabulous dissertation. He's always loved medicine. We got along well together, but it was our wives who introduced us initially (Figure 16).

WCR: *He made you a member of the board of his company right off the bat?*

HCU: Not immediately. He only had 2 or 3 guys working for him when I met him. I started in the late 1960s.

WCR: *After your life got established here in Dallas, what were your daily activities like?*

HCU: We operated 6 days a week and performed 8 cases a day. Our group was Shaw, Paulson, Kee, Urschel, Wood, and Razzuk. We had our own building, beside Drs. Sparkman and Duckett, on Swiss Avenue. It was a massive amount of surgery. We performed heart, lung, and esophageal operations. We had referrals from 5 states. Shaw was the first thoracic surgeon in Dallas, the second in Texas. Dr. Alexander developed the first residency in thoracic surgery, and Robert Shaw was his seventh resident.

WCR: *Alexander was where?*

HCU: Michigan. Dr. Shaw wanted to be a medical missionary and work in Afghanistan and India, but he contracted tuberculosis. He went into medicine and then thoracic surgery. He came here in 1937 and built up a large practice. Paulson trained at the Mayo Clinic and was chief of thoracic surgery at Brooke Army Hospital during World War II. He knew Shaw and came to practice after the war. John Kee joined them from Johns Hopkins.

We had fairly good dog laboratories, similar to those in Bethesda. We began our experimental work each day at 4:00 AM in the dog lab, worked there for 2½ hours, and then started in the operating room. Donovan Campbell, the anesthesiologist, brought Mike Ramsay, Roy Simpson, Peter Walling, Colin Blogg, and other English anesthesiologists to Dallas. The double-lumen tube all started at BUMC. We performed research 4 days a week.

WCR: *What was your day like, for example, in 1970?*

HCU: That was about the peak time. I'd arise about 3:30 AM and start in the dog lab about 4:30 AM. I'd work until about 6:00 or 6:30 AM, make rounds, and start the first case in the operating room about 7:15 AM. We'd operate all day, and I'd come to the office between cases. Our office was a block away. We utilized 3 or 4 operating rooms, and we'd go back and forth. Residents and fellows provided lots of help. We didn't have to open or close most patients.

WCR: *What time would you go home?*

HCU: Probably 8:00 PM.

WCR: *So you'd get home at 8:30 PM.*

HCU: When we lived in Highland Park, it was just 10 minutes away. It's not that much farther now. It was an efficient operational system. We didn't waste time. I didn't have committee meetings or at least not more than once a month. Everything was simple.

WCR: *When did you go into practice by yourself?*

HCU: We came to the Barnett Tower as a group in 1971 and were among the first surgeons in here. We remained here until about 1984. I always had a partner until Maruf Razzuk died about 2 years ago.

WCR: *You and Razzuk were together for how long?*

HCU: Over 30 years. Now I'm by myself.

WCR: *Do you like it this way?*

HCU: Yes, to be honest. One does in life what the occasion dictates. In other words, when the practice is large, one needs partners. I don't have that much clinical practice now.

WCR: *Hal, you're how old?*

HCU: Seventy-three.

WCR: *How long are you going to work?*

HCU: Until I feel that I have nothing further to contribute. The only things I do now are complicated thoracic outlet procedures, which nobody else wants to do.

WCR: *But you enjoy it.*

HCU: Oh, I love it.

WCR: *Your family has really turned out well. You have 5 children, all of whom have gone to Princeton. They're very decent people. Tell me more about your family. How have you done so well?*

HCU: My wife, Betsey, and I wanted a family so very much—we feel it is one of our major contributions. We hope our children have had a strong spiritual background along with a good education and will want to serve others. They all care about other people, and they've all tried to do their best to make a difference in what happens in their community, in the country, and in the world. I think they've been fortunate in having good grandparents (our parents), and I think that Dallas has been a fertile place for them to grow up (Figure 17).

WCR: *You've had 1 tragedy in your family. That must have been very difficult.*



Figure 17. With wife and children at son Brad's graduation in 1983.

