Shortly after completing his residency training at the Massachusetts Eye and Ear Infirmary, Derrick Vail, Jr, MD (1898-1973) (Figure 1), traveled to India to work at a missionary hospital and perfect his surgical skills. His father, Derrick Vail, Sr, MD (1864-1930) (Figure 2), also a highly respected ophthalmologist, accompanied him, as did their wives. Vail’s description of the expedition, which has not been published previously, gives an interesting perspective on eye care during the early years of the 20th century by a man who was to become one of the most influential ophthalmologists in the world.

Derrick Tilton Vail, Jr, was born in Cincinnati, Ohio, the middle of 5 children of Derrick Tilton and Della Harris Vail. The elder Vail was chairman of the Department of Ophthalmology at the University of Cincinnati (1909-1912), a founding member of the American Academy of Ophthalmology and Otolaryngology, and its president in 1908.1 He had visited India in 1909 to observe the surgical technique of Colonel Henry (“Jullundur”) Smith of the Indian Medical Service, an Irish surgeon and ophthalmologist. Nicknamed for the Indian city where he once worked, Smith revolutionized cataract surgery through his intracapsular technique of removing the lens. Vail became an advocate of Smith’s method, encouraged him to undertake a surgical tour of America to demonstrate intracapsular surgery, described the Smith procedure in the medical literature, and drew the illustrations for Smith’s book about cataract surgery.2,3 Curiously, the year Derrick Vail, Jr, died, he published a fascinating description of Smith titled, “The Man With the Cigar.”4 (Smith operated with a cigar in his mouth and said, “If I have to lay down my cheroot it is a bad operation; and if my cheroot goes out, it is a damned bad operation.”)

Vail acknowledged that his father stimulated his earliest interest in medicine and ophthalmology, noting “about everything in our home centered about ophthalmology.”5(p966) Prominent ophthalmologists from around the world were frequent guests in the Vail home. “They would talk about things I couldn’t understand, but after a while I began to memorize some of the lingo, and while it often didn’t make sense, I pretended it did,” he continued. “As I look back at it I realize Father had designs on my following in his footsteps. He got me interested in things involving manual dexterity, like wood-carving, painting and playing the violin.” Vail was proud of his father. “When I was 10 years old I can remember Father announcing at dinner one night that he had been elected president of the Academy. This pleased me immensely. I thought he was talking about the riding academy around the corner from our house, and to me that was about as great an honor as being elected President of the United States.”5(p966)

Vail graduated from Yale University in 1919 and from Harvard University Medical School in 1923 and followed with a residency in ophthalmology at the Massachusetts Eye and Ear Infirmary. He was strongly influenced by the powerful personality of Frederick Verhoeff at the Infirmary. Verhoeff was his hero, to be emulated as a thinker, writer, and surgeon.5 Next came the 6-week surgical stint in India with his father as mentor. The Vails returned to Cincinnati to practice ophthal---
mology, alongside Derrick Jr’s brother Harris, an otolaryngologist. He took time off for further training at Oxford, England, in 1927 and earned the diploma in ophthalmology. Vail taught at the University of Cincinnati Medical School as well, achieving the rank of professor in 1937 and chairman of the Department of Ophthalmology (1937-1945).

During World War II, Vail became the chief consultant in ophthalmology to the US forces in Europe. An ardent Anglophile, he got along extremely well with his British counterpart, Sir Stewart Duke-Elder. Duke-Elder liked to tell the story of their visit to a Paris nightclub just after its liberation from German occupation:

Everything went well until he demanded the violin from the leader of the orchestra, on which in a fit of aberration he played the love-lyric that maintained the morale of the German Army throughout the war and had been accepted by their soldiers as an unofficial national anthem [undoubtedly Lili Marlene]; the rest of the orchestra and the entire night-club fell into shocked silence. As I got him in, with considerable difficulty I got him out.

While overseas he was offered the chair of ophthalmology at Northwestern University. The family deliberated the wisdom of moving from a comfortable position in Cincinnati to a new situation that involved considerable uncertainty, but all agreed to the move and it was a good one. He was chairman at Northwestern from 1945 to 1966. David Shoch, his close colleague at Northwestern, said of Vail, “Above all he had a highly developed sense of fair play. It is perhaps this trait that he most strongly emphasized to his many students.”

