Belding Hibbard Scribner, the individual: a brief biography

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ABSTRACT: The paper gives a short biography of Belding Hibbard Scribner (1921-2005) and discusses his contribution to therapy of renal disease. A particular emphasis is given to peritoneal dialysis, the Teflon shunt and the first out-hospital dialysis unit.

Key words: Teflon shunt, Out-hospital dialysis, Peritoneal dialysis

EARLY YEARS AND EDUCATION

Belding Hibbard Scribner was born in Chicago on January 18th, 1921 and named Belding after his mother, Mary Elizabeth Belding, a magazine editor and later a news editor for NBC radio. Her ancestors had established a silk mill in Belding, a small Michigan town that was named after them. He disliked his first name because it was unique and so became known as "Scrib" by almost everyone. His father, Carleton Scribner, was in the lumber business but was also an aeronautical engineer who had flown in World War One and was an Illinois state investigator for aviation. His grandfather, Charles Scribner, worked with Alexander Graham Bell and invented the multiple switchboard that made telephone exchanges possible. Scrib was named Hibbard after his godfather, Jack Hibbard, who later introduced the young Scrib to fly fishing which he enjoyed throughout his life.

In childhood, Scrib suffered severely from asthma, hay fever and eczema and each fall had to leave Chicago for Wisconsin during raspered season to avoid attacks of asthma. Being very sick as a child led him to want to become a doctor.

He attended local schools in Lake Forest, Chicago, where the shop teacher introduced him to tinkering and Scrib built his own radio. For high school, he won a scholarship to Fountain Valley School, a prep school in Colorado - "And luckily to a private school. I'm one of those people who needed the shelter and protection of that environment. It wasn't the prestige. It was because I was insecure." In 1937, aged 18, he went for his first year of university to Williams College in, Massachusetts, and here he was introduced to the effects of osmotic force when his chemistry teacher did an experiment in the starwell of the chemistry building, putting copper sulfate in a very long tube closed at one end with a semipermeable membrane that was submerged in water. The resulting osmotic force pushed the copper sulfate solution up three stories.

In 1938, his family moved to California and Scrib transferred to the University of California in Berkeley, graduating with a Bachelor of Arts degree in 1941. Here he attended a course in microchemistry that gave him the skills he used later to develop bedside tests for serum electrolytes. He also took classes in English composition that resulted in his ease in writing clearly. Almost all his life thereafter was spent on the West Coast. "I always liked the west coast. I had the sense there was more freedom there and a lot more chance to be an individual. I had to choose between Harvard and Stanford Medical Schools and I chose Stanford for that reason. It turned out to be the most crucial decision I ever made."

Scrib entered Stanford University School of Medicine in 1941 and graduated MD in 1945. Most importantly, his mentor in medical school was Thomas Addis, a Scottish physician who is recognized in nephrology for urinary Addis counts and studies on the "urea ratio" which led to the concept of clearance. Scrib had seen a post-operative patient die from fluid and electrolyte imbalance and so he worked with Addis on salt and water balance. Schales and Schales had just described titration to measure chloride (1), leading Scrib to develop a bedside test to diagnose saline depletion. Addis was so impressed that he paid for a special cart to be built for Scrib that he wheeled around the hospital in his white coat, looking like an ice cream seller.

While in medical school his eyesight began to fail as a result of keratoconus and he was referred to Dr Townley Patton in New York who had founded the first eye bank in the U.S. and was a pioneer in corneal transplantation. In 1951, Scrib had the first of several corneal transplants that saved his vision and his career.
PROFESSIONAL HISTORY

Because of World War Two, Scrib's fourth year of med-
cial school was spent as an intern at San Francisco
Hospital where he went on to complete his residency.
In 1947 he became a fellow at the Mayo Foundation in
Rochester, Minnesota, and it was here, because of his
eye problems that he decided to become an academic
rather than go into practice. He developed further
bedside tests for serum bicarbonate, total base and
urea and published his first papers describing these
(2, 3). His life changed one sunny afternoon in July
1950 when a friend persuaded him not to play golf but
rather to attend a talk given by John Merrill about
the rotating drum artificial kidney. This talk convinced
him that hemodialysis had a real future, particularly
as a research tool to manipulate electrolyte balance (4).
Unfortunately the Mayo Clinic did not share his
enthusiasm and declined to buy an artificial kidney. He
completed his fellowship in 1950, and stayed on at the
Mayo Clinic as an Assistant to Staff for a year during
which he obtained a Master of Science degree from
the University of Minnesota.