HCU: It was terrible. We were traveling from a hunting trip to the Olympic track trials in 1983 and had a car accident. My son Brad had a severe head injury and was here at BUMC approximately 7 months; for 1 month of that time, he was in a coma. Betsey and I lived in the hospital. Brad is a wonderful human being and was named the greatest athlete in St. Mark's history. He still has 4 records in track: a pole vault record, 2 hurdle records (state championship times), and the decathlon record. The same thing is true at Princeton. He's ended up being a very spiritual and philosophical individual. He spends his life doing what he thinks is the best thing. We all spend our lives doing what we think is best, but if we knew we were going to die tonight, there are a lot of things we might omit. Brad gives inspirational speeches at Highland Park and other high schools, and they always give him standing ovations. A track meet at St. Mark's is the largest in the state and is named the Bradley Urschel Invitational Track Meet, with 1300 athletes participating. The award for best attitude at St. Mark's is called the Bradley Urschel Award. Students whom he has coached in track at St. Mark's who go to Stanford or Harvard write him all the time and tell him what a great influence he's been on their lives. He has a great influence on people for the good. His philosophy is "There's no ceiling on effort" (Figure 18). He has a wonderful wife, Bonny, and 2 beautiful children.

WCR: *That's quite a tribute. What are your other children doing?*

HCU: Hal, the eldest, is a psychiatrist, head of the substance abuse center at the medical school, located at St. Paul Hospital. He coordinates much of the research for outpatient substance abuse in the country. He and his wife, Christi, have 2 wonderful boys, and she is the president of Home Interiors, a 70,000-woman company. Our third son, Sterling Locke, is an entrepreneur, lives in Hawaii, and manages several companies. He's a wonderful boy. Amanda is married to Robert Goldstein. After Princeton, she received her master's degree in social work at the University of Texas and then met Bob Goldstein on a liver transplant trip to procure an organ. They have 2 fabulous children. Susanna is a bright, beautiful young woman, dedicated to the service of others, and a highly successful software engineer in Atlanta.

WCR: *Hal, what are your hobbies now outside of medicine?*

HCU: Hunting, fishing, travel, photography, and my 6 grandchildren (Figure 19).

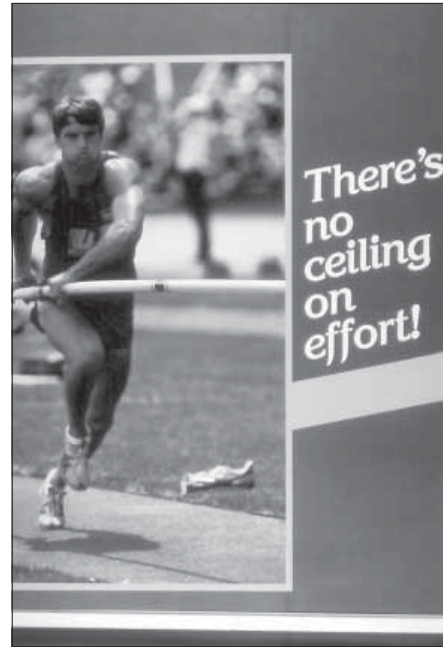


Figure 18. Son Brad Urschel set the national decathlon record in high school and at Princeton and has been honored by St. Mark's School in Dallas.

WCR: *What do you hunt now?*

HCU: The elk on my wall here was the biggest one to come out of New Mexico that year and was probably the end of my hunting career (Figure 20). My wife won't let me take it home, so that's why it is here in my office.

WCR: *What do you fish?*

HCU: I fly-fish mainly. That's what I love the most. Our fellows and residents from BUMC live all over the world, and that's where we fish. I have one from the Arctic Circle (Figure 21).

WCR: *What do you read?*

HCU: Everything. Stephen Ambrose is a favorite. We stay philosophically and theologically oriented. When we were at Harvard, Paul Tillich was a good friend of Betsey's—he was a theologian and wrote *The Ground of Our Being*. "After Bonhoefer died, the 4 greatest living theologians are in Dallas," he said. We met them all here. We read a lot of theology.

We set up a course at the Kennedy School for Health Care Policy at Harvard for cardiac surgeons. It is given twice a year for about 8 days. It uses faculty from the Kennedy School, Harvard Medical School, the schools of public health and business law, and all the Harvard graduate schools. Joe Newhouse directs it, and he's the chairman of the committee that advises Congress (MEDPAC).

Betsey is also on the board of Harvard. She goes up there 3 or 4 times for the Alumni Association. For 20 years, she's taught a course on healthy marriage for the Society of Thoracic Surgeons (where she is the only woman to win the Distinguished Service Medal). Denton Cooley sat in the front row and said, "I wish I'd heard that back when I needed it." She stays involved in medicine more than the average wife, and I think that's why we do so well. She has an interest in knowing what is on the "cutting edge" of medicine. (Both parents and her brother were physicians.)

We have other new initiatives involving heart disease in women and cardiac surgery for the humanitarian countries.