He was the editor in chief of the American Journal of Ophthalmology for 25 years, from 1940 to 1965. When Francis Heed Adler, MD, the long-term editor of the Archives of Ophthalmology, interviewed him, Vail said his first paper was published in the Archives and that Arnold Knapp offered him the job of editor in chief of the Archives in 1945, but he turned it down because he was already the editor of a major journal. He and Adler were friendly rivals as editors of competing publications and cooperated to advance scholarship in the field. Frank Newell, Vail’s successor as editor of the American Journal of Ophthalmology, wrote, “He had the singular combination of talents of a great editor—a lively imagination, humor, inspirational leadership, enormous capacity for detail, and ability to delegate.”

Further honors followed. He was president of the American Academy of Ophthalmology and Otalaryngology in 1951-1952, the same position his father had held more than 40 years earlier. They remain the only father-son team to have served in that capacity. Vail was president of the American Ophthalmological Society in 1958-1959. His stature in academic ophthalmology, rather than his trips abroad, earned him the presidency of the International Council of Ophthalmology in 1962, the highest international office in ophthalmology.

INDIA

Vail’s previously unpublished thoughts are described in a manuscript titled Shikarpur Fragments. On a “brilliantly hot morning” in January 1925, the Vails sailed from Bombay to Karachi. Derrick was entranced by the “vivid colors of shawls, scarfs and turbans” of the populace. Although this was winter, the heat and clouds of dust were intense. After landing at Karachi, an 18-hour train ride took them 200 miles to Shikarpur, a town of 45000 in the Sind province, roughly 250 miles from Afghanistan. Shikarpur is on the trunk road and caravan route from Baluchistan through the Bolan Pass to Kandahar in Afghanistan. Half the population of the town at that time was Muslim, half Hindu. Following the partition of India, it became part of Pakistan, and nearly all the Hindus departed.

The trunk road through Shikarpur was picturesque. In Vail’s words,

All day and night the creak of wheels of bullock carts, the snorts and belches of camels, the yelping of semi-wild dogs and the sound of human voices could be heard. Dust flew in puffs and clouds and covered the low foliage with each footstep and turn of the wheel. At night the howl of the jackals added a sinister note to the constant undertone of movement. Because the average rainfall is but two inches, not a blade of grass or low vegetation is to be seen anywhere except where there is irrigation.

The days were hot and sunny and the nights cold. During the night, noises “blended with the odors of burning dung, wood, and flowers.”

Summer is unbearable in Shikarpur. The temperature in the shade often exceeds 120°F every day for 2 interminable months, and the flies can be overwhelming. Any Indian who could get away would go to the river near the edge of town and stay in the water from sunrise to sunset. Food was sent to the bathers on rafts. An English maxim states there are only 2 luxuries in India: cold water and cool air.
The Vails were part of the surgical team at the missionary hospital in Shikarpur. This was a branch of a hospital in Quetta, 200 miles to the northwest in the direction of Afghanistan, that was run by a well-known missionary surgeon, Sir Henry Holland. It was active only 6 weeks a year, since the climate was too inhospitable most of the year to maintain a permanent installation. Holland invited the Vails to work at the hospital. Few opportunities of this type existed, so American ophthalmologists rarely ventured abroad to practice.

As many as 900 patients and even more family and friends camped on the hospital grounds. Each was expected to bring his own bedding and thin cotton mattress. Nursing care and cooking were the family's responsibility, but rice was provided for all. When the hospital opened 12 years earlier, a local banker provided rice free of charge, but he was no longer alive, and his son “cursed his father's charity which had become a burden to him, and did his best to chisel on the rice supply.” Although the patients were “scrupulously” separated by religion, keeping the Muslims and Hindus apart, there was no separation by sex.

The patients would arrive at the hospital during the night and camp on the premises. The government provided 3 Sikh policemen to maintain order. As soon as the hospital doors opened in the morning, the new patients would charge in, fighting, kicking, and biting to be first in line. Triage was done by a physician from the permanent medical staff whose job was to separate the patients into medical and surgical groups. The hospital had been established for ophthalmic care, so several surgeons and occasionally leprosy was diagnosed. Consideration of the conditions and the complexity of disease presented by the patients, the results were good. Communication with the patients was often difficult for they spoke many languages, and even the Indian assistants did not understand them all. Several surgeons were involved, some of whom had little experience before coming to India. A graduate of the Massachusetts Eye and Ear Infirmary residency, for example, might have completed the program and performed only 25 cataract procedures. Dust was everywhere, even on the instruments, and flies were a problem. If surgery were delayed until trachoma was adequately treated, 90% of the patients would not undergo surgery.

During their 6-week stay, the Vails removed approximately 1200 of the 1346 cataracts extracted by the surgical team. The 2 men often worked together. The junior Vail would treat the uncomplicated cases, while his father would take on the difficult ones and would come over to rescue him whenever he got into difficulty. Years later he told Francis Adler, “I had about every complication possible and learned what to do for them.”