On leaving the Mayo Clinic he took his family on a trip
to Los Angeles to let his children meet their grand-
mother before going on to take up a position at Memo-
rial Hospital in New York in order to be near Dr. Paton.
They made an excursion up the coast to the Northwest
and stopped in Seattle. The University of Washington
was starting a new medical school and had just opened
a VA hospital where the chief of medicine was Robert
Kavan, "my old teacher at Stanford who recognized that
I had certain abilities. He talked to the chairman of
medicine (Robert Williams) who called his buddy at
Memorial and talked him into letting me give up my
commitment and so we came to Seattle."

From 1953 to 1957, Scrib was Director of General
Medical Research at the VA Hospital and a faculty
member of the University of Washington. In 1955 he
persuaded the VA to buy an artificial kidney and be-
chose the Siggens-Leonardi dialyzer because of its
superior blood volume performance rather than osmo-
tonic ultrafiltration and low internal resistance so a
blood pump was unnecessary (4). For three years he trans-
ported this in a truck to local hospitals to treat pa-
tients with acute renal failure and in 1957 changed to
using disposable twin coil dialyzers. At the same time,
he and Jim Burrell were studying sodium and potassi-
um metabolism (5), and in 1956 published a classic
paper on the relation between extracellular pH,
serum potassium concentration and intracellular potassium
(6). Scrib was also refining his bedside tests to
measure chloride, bicarbonate, total base (sodi-
um), potassium and urea (7), and developed a bed-
side kit to measure these and a Teaching Syllabus of
Fluid and Electrolyte Balance (8) that was used for
many years to teach University of Washington medical
students a simple and effective way to manage fluid and
electrolyte problems.

In 1958, Scrib became the first head of the Division of
Nephrology at the University of Washington. He ex-
panded the acute renal failure program and following
reports on "prophylactic daily dialysis" by Paul Teschan
(9), he instituted a continuous dialysis technique using
the Siggens-Leonardi dialyzer and a large deep freezer
to maintain cold dialysate for 12-24 hours of dialysis (10).
Together with Tom Marr he also studied gastrointestinal
for the treatment of renal failure (11).

Also in 1958, Scrib was awarded a Markle Scholarship
and spent 18 months at the Hammersmith Hospital in
London where he worked with Malcolm Milne on basic
research that led to a classic paper on non-ionic diffu-
sion (12). He used his family visit to France several times
where Scrib discovered the wonder of French red wine.
It was after his return to Seattle that he made his great
technical advance. In January 1960, a desperately sick
patient was admitted with apparent acute renal failure and
after removal of 5 liters of fluid was walking around
only two days after admission. Unfortunately, a renal biopsy
showed complete fibrosis of all glomeruli and he was discharged
to home to die. Breeding about this led Scrib to come up with the concept of a per-
manent shunt to allow long term dialysis (4). The Telfos shunt (13), the technique of hemodialysis for
chronic renal failure using Siggens-Leonardi dialyzers
without a blood pump (14) and early developments of
the techniques of hemodialysis and peritoneal dialysis in
Seattle have been described elsewhere (15). The
Siggens-Leonardi dialyzer was a multilayer device and
complicated to assemble and when Scrib visited Claus
Brund in Copenhagen in 1961 he was shown the Kid dial-
yzer which was much simpler to assemble and also
had low resistance. Scrib brought one home and be-
cause it worked well searched for a possible U.S.
manufacturer. An acquaintance led him to the chief engi-
neer at Western Gear who found it was possible to mill
the boards from polypropylene, making the Kid di-
alyzer the prototype dialyzer in Seattle and some oth-
er programs until the development of disposable dialyzers
in the 1970s (5). The origin of the first out-of-hospital
dialysis unit, the Seattle Artificial Kidney Center (16),
and the technological developments that led to pro-
portioning dialysis equipment (17) using acetate
rather than bicarbonate (18) and home hemodialysis
(19) have also been described elsewhere.

Scrib's impact on peritoneal dialysis began in 1962
with recruitment of Fred Boon from the Netherlands
to Seattle. Previously peritoneal dialysis for chronic re-
nal failure had been impractical because of recurrent
infections. Fred showed this could be solved by avoid-
ing indwelling devices and puncturing the abdomen
anew for each treatment. He went on to develop a
closed system from the equipment used for gastrodialysis and was joined by Henry Tenckhoff in 1964. Henry developed the catheter still in use today and developed further closed systems to make sterile dialysis. These were superseded in the late 1970s by continuous ambulatory peritoneal dialysis devised by Popovich and Moncrief in Austin, Texas, Popovich previously having been an engineering fellow in Seattle involved in dialysis research. In 1965, Scrib noted that peripheral neuropathy was generally not a problem in patients treated by chronic peritoneal dialysis even though their urea and creatinine levels were higher than in hemodialysis patients. He postulated this was due to greater clearance of what he called "middle molecules" through the more permeable peritoneal membrane. This led to the square meter-hour and middle molecule hypotheses (20, 21) and the dialysis index, the first quantitative description of adequacy of dialysis (22).