Figure 19. With children and 6 grandchildren. Back row, left to right: Robert Goldstein, Amanda Goldstein, Susanna, Brad, Bonny, Locke, Christi (holding Carr), Hal (holding Chase). Front row, left to right: Bear Goldstein, Rush (Brad's son), Betsey, Haley (Brad's daughter), Hal, Everest Goldstein.

WCR: *What do you do when you get home at night now?*

HCU: Baylor offered me the chair of cardiovascular and thoracic surgical research, education, and clinical excellence. Both Betsey and I spend most evenings planning various initiatives for BUMC regarding identifying it as a major international destination for cardiovascular and thoracic disease, as well as multiple fundraising projects for the future.

WCR: *You're still active in the church.*

HCU: Yes. We headed the Sunday school at Highland Park United Methodist Church. We taught a lot of the youth in the late 1960s who had an aversion to reading the Bible. The only way we could interest them was to take them to a good movie and then discuss the spiritual ramifications.

WCR: *Is that where you still go to church?*

HCU: No. We are active members of Lover's Lane Methodist Church now, where Betsey is on the board.

WCR: *What do you like to read? What nonmedical works do you prefer to read?*

HCU: On Sunday, she does the crossword puzzle in *The New York Times* with a pen and a stopwatch, like she's always done, and I pick up the book review section and wade through it. I read everything from *Lyndon Johnson: Master of the Senate* to *The Search for Peace*. What is the chance for world peace? Biographies are also great: Theodore Roosevelt, Lewis and Clark, etc.

Frannie Moore wrote the book *A Miracle and a Privilege: Re-counting a Half-Century of Surgical Advance*. Ben Roe wrote the book, *Maverick Among the Moguls*, about heart surgery for 50 years. Welch's book is excellent, *A Twentieth-Century Surgeon: My Life in the Massachusetts General Hospital*. Dick Bass's book on the Seven Samurai is outstanding. He took us (as well as all of our children separately) to the base camp at Mount Everest. He's climbing Mount Everest again as we speak, trying, at 73, to be the oldest man to summit.

WCR: *Your social activities must be relatively heavy.*

HCU: They're relatively few actually. We travel a fair amount related to research work for the Society of Thoracic Surgeons. We work for the church and Baylor, and we don't go out much.

WCR: *Your capacity for friendship seems to be quite great. If you wanted to go out every night, I'm sure you could.*



Figure 20. With the largest elk taken out of New Mexico, 2000.



Figure 21. A fishing adventure with son Locke at Yellowknife in the Northwest Territory at the Arctic Circle.

HCU: I want to go home to my wife.

WCR: *Is there anything, Hal, that we haven't talked about that you think would be useful to discuss?*

HCU: I think we've talked about more than enough.

WCR: *Hal, not only for me but for the readers of BUMC Proceedings, I want to thank you for being so open in discussing your life and your achievements.*

HCU'S BEST PUBLICATIONS AS SELECTED BY HIM

(Publications are numbered according to his curriculum vitae.)

- Conrad RA, Robertson JS, Meyer LM, Sutow WW, Wollins W, Lowrey A, Urschel HC Jr, Barton JM, Coldman M, Hechter H, Eicher M, Carver RK, Potter DW. *Medical Survey of Rongelap People, March 1958, Four Years after Exposure to Fallout*. Brookhaven National Laboratories and the Atomic Energy Commission, BNL 534 (T-135), 1958.
- Urschel HC Jr, Roth EJ. Electronically controlled coronary arteriography. *Ann Surg* 1959;150:275.
- Berrian JJ, Urschel HC Jr, Adcock J. *Effects of High Onset Decelerative*