Vail hoped to break the Shikarpur record for extractions by a single surgeon in a single day. In 1923, William A. Fisher, MD, of Chicago had performed 13 iridectomies for glaucoma or optical purposes and 100 cataract extractions, operating from 10:00AM to 5:30PM, even taking a leisurely hour off for lunch. He averaged 1 operation every 3½ minutes. The following year Fisher improved on his record performance, removing 114 cataracts in just 1 day.

Vail wrote, “In a few days when she found that her sight had been restored, she ceased her grumbling,” but she still needed to adjust to aphakia. The patients came from as far as Afghanistan. Vail found the Afghan men larger, stronger, and better nourished than the Indian Hindus. Their henna-dyed beards and hooked-nose eagle expressions created an unusual but handsome appearance. The women from both groups came in all sizes but were generally “thin and scrawny” and looked older than their stated age. Although the men dressed similarly, a skillful observer could tell where they came from by the size and folds of the turbans. Most were barefoot. The women dyed their fingernails and toenails with henna and darkened their eyelids with antimony, which they felt protected the eyes. Muslim women hid their faces behind a veil, which they would readily remove for surgery. Hindu women wore a tight bodice covered with mirrors to ward off the evil eye, necklaces, bracelets on the arms and ankles, and rings on the fingers, toes, and in the nose. They were so laden with jewelry that “they clanked when they walked like prisoners in chains.”

**CATARACT SURGERY**

Cataract extraction was the most common surgical procedure and made up about two thirds of the operations. General surgery was predominately removal of hemorrhoids and bladder stones and repair of hernias. Considering the conditions and the complexity of disease presented by the patients, the results were good. Communication with the patients was often difficult for they spoke many languages, and even the Indian assistants did not understand them all. Several surgeons

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The anesthetic was topical cocaine, which nearly ran out toward the end of their stay and was saved...
for the cataract cases. Most of the other eye problems involved the lids and had to be done without anesthesia. In Vail’s words, “The poor patient biting his shawl and putting himself into a state of self hypnosis, submitted to what was necessary without an outward sign of pain.”

Cataract patients were positioned around one of the operating rooms. They squatted and an assistant circled them, instilling cocaine drops in their eyes. After 3 sets of drops, the first patients were prepared for surgery. Turbans and shawls were removed and the patients lay down on the operating table. The Vails averaged 6 minutes per case. After the procedure was completed, both eyes were bandaged by an assistant and the patient was carried in a stretcher across the road to the hospital buildings, where the families assumed care. Surgical care reminded Vail of a factory assembly line.

Most cataracts were removed using the Smith-Indian intracapsular technique. Extracapsular procedures were limited to cataracts in which vitreous loss or hemorrhage were particularly risky: juvenile, traumatic, and complicated cataracts; elevated intraocular pressure; large, prominent eyes; eyes in which the lens would be unlikely to prolapse. The intracapsular procedure was preferred for most cases; since it was not necessary to wait for the cataract to be mature, there was less postoperative inflammation, no need to open the posterior capsule after its inevitable opacification, and the postoperative visual acuity was better. When Hermann Knapp accepted “Jullundur” Smith’s 1905 paper on cataract surgery for the ARCHIVES, he wrote Smith, "(pv)

If you can establish a safe method of intracapsular extraction of cataract, you will be a greater benefactor to mankind than Daviel [the first surgeon to perform a planned cataract extraction, in 1747]. If I were not over 70 years of age and in infirm health, I would go around the world to see how to do it.

The Smith-Indian technique included a clear corneal incision made superiorly with a Graefe knife followed by a sector iridectomy. Delivery was begun by pressing on the inferior limbus with a large spatula, directing the force toward the optic nerve initially, then upward. A strabismus hook was then used to press on the cornea, moving in a zigzag pattern across the cornea until the edge of the lens appeared in the incision. If the lens would not prolapse, a spatula was used to depress the scleral edge of the incision. Variations in technique included use of a lens spoon and delivery by sliding or tumbling. No conjunctival flap was made, and no sutures were used.

