Helen B. Taussig, MD (1898–1986)

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*Helen B. Taussig (1898–1986).
Courtesy of the Chesney Archives of
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If Helen Brooke Taussig were alive today, she would be Anthony Fauci on steroids, pleading with the unvaccinated on Twitter, cold-calling reporters with the latest science on COVID, and sending nurses out to jab workers. As a pediatrician, she worked to reduce suffering and to prevent premature death in those who had no choice of prophylactic – children born with heart defects. Preventable suffering – whether due to war, drug abuse, pa-

rental neglect, or patient noncompliance – ignited her fury. She would even have calculated the cost to treat unvaccinated COVID patients and suggested they donate a like sum to a health problem like hypertension in children, which she first brought to public attention in 1938 [1]. She was as compassionate as she was tactical.

Taussig was the first to diagnose congenital malformations of the heart in the living, which made them possible to fix. Beginning in her children's rheumatic fever clinic at the Johns Hopkins Hospital in Baltimore in 1930, the soft-spoken but willful Bostonian differentiated damage to hearts caused by disease from damage present at birth. This damage may be in the form of a nonworking valve, or a narrowed artery. After puzzling out how and why defective hearts worked, she realized a way to fix the most common of them, the tetralogy of Fallot. Her campaign to convince surgeons to alter the workings of the heart led to a historic partnership with the surgeon Alfred Blalock and the first "blue baby" operation in 1944 [2]. The Blalock-Taussig shunt, a subclavian-pulmonary artifice to move additional blood to the lungs, is still used today in newborns too fragile to tolerate open-heart corrective surgery. Taussig's timing was impeccable. In her 1947 book, which became the "bible" on how to diagnose heart defects, she mapped out other malformations that surgeons could try to fix. At her death, she was still pursuing the cause of heart defects. Her final study, published posthumously, cataloged malformations in the hearts of birds she had dissected starting in her kitchen sink!

Taussig's lifelong devotion to her patients was balanced by a love for poets, like Keats, and the music of composers like Brahms, but her ultimate "god" was na-

ture; her garden, whose blooms may still be glimpsed from the path around Baltimore's Lake Roland each spring, is a metaphor for the seeds she planted in medicine at a time when technology began to replace direct observation of patients. On these grounds, Taussig literally grew a new academic field, pediatric cardiology, by convening her fellows and other doctors interested in children's hearts to share discoveries. She embodied Emersonian independence of thought and a love of learning.

Taussig was born in Cambridge, MA, the daughter of a Harvard professor of economics who insisted she be sure of her facts and a botanist mother who schooled her in observing nature at the family's summer home in Co-tuit, Cape Cod. Her childhood struggle against incipient tuberculosis after the death of her mother from the same disease, and her dyslexia, fueled her will to succeed and her compassion for the underdog.

She badgered her father to allow her to enroll in medical school with the same quiet determination she would employ to assure sick patients they could live a normal life and to convince a surgeon to tackle the unknown. It was going to happen. Harvard had rejected every woman who applied since 1847, so her father could not help her there. But his friend, the Harvard physicist Walter Cannon, used his influence with Johns Hopkins, which admitted women from its founding. At Hopkins, the anatomy professor Florence Sabin, the first female member of the National Academy of Sciences, helped Taussig find lab space so she could continue her examination of animal hearts into the evening. Initially, Taussig dissected them in the women's boarding house bathtub. Recognizing her talent, the highly regarded pediatrician Edwards A. Park lured her into directing his new clinic for patients with rheumatic fever. Archived records confirm she saved some children from premature death by sternly, but kindly, insisting on bed rest that could endure years, along with precisely timed doses of anti-inflammatory drugs to ward off permanent heart damage. In the 1930s, when the cause and cure for rheumatic fever remained unknown, she advanced treatment with her original observation that aspirin reduced heart inflammation [3].