- Forces on Swine. Supplemental publication to McDonald Report #6875 (Pilot Support System Development), Project Mercury, National Space Agency (NASA), 1959.
6. Urschel HC Jr, Greenberg JJ, Hufnagel CA. Elective cardioplegia by local hypothermia. *N Engl J Med* 1959;261:1330.
 13. Urschel HC Jr, Greenberg JJ, Roth EJ. Rapid hypothermia: an improved extracorporeal method. *J Thorac Surg* 1960;39:318.
 15. Urschel HC Jr, Greenberg JJ. Differential cardiac hypothermia for elective cardioplegia. *Ann Surg* 1960;153:845.
 17. Urschel HC Jr, Roth EJ. Small arterial anastomosis: I. Non-suture. *Ann Surg* 1961;153:611.
 18. Urschel HC Jr, Roth EJ. Small arterial anastomosis: II. Suture. *Ann Surg* 1961;153:611.
 19. Urschel HC Jr, Skinner DB, McDermott WV. Hemobilia secondary to liver abscess. *JAMA* 1963;186:797.
 20. Scannel JG, Baue AE, Urschel HC Jr. Reoperation for failed mitral valvulotomy. *Ann Surg* 1963;158:884.
 21. Finney JW, Collier RE, Balla GA, Tomme JW, Wakley J, Race GJ, Urschel HC Jr, D'Errico AD, Mallams JT. The preferential localization of radioisotopes in malignant tissue by regional oxygenation. *Nature* 1964;202:1171.
 26. Urschel HC Jr, Paulson DL. Superior vena cava obstruction. *Dis Chest* 1965;49:155.
 33. Urschel HC Jr, Paulson DL, Shaw RR. Mucoid impaction of the bronchi. *Ann Thorac Surg* 1966;2:1-16.
 34. Urschel HC Jr, Finney JW, Morales AR, Balla CA, Mallams JT. Effects of hydrogen peroxide on the cardiovascular system. *Proceedings of the 3rd International Congress on Hyperbaric Medicine*. National Academy of Science-National Research Council, Washington, DC, 1966;307-316.
 44. Urschel HC Jr, Morales AR. Posterior myocardial revascularization by retrograde internal mammary artery implantation. *Surgery* 1967;61:59-73.
 45. Urschel HC Jr, Paulson DL. Gastroesophageal reflux and hiatal hernia. Complications and therapy. *J Thorac Cardiovasc Surg* 1967;53:21-32.
 48. Urschel HC Jr, Finney JW, Dyll LD, Boland GL, Race GJ, Jay BE, David G, Bulla GA. Treatment of arteriosclerotic obstructive cerebrovascular disease with hydrogen peroxide. *Vasc Dis* 1967;1:77.
 53. Urschel HC Jr, Finney JW, McNamara JJ, Boland GL, Aslami A, Race GJ, Balla GA. Effects of hydrogen peroxide on arteriosclerosis: experimental observations. *Surgery* 1968;61:1.
 69. Urschel HC Jr, Miller ER, Razzuk MA, Alvares JF, McNamara JJ, Paulson DL. Aorta-to-coronary-artery vein bypass graft for coronary artery occlusive disease. *Ann Thorac Surg* 1969;8:114-125.
 70. Urschel HC Jr, Razzuk MA, Miller ER, Alvares JF, Paulson DL. Vein bypass graft and carbon dioxide gas endarterectomy for coronary artery occlusive disease. *JAMA* 1969;210:1725-1728.
 80. Urschel HC Jr, Razzuk MA, Miller ER, Nathan MJ, Ginsberg RJ, Paulson DL. Direct and indirect myocardial revascularization: follow-up and appraisal. *Surgery* 1970;68:1087-1100.
 85. Paulson DL, Urschel HC Jr, McNamara JJ, Shaw RR. Bronchoplastic procedures for bronchogenic carcinoma. *J Thorac Cardiovasc Surg* 1970;59:38-48.
 90. Paulson DL, Urschel HC Jr. Selectivity in the treatment of bronchogenic carcinoma. *J Thorac Cardiovasc Surg* 1971;62:554.
 91. Urschel HC, Razzuk MA. Reconstruction of the left anterior descending coronary artery. Proximal vein bypass graft and distal gas endarterectomy. *JAMA* 1971;216:141-143.
 95. Bergman SA Jr, Urschel HC Jr, Blomqvist G. Pre- and post-operative exercise testing in patients undergoing direct myocardial revascularization. *Circulation* 1971;XLII-ELIV(Supp II):141.
 98. Urschel HC Jr. Management of the thoracic-outlet syndrome. *N Engl J Med* 1972;286:1140-1143.
 104. Lepley D, Urschel HC Jr, et al. Optimal resources for coronary artery surgery. Report of the Inter-Society Commission for Heart Disease Resources. *Circulation* 1972;SLV:A-125.
 106. Urschel HC, Razzuk MA, Wood RE, Paulson DL. Factors influencing patency of aortocoronary artery saphenous vein grafts. *Surgery* 1972;72:1048-1063.
 108. Urschel HC Jr, Razzuk MA. Management of acute traumatic injuries of tracheobronchial tree. *Surg Gynecol Obstet* 1973;136:113-117.