Ophthalmology in Shikarpur had some unique features. The history and visual acuity measurements were often totally unreliable. The acuity was always measured preoperatively, but frequently the findings were biased. One group of patients believed surgery would be denied them if the visual acuity was too good, so they would claim poor vision, even no light perception. Another group believed just the opposite, that surgery would be denied if their vision was too poor, and claimed much better vision than they actually had. Evaluating the vision postoperatively was difficult also. Most patients were illiterate and a language barrier often existed, even for the native staff. The ability to count fingers accurately at a few feet without corrective lenses was considered good. An attempt was made to measure the visual acuity postoperatively by mail, using a system of dots on a postcard, but most patients simply removed the postage stamp and destroyed the card. Before surgery, the pupillary reactions were evaluated, and the intraocular pressure was measured with a McLean tonometer. If the pressure was moderately elevated, cataract surgery was still performed. Angle closure had not been clearly separated from open-angle glaucoma at that time. Sir Henry Holland found iridectomy gave better results than drainage procedures, so iridectomy was the sole operation performed for glaucoma. If a cataract patient had high intraocular pressures, an iridectomy was made and cataract surgery was deferred. Holland had established a policy of offering cataract surgery to anyone who stood a chance of improvement, and both eyes were operated on at the same sitting if each eye had significant lenticular opacities. The patients often came from great distances by bullock cart or rail and expected to undergo surgery. If cataract surgery was refused them, according to Holland, they would usually turn to an Indian cataract coucher. In most cases, this meant only temporary improvement or even endophthalmitis. Nearly every patient had trachoma and poor general hygiene, especially of the mouth. Many patients would remove their dressings and rub their eyes during the early postoperative period. Dust storms and flies increased the risk of infection.

Postoperative statistics for cataract surgery during the year of the Vails’ visit to Shikarpur (1925) are not available but do exist for 1923, 1924, and 1926, the years immediately before and after their visit. During those 3 years, 4027 cataracts were removed. The major complications were 10% vitreous loss, 7% iris prolapse (with 2% requiring additional treatment), 6% capsular rupture, 4.5% iritis, 1.6% sepsis, and 1.4% choroidal hemorrhage. Vitreous loss was usually due to uncontrollable squeezing of the lids, since the anesthesia, topical cocaine, did not block the action of the orbicularis oculi or the extraocular muscles and there was no posterior capsule to protect the vitreous. Despite the high incidence of vitreous loss, the vision was nearly always improved after surgery, since most patients had advanced cataracts. Iritis was undoubtedly underreported, since the examination was made without a slitlamp, using only artificial light, a magnifying lens, and loupes. Serous iritis was diagnosed if an albuminous exudate was seen in the anterior chamber and details of the iris could not be visualized clearly. Plastic iritis was diagnosed if a fibrinous exudate was present in the anterior chamber. Most iritis cases were associated with capsular rupture and retention of cortical material. More inflammation was encountered in extracapsular than intracapsular extractions. Topical corticosteroids did not become available to treat inflammation until 25 years later.
Ward rounds took all day. Dressings were not touched until the sixth day after surgery and not again until the ninth postoperative day, when the patient was discharged from the hospital. This followed Smith's rule that no good was done by meddling before the sixth day, unless there was pain. A retinue of personnel toured the hospital grounds, examining the patients. In the lead was a nurse, whose job was to remove bandages. A surgeon followed with his team of assistants. One held a lantern to inspect the patients, who were in dim light under low thatched roofs. Others carried dressings, medications, antiseptics, towels, and notebooks. The perambulation reminded Vail of a hunting game, following a trail of unwound bandages.

The Vail women helped sterilize surgical instruments and prepare bandages. Vail's mother was a large woman and always the center of attention of a crowd of natives who “respectfully eyed her proportions with awe and reverence.” The first time they circled her, she waved them away, but her gestures had the opposite effect. They crowded closer and yelled, which panicked her. A nurse came to her rescue and explained that the gesture, which means go away in the West, has the opposite meaning in India. On another occasion, Vail's mother was bitten by a scorpion hidden in a blanket. Her arm swelled up immediately and the pain was excruciating. She was certain her life would soon be over and wrote a farewell letter to tell the family what had happened. When they arrived, she was hysterical but soon recovered. Word of her injury and recovery was spread through the bazaar by servants so that she became “the object of further nosiness veneration.” Vail's wife had blonde hair, another feature that astonished the Indians.

The senior Dr Vail had his own singular event:

An old man surrounded and led by six stalwart sons armed with daggers demanded the services of the head doctor and pointed to my father. He fearfully performed the operation on the patriarch, still surrounded by his sons standing around the table and silently watching every move with fierce attention. They never left his side during the time of his convalescence and when he recovered they silently carried a large dead and dressed whole sheep and laid it at my father's feet with deep salaams. What could have happened had the result been a failure?

After 6 weeks of work in India, the 4 Vails traveled around the world together, still enjoying each other's company. The relationship was so good that Derrick Vail, Jr, went into his father's office in Cincinnati as his assistant. His ascent to the peak of American ophthalmology was about to begin.

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