In the early 1970s, Scrib became interested in parenteral nutrition after reading an article in World Medical News that mentioned the difficulties of blood access for this. After experimenting using stumps and fistulas, his group turned to right atrial catheters for nutrition. This led to the Browne (23) and Hickman catheters, the latter with its double or triple lumens now is widely used for long term blood access for bone marrow transplantation, chemotherapy and many other purposes (24). The Division ran a very active program for home parenteral nutrition for several years (25), but his choice of a name for the technique — "the artificial gut" — did not go down well with gastroenterologists.

Scrib also played an important role in the development of medical ethics, starting with the 1962 decision of the King County Medical Society to establish an anonymous lay committee to select patients for the Seattle Artificial Kidney Center (26). An article in Life Magazine (27) precipitated widespread discussions in medical and legal journals about this (28). His presidential address to the American Society for Artificial Internal Organs in 1964 addressed the problems of patient selection, terminating treatment, patient suicide and death with dignity (29) but was not very well received at the time. He continued to campaign for death with dignity for the rest of his life. One of Scrib's eulogizers who was very important in improving the life of dialysis patients generally was Joe Eschbach. As a fellow in the 1960s, Joe began studying the anemia of chronic renal disease and erythropoietin and so when this drug was finally synthesized the first patients to receive it were at the Northwest Kidney Centers in Seattle.

Scrib also played an important role in the passage of legislation to create the U.S. Medicare End-Stage Renal Disease Program. One of the childhood friends of Henry Jackson, a powerful senator from the state of Washington, was on dialysis in Seattle, and so at Scrib's urging Jackson introduced the first bill to get government payment for dialysis and transplantation. After several years and efforts by other physicians and legislators these efforts led to the program that began in 1973. Scrib continued his interest in the politics of renal disease for the rest of his life. Scrib retired from the University in 1991, ironically only one month before the state rules changed no longer requiring mandatory retirement at the age of 70. However he continued his interest in dialysis, particularly adequacy (30, 31), duration and frequency (32) and blood pressure control (33). He continued to keep in touch with many of his ex-fellows, but no longer by hand written notes on yellow pads as Les Babich had made him computer literate and so he used email extensively.

THE HOUSEBOAT, THE GAME and THE RED CAP

When Scrib remarried in 1986, he and Ethel moved into a houseboat on Portage Bay, almost opposite the University of Washington Health Sciences complex. They also owned a house up the hill from the houseboat moorage, where Scrib kept his collection of fine wines. The houseboat soon became the center of their social life. Many physicians from the U.S. and all over the world have been entertained to lunch or dinner there, and over the years it was the site of many memorable parties for renal fellows and staff. Scrib always loved sailing, but houseboat living made him famous in a new way as he cared to work and back across Portage Bay. The University of Washington used pictures of him doing this in his red cap as television publicity for fund raising. On one occasion a friend who appeared weekly on national television was leaving after dinner and Scrib escorted her to a taxi. She was chagrined when the driver failed to recognize her and could only talk about the famous doctor in the red cap who was on local TV. As for his signature red cap, this was related to his eye problems. Because of severe corneal scarring following several transplants it was extremely difficult to make contact lenses for him. He eventually found a technician at Moorfields Eye Hospital in London who he trusted to make his lenses. This man always wore a red cap and Scrib was so impressed that the man gave him one. Ever afterwards, Scrib could be instantly recognized out of doors by his red cap.