By the mid-1930s, Taussig had become fascinated with hearts defective from birth, much to the chagrin of friends who feared she was wasting her time, since these babies all died. One day she became obsessed by a baby with a large *patent ductus arteriosus* (PDA), the fetal bypass between the aorta and the pulmonary artery that if it did not close after birth, diverted blood from the body into the lungs. What role did it play? How did it work? She gathered all reported cases, learning that otherwise healthy

patients lived with the flaw into their 40s. The PDA figured in her first diagnostic breakthrough. After using her fluoroscope to diagnose 2 babies in succession with what she suspected was a missing right heart, she theorized they had survived because they also had a PDA that sent blood to the lungs. Autopsies established her reputation as a master diagnostician [4]. These cases were stunning for another reason: Taussig realized that malformations were not unique but repeated themselves and had symptoms that could be detected.

Eventually, she identified the critical role the PDA played to bring blood to the lungs of children with tetralogy of Fallot, the primary problem being a narrow or obscured pulmonary circulation; they either died when the PDA closed or grew bluer, evidence of reduced oxygen. In late 1939, upon learning that a long-time correspondent, the surgeon Robert Gross, had closed a PDA in a young girl with no other heart problems, Taussig visited him in Boston to ask whether he could *build* a duct from existing blood vessels for a child in need of blood oxygen. Amused, he dismissed her, although he had sewn already such passages in the lab. By then, Taussig had also begun re-examining rheumatic patients for signs of misshapen parts and collateral circulation she had come to recognize in children with congenital defects.

Patient observations increased Taussig's confidence in diagnoses and a surgical solution. In 1942, she introduced Blalock to her cyanotic patients and asked him to build an artificial passage to the lungs to help them. Coincidentally, Blalock's technician, the legendary Vivian Thomas, had already built such a duct in his animal laboratory. It was impossible for him to simulate the tetralogy of Fallot in animals to test the surgical solution, but Taussig convinced Blalock it would work, based on her clinical observations.

Taussig's and Blalock's collaboration became the model as medicine specialized. Their behind-the-scenes struggle was fraught and, viewed from afar, at times comical. Prior to an operation, Taussig sometimes suggested the best vessel and technique to use on a particular patient and then followed her patients into the operating room. Blalock tried repeatedly to loosen her grip on patients, threatening to quit working with her when she demanded credit. "He had a fiery temper, but I had my own ideas," Taussig said. Their respect for one another was evident. A surgeon assisting Blalock in 1958 told me that Taussig convinced Blalock to return to the operating room to fix a shunt she was convinced was too large for the patient. Only minutes after he had taken off his scrubs, he scrubbed in again!

The epidemiologist and pediatrician Charlotte Ferencz, among others, recalled that Taussig could be unexpectedly sharp and sometimes pedantic when re-enforcing her methods. Taussig was also a gracious host and committed mentor. Her fellows had only to witness how she cuddled her patients to fall under her spell. She herself was humbled by errors and adapted based on new information, for example, solving diagnostic mysteries with the catheter pioneered by Richard J. Bing, or vetoing surgery on young children whose lungs, she learned from discoveries by her fellows, J. Frank Dammann and Ferencz, were not yet able to handle blood from a new shunt. She frequently warned against aggressive invasive procedures and delayed surgery based on her own clinical observations [5]. Critics complained that Taussig was too close to patients, and she was unusually so. She was grateful for her relationships with patients and credited the time she spent listening to their chests with her hands, rather than the stethoscope. Taussig was essentially deaf.

Taussig's need to fix a problem, rather than simply diagnose it, explains why her most important contribution may be a political feat rather than a scientific discovery; she gathered and publicized incontrovertible evidence from multiple clinics in Germany and England establishing a link between the sleeping pill thalidomide and babies born without arms and legs. In 1962, her dramatic stories, photos, and speeches stalled drug company lobbyists long enough for Congress to pass what are still the toughest drug testing laws in the world (thalidomide never entered the American market). When I saw the green spiral notebook where she tabulated data on mangled babies born to mothers who took the drug, I could only imagine the lives she might have saved using a laptop and

spread sheet today. Tools were a boon to medicine in her era, too, but to Taussig, the most important ingredient in the search for the unknowable was to pursue what was right. She was driven by her desire to prevent suffering.

Main Discoveries

- Diagnosed congenital heart defects in vivo and explained their physiology.
- Observed and convinced a surgeon to act on her observation that cyanotic babies can be saved by a surgical bypass to increase blood flow to the lungs.
- Collected, and brought to public attention, incontrovertible evidence from multiple countries linking the sleeping pill thalidomide to malformations in newborns.

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Conflict of Interest Statement

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