 111. Urschel HC, Razzuk MA, Wood RE, Galbraith NF, Paulson DL. An improved surgical technique for the complicated hiatal hernia with gastroesophageal reflux. *Ann Thorac Surg* 1973;15:443-451.
 112. Urschel HC Jr, Razzuk MA, Hyland JW, Matson JL, Solis RM, Wood RE, Paulson DL, Galbraith NF. Thoracic outlet syndrome masquerading as coronary artery disease (pseudoangina). *Ann Thorac Surg* 1973;16:239-248.
 113. Blomqvist CG, Urschel HC Jr, Bergman SA Jr, Triebwasser HH. Aorto-coronary bypass procedures: results of pre- and post-operative exercise studies. In "Das Chronisch Kranke Herz" *International Symposium*, Bad Krozingen, Germany, 1972. Stuttgart: FK Schattauer Verlag, 1973.
 119. Urschel HC Jr, Razzuk MA, Wood RE, Paulson DL. Improved technique to revascularize the poor left ventricle or stenotic left main coronary artery. *Circulation* 1973;VII-VIII(Supp IV):225.
 125. Razzuk MA, Pockey M, Urschel HC Jr, Paulson DL. Dual primary bronchogenic carcinoma. *Ann Thorac Surg* 1974;17:425-433.
 126. Urschel HC Jr, Razzuk MA, Wood RE, Galbraith N, Pockey M, Paulson DL. Improved management of esophageal perforation: exclusion and diversion in continuity. *Ann Surg* 1974;179:587-591.
 135. Urschel HC, Razzuk MA. Revascularization of the stenotic left main coronary artery and impaired left ventricle. *J Thorac Cardiovasc Surg* 1975;69:369-372.
 140. Urschel HC Jr, Razzuk MA, Gardner M. Coronary artery bypass occlusion second to postcardiotomy syndrome. *Ann Thorac Surg* 1976;22:528-531.
 141. Urschel HC Jr, Razzuk MA, Paulson DL. Management of concomitant carotid and coronary artery occlusive disease. *J Thorac Cardiovasc Surg* 1976;72:6.
 143. Urschel HC Jr, Razzuk MA, Albers JE, Wood RE, Paulson DL. Reoperation for recurrent thoracic outlet syndrome. *Ann Thorac Surg* 1976;21:19-25.
 156. Urschel HC Jr, Razzuk MA. "Collis-Belsey" fundoplication for uncomplicated hiatal hernia and gastroesophageal reflux. *Ann Thorac Surg* 1979;27:564-566.
 166. Urschel HC Jr, Razzuk MA. Management of trachea esophageal fistula. In Daughtry DC, ed. *Thoracic Trauma*. Boston: Little, Brown and Co, 1980:87.
 169. Urschel HC Jr et al. Training, examination and certification of a thoracic surgeon. A position paper of the American Board of Thoracic Surgery. *Ann Thorac Surg* 1980;29:495.
 177. Urschel HC Jr, Razzuk MA. Bronchoplastic procedures. In Glenn WL, ed. *Thoracic and Cardiovascular Surgery*, 4th ed. Norwalk, Conn: Appleton-Century-Croft, 1983.
 179. Urschel HC Jr, Razzuk MA, Leshnower AC. Bypass grafting and aneurysmorrhaphy for aortic arch aneurysms. *Ann Thorac Surg* 1983;35:579-583.
 184. Urschel HC Jr, Byrd HS, Sethi SM, Razzuk MA. Poland's syndrome: improved surgical management. *Ann Thorac Surg* 1984;37:204-211.
 186. Urschel HC Jr. "Life is short and the art long, the occasion instant, the experiment perilous, the decision difficult" [presidential address]. *Ann Thorac Surg* 1984;38:1-14.
 193. Urschel HC Jr. Superior sulcus tumor. In Pickard LR, ed. *Decision making in cardiovascular surgery*. Philadelphia: CV Mosby Co, 1986.
 197. Urschel HC Jr, Razzuk MA. Median sternotomy as a standard approach for pulmonary resection. *Ann Thorac Surg* 1986;41:130-134.
 198. Urschel HC Jr. Cystic and bullous lung disease: surgical considerations. In Cherniack RM, ed. *Current Therapy in Respiratory Disease, II*. Philadelphia: BC Decker Inc, 1986.
 199. Urschel HC Jr, Razzuk MA. The failed operation for thoracic outlet syndrome: the difficulty of diagnosis and management. *Ann Thorac Surg* 1986;42:523-528.
 204. Urschel HC Jr. Superior pulmonary sulcus carcinoma. *Surg Clin North Am* 1988;68:497-509.
 218. Urschel HC Jr, Razzuk MA, Miller E, Chung SY. Operative transluminal balloon angioplasty. Adjunct to coronary bypass for extended myocardial revascularization of more than 3000 lesions in 1000 patients. *J Thorac Cardiovasc Surg* 1990;99:581-588.
 219. Urschel HC Jr, Razzuk MA, Netto GJ, Disiere J, Chung SY. Sclerosing mediastinitis: improved management with histoplasmosis titer and ketoconazole. *Ann Thorac Surg* 1990;50:215-221.
 222. Urschel HC Jr. Surgery for tracheomalacia with expiratory collapse (stenting). In Nora PF, ed. *Operative Surgery*, 3rd ed. Philadelphia: WB Saunders, 1990.

223. Urschel HC Jr. Internal thoracic artery and competitive flow. *J Thorac Cardiovasc Surg* 1991;102:639–640.
226. Urschel HC Jr, Razzuk MA. Improved management of the Paget-Schroetter syndrome secondary to thoracic outlet compression. *Ann Thorac Surg* 1991; 52:1217–1221.
227. Urschel HC Jr, DeWeese JA, Waldhausen JA. Guidelines for minimal standards in cardiac surgery. *Bulletin of the American College of Surgeons*, August 1991.
232. Urschel HC Jr. New approaches to Pancoast and chest wall tumors. *Chest* 1993;103(4 Suppl):360S–361S.
236. Urschel HC Jr. Video assisted sympathectomy and thoracic outlet syndrome. *Chest Surg Clin N Am* 1993;3(2).
241. Urschel HC Jr. Put our patients first. *Am J Cardiol* 1994;74:170–171.
252. Pearson FG, Deslauriers J, Ginsberg RJ, Hiebert CA, McKneally MF, Urschel HC Jr, eds. *Thoracic Surgery*. New York: Churchill Livingstone, 1995.
253. Pearson FG, Deslauriers J, Ginsberg RJ, Hiebert CA, McKneally MF, Urschel HC Jr, eds. *Esophageal Surgery*. New York: Churchill Livingstone, 1995.
254. Urschel HC Jr, Cooper JC. *Atlas of Thoracic Surgery*. New York: Churchill Livingstone, 1995.
273. Urschel HC Jr, Razzuk MA. Upper plexus thoracic outlet syndrome: optimal therapy. *Ann Thorac Surg* 1997;63:935–939.
279. Urschel HC Jr, Razzuk MA. Neurovascular compression in the thoracic outlet: changing management over 50 years. *Ann Surg* 1998;228:609–617.
298. Urschel HC Jr, Razzuk MA. Paget-Schroetter syndrome: what is the best management? *Ann Thorac Surg* 2000;69:1663–1668.
299. Urschel HC Jr. Superior pulmonary sulcus tumors. In Skarin AT, ed. *Multimodality Treatment of Lung Cancer*. New York: Dekker, 2000:159–189.
- Lenfant C, ed. *Lung Biology in Health and Disease*, vol 140.
301. Urschel HC Jr. Robotics in cardiac surgery: a cautionary note. *CTS NET* 2000;Oct.
304. Urschel HC Jr. Contributions of women to general thoracic surgery. *Ann Thorac Surg* 2001;71(2 Suppl):S14–S18.
309. Pearson FG, Cooper JD, Deslauriers J, Ginsberg RJ, Hiebert CA, Paterson GA, Urschel HC Jr, eds. *Thoracic Surgery*, 2nd ed. Philadelphia: Churchill Livingstone, 2002.
310. Pearson FG, Cooper JD, Deslauriers J, Ginsberg RJ, Hiebert CA, Paterson GA, Urschel HC Jr, eds. *Esophageal Surgery*, 2nd ed. Philadelphia: Churchill Livingstone, 2002.
316. Urschel HC, Jr. Surgical techniques for chest wall and sternum: surgery of the clavicle. In Pearson FG, Cooper JD, Deslauriers J, Ginsberg RJ, Hiebert CA, Paterson GA, Urschel HC Jr, eds. *Thoracic Surgery*, 2nd ed. Philadelphia: Churchill Livingstone, 2002:1490–1498.
325. Patel AN, Hebler RF Jr, Hamman BL, Wood RE, Urschel HC Jr. Epicardial atrial defibrillation: novel treatment of postoperative atrial fibrillation. *Ann Thorac Surg* 2003 (in press).