Scrib's Wines

In 1957, Scrib began his sabbatical in London and discovered French wine. On returning to Seattle, deter-
minded to build a fine cellar, he came up against the ob-
stacle of the Washington State Liquor Control Board. 
At that time there were no wine shops or wine distribu-
tors and no wine available in restaurants in Wash-
ington State. Stores and restaurants had to buy wine 
through state stores and the only exception was that 
you could buy from the local wine industry. This was in 
itself an In fact, all its products were generally unim-
peachable. Scrib decided to go ahead and buy fine wines from oth-
er cities, particularly San Francisco. This was illegal, al-
though bringing a bottle to two home from a trip to 
California was common. He was soon joined by several 
friends, also craving fine wines. When 2 restaurant on 
Nob Hill in San Francisco closed, the master of the wine 
cellar, a friend of Scrib, offered him the contents of the 
cellar for cost. When wind malls went to San Francis-
cisco, they would bring back a case of wine and were re-
warded by being given one of the bottles. 
Disaster struck in the mid-1800s when the disgruntled 
wife of one of the group reported what was going on. 
The state then had no alternative but to raid and con-
fiscate the contents of the cellars of Scrib and his friends. 
Scrib and Ethel returned home from a meeting 
to find their door had been broken and a note on the 
table informing them what had happened. Scrib had 
to go to the King Street jail where he was finger-
print, had mug shots taken and was convicted. 
Fortunately, the State officials had realized how special 
the vintages were and so did not pour the wine 
down the drain. They put the bottles in storage, up-
right, in a warehouse during a 90°F summer, but the 
wines survived unharmed, and Scrib and the others 
were allowed to buy them back at nearly $80 of their 
original cost. Fortunately most of the '61 vintages were 
still in San Francisco, including cases of Chateau 
Laflite, originally bought for $120 and now worth 
$5,000, and magnums of Pauzzis. 
The raid on Scrib’s cellar made headlines in the lo-
cal press for weeks and became a “cause celebre” that 
drew public attention to the strange state laws. Scrib 
looked at the U.S. Constitution as he thought the state 
law was a restraint of trade but found, this did not ap-
ply to alcohol. However, as a result of all the publicity, 
in 1869 the State legislature passed a new bill that put 
vines in the hands of private dealers. One result of 
this was to stimulate the Washington wine industry 
to become more competitive and develop good wines 
and led to a very successful state industry that is rec-
ognized around the world today. Scrib himself wrote 
an article entitled “A Wine Smuggler Spills All.” 
While Scrib was extremely proud and knowledgeable 
about wine, there was one occasion when he was ner-
vous about how good his cellar really was. This was 
when he entertained Professor and Madame Hambur-
g for lunch at the houseboat. Of course, they were 
brung over on the canoe and stepped out on to the 
houseboat deck immaculately dressed. Ethel had pre-
pared a fabulous lunch and Scrib had selected from his 
best wines. You can imagine how delighted he was when 
Professor Hamburger said that he could not have had any 
better wine for lunch anywhere in Paris. 
In 1992, when funds were being raised by the Universi-
ty of Washington to endow a Scribner Chair in Nephrology, Scrib donated his cellar for auction. 
This was a major event, at it represented more than 
three decades of collecting and included rare and ex-
enpensive case lots. One bottle, a 1949 Chateau La Mis-
sion Haut Brion, was a gift from the chateau’s owner in 
thanks for his daughter’s life having been saved by 
hemodialysis. The auction raised more than $70,000.

**SCRIB AND AIRPLANES**

His father had one of the first aeronautical engineering 
degrees (from the Massachusetts Institute of Technolo-
y, and one of Scrib’s earliest memories was seeing his 
father flying. As a result, he was always interested in 
airplanes, and in California as a student he learned to fly a 
glider. However, because of his poor eyesight he never 
progressed beyond this until he began to fly radiocon-
trolled model planes. His favorites were relatively large 
model airplanes that he flew from the houseboat, and 
when one fell into Portage Bay someone who saw it 
called the Federal Aviation Agency to report a plane 
crash. Colleagues and their children were encouraged to 
try their hands at flying. Later, Scrib also became in-
terested in racing radiocontrolled yachts.

**SCRIB, LUCK AND HIS SUCCESS**

Scrib said that he had been very lucky all his life. Some 
examples include learning to tinker as a small boy, 
choosing Stanford over Harvard, being mentored by 
Thomas Addis, hearing John Merrill talk, having his 
eyesight saved by corneal transplantation, visiting Seat-
tle and being offered a position, coming up with the 
idea of the start-up at the time that Telson taking first 
became available, working with Wayne Quinn and Les 
Babb who contributed so much to the technical devel-
opment, visiting Claus Braun who sold him a Kill dialyz-
er and having a friend introduce him to the Western 
Gear Company which was able to make Kill dialyzers, 
and of course, being a Markle Scholar and visiting and 
learning the joy of wine. However in addition, his per-
sonal attributes contributed to his success. These in-
cluded his perseverance, the fact that he loved tinker-
ing with devices, was a great teacher and leader, and a 
generous person. He was always concerned about pa-

tients, the role of profit in the dialysis field, the future of 
U.S. medicine and the future of the world. He received

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many honors and awards including honorary degrees, presidency of the American Society for Artificial Internal Organs and the American Society of Nephrology and sharing the Lasker Award with Pin Koffler in 2002. Scrib died on June 19, 2003, drowning after apparently falling from the houseboat. He had been frail for some time, suffering from cardiac and bone disease but he remained mentally active to the end. His last paper was published posthumously (54). He is survived by his wife Edith and four children from his first marriage and three from hers.

His epigaph was well summed up by his friend, Claude Jacob from Paris: "Scrib was one of the few 'Great Men' whom I have had the privilege to personally know and appreciate during my lifetime. As a physician, visionary, mentor, friend and Man I cube him very, very much and will remain to my last the grateful to him."

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References: