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The thesis of Alice Home Taussig entitled
Risks and Rewards - The Story of Helen B. Taussig, M.D. -
A Pioneer in Pediatric Cardiology and Co-Inventor
of the Blue Baby Operation
submitted in partial fulfillment of the requirements for the
degree of Bachelor of Arts in Liberal Studies in the School
for Summer and Continuing Education of Georgetown University
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RISKS AND REWARDS -- THE STORY OF HELEN B. TAUSSIG, M.D.
A PIONEER IN PEDIATRIC CARDIOLOGY
AND CO-INVENTOR OF THE BLUE BABY OPERATION

A Thesis
submitted in partial fulfillment of the requirements
for the degree of
Bachelor of Arts in Liberal Studies

By

Alice House Taussig

School for Summer and Continuing Education
Georgetown University
Washington, DC
April 1, 1993
ABSTRACT

The Liberal Studies program at Georgetown emphasizes a concern for social and human values in all disciplines, and with that thought in mind, this senior project is an attempt to explain Helen Brooke Taussig's life and work as a humanist whose concern for mankind and belief in the value of life and respect for each individual shaped her contribution in the field of medicine.

This brief biographical look at her achievements as a pediatric cardiologist and inventor of the "Blue Baby" operation is a testament to her devotion to her patients, and her self determined sense of sacrifice for the good of others. Her indefatigable spirit and hope in the face of adversity, and quiet determination to help disabled children despite what was often blatant discrimination and sexism, is an inspiration to all who have suffered disappointments in their life's work. What many of us forget is that out of loss often springs opportunity, for had Dr. Taussig not been pushed aside, tasked with
clinically observing and scientifically researching and documenting congenital abnormalities, she would never have questioned the fact that others accepted the fate of these children as hopeless.

This paper is a tribute to one woman's triumph over her own adversity and the translation of her empathy into a life saving technique for others.
DEDICATION

I would like to dedicate my project to Dr. Phyllis O'Callaghan, Dr. Leona Fisher, and all my professors and mentors at Georgetown who have taught me, encouraged me, and extended a hand in friendship along the way.

To those who told me about Helen Taussig, and shared their thoughts and ideas about their friend and colleague, I am grateful. While I am not qualified medically to observe history, I have tried faithfully to record what I have read and gleaned from books and articles about the technique and the times.

In addition, this book honors all the men and women in the medical profession who live their lives and use their knowledge to help others.

But in the end, most of all, I dedicate this to Helen Taussig, in celebration of her life!
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INTRODUCTION

The Liberal Studies program emphasizes a concern for social and human values in all disciplines, and with that thought in mind, I have chosen to write my senior project about a woman for whom I have a great deal of respect, and whose story has made a lasting impression on me. I regret that no definitive biography has been written about this unique individual, a humanist who dedicated her life to children born with defective hearts.

I married into the Taussig family in 1954, and have raised four Taussig children whom I love very much. When my life's disappointments threaten to overwhelm me, Helen Taussig has been my inspiration to continue my education and pursue a career that will be professionally fulfilling as well as rewarding in its service to others. This paper is my attempt to both pay tribute to Dr. Taussig and her achievements, and pull together her story in a small way for my children, that they may never cease to be inspired by their relative, and incorporate into their own lives the
spirit of caring and doing for others that she embodied.

Helen Brooke Taussig had her share of adversity and disappointment, and this is the major point of my paper. She had tuberculosis as a child, her mother died when she was only eleven years old, she lost her hearing in medical school after a bout with whooping cough, and she had difficulty reading. It is my belief that compassion and respect for others is acquired in the home, and Helen is an example of this theory. Her father worked patiently with her when she was a child, teaching her to read and giving her the time and attention she needed to conquer what we now know to be dyslexia. Her grandfather, while busy and successful in his profession, began a program in St. Louis for children whose sight was poor and personally funded their testing and glasses because he felt that because of their handicap, they might have been thought to be unintelligent or poor learners.

When Helen chose to attend medical school, she risked assaults on her self esteem since women were not wanted in the medical profession, except as nurses and
social workers. Despite many obstacles along the way, she persevered and finally became a physician.

Had she not been disappointed in her quest to practice internal medicine, and shunted aside into a clinic where babies were sent to die, she would never have had the opportunity to observe, document, and determine that there was a way to correct congenital malformations. Out of disappointment often springs opportunity, and she was able to succeed despite all the risks.

Success for Helen Taussig meant self-sacrifice, honor, integrity, dedication to work, respect for her patients and their families, and little regard for material things. Her father taught her the most important lesson which was respect for the individual, regardless of his or her station in life or handicap.

A student at Yale University Medical School wrote a thesis about Helen in 1983, stressing her "gentle heart." I look at her from a different perspective, valuing what I see in her as a "strong heart." (These are not mutually exclusive terms.) She was willing to fight for her babies and their lives, never hesitating
to talk to surgeons and doctors about her theories and pushing them to take a risk to make these babies well.

Dr. Taussig might be said to have had a stroke of good luck when Dr. Alfred Blalock became chief of surgery at Johns Hopkins because he was willing to listen and eventually ready to take on the risk of a new surgical procedure. Helen Taussig was pushing him all the way, from the stories I’ve heard from her colleagues.

There is no doubt she was assertive when she wanted something done for her children, but on the other hand, she was a humble person, never seeking fame or monetary reward for her work. At the end of her life, when she had time to relax, she did enjoy the honors and awards she received, but when she was busy with her clinic her only thought was to help the patients entrusted to her care.

Helen Taussig’s strength of character made her a perfect role model for both men and women who seek professional careers. Trained by her father to concentrate on her work and to set time aside for research and writing, she was obviously influenced by his patience with her, and never let herself be pushed
when she was working with the patients and their families. Dr. Richard Bing recalled in an interview with me in 1987, that he thought she practiced medicine with her heart, not her head nor her hands. He said that one doesn’t see that kind of practice anymore. She was unique.

With this sense of her compassion and empathy in mind, I will attempt at the end of the paper to draw conclusions about empowerment, and her actions when finally she was given control of the pediatric cardiac clinic. I will conclude with a discussion of her use of power, the balance, the centeredness, of a woman who started her career with an inferiority complex caused by her reading and hearing difficulties, combined with the atmosphere that existed in medical schools in the 1920’s - 1960’s, and the ways she translated the lessons she learned as a child into the innovator and motivator she became.

In explaining her life with its sorrows and triumphs, I would be remiss if I didn’t speculate on why she never married. No one seems to have an opinion, but obviously she lived her life immersed in her work. Whether she ever had time to pursue a
romance, or even to miss the lack of it, is pure speculation. More important, perhaps, is the thought that she was married to medicine and its challenges, filled with concern for the poor and sick, and warmed by the love she received from her patients, their grateful parents, and her Fellows, and that they comprised her "family." Whatever the case, I celebrate her life with my attempt to record my impressions of the risks and rewards of her educational and professional life.

Those who knew Helen Taussig well liked her sense of humor. It is my hope that as she aged, and slowed down enough to reflect on her life in an attempt to reconcile the risks she took with the rewards she achieved, both personally and professionally, she might have had a good laugh at the ironies.
CHAPTER 1
THE QUESTION OF HIGHER EDUCATION FOR WOMEN

Helen Taussig's attempts to achieve a professional degree during the early 1900's were frustrating for her given the climate of the post Victorian era and the collective attitudes about higher education for women. An examination of the prevalent issues of the time are an important part of her story, and explain why her ultimate successes as a physician were more meaningful than they would have been had the doors to a medical education been open and welcoming to her. While a major portion of this paper addresses the Blue Baby operation that made her famous, a look at the steps that led to the development of the technique must include a look at the ability of any woman to receive a higher education in 1917, when Helen attended Radcliffe, and then in 1919, when she attended the University of California at Berkeley. Her attempts to gain admittance to medical school and her final success in this endeavor led to her subsequent appointment as Chief of the Harriet Lane Clinic, and her collaboration
with Dr. Alfred Blalock, Chief of Surgery at Johns Hopkins Hospital.

During what was termed the "Progressive Era" in education, from 1890 to 1920, college women served as a bridge between Victorian and modern America as they established a campus life that ran parallel to men's amid cries for recognition of their distinctiveness and equality. This era became a hallmark in the history of American women.¹ At this time women began to look beyond domesticity as they fought exclusion by men at coeducational colleges and pleaded to be prepared for the same professional and educational roles in life that men enjoyed.² On co-ed campuses, the activities that women participated in were modeled after those of

¹Lynn D. Gordon, Gender and Higher Education in the Progressive Era,(Chelsea, MI: BookCrafters, Inc., 1990),1-2. The "Progressive Era" as defined by Gordon is in comparison to the restraints of the Victorian age. I have relied heavily on her observations and conclusions about this period in history, because it coincides with Helen Taussig's education and her search as an individual, which I think demands a larger look at what was occurring in society as a whole. With this chapter as a framework, the rest of the story of Helen Taussig follows logically. Most of my comments in this chapter are drawn from Gordon's analysis, although I will cite other authors where appropriate.

the men and allowed them to be members of societies that promoted sisterhood and leadership. Women were cognizant of the changes that were taking place in society, and were quite able to discuss intelligently and knowledgeably political and social issues that were vital causes in the Progressive Era.³

It was during this time that women demanded to be let out of the "seminary," with its rules and regulations tied to the Victorian era, the most challenging one being that women were only suited for domesticity. As women began to search for answers about the roles they might play in society other than the more traditional ones, the values they had been entrusted with as women who were also mothers and standard bearers of social and moral values in the family came to the forefront.⁴ Knowledge of and concern about these values logically led to the interest of women in social reform and women's rights

³Gordon, 15-17.

movements. These interests they were able to justify by arguing that their activist participation to promote such values could only benefit society by enhancing their traditional roles as protectors of the same values.

One definition of the changes taking place in the world of higher education as the movement progressed was described as the "linking of gender consciousness to campus life and to postgraduate plans for social activism, a growing commitment to egalitarian rather than separatist feminism, and a simultaneous interest in marriage." While women were seeking equal opportunities in education and the workplace, they were not giving up their roles as wives and mothers, and felt that marriage could co-exist with their progressivism in other areas.

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*Faragher and Howe, 156.

*Gordon, 13.

*Gordon, 4-5, 26-28. The seminary, or finishing school, was the accepted higher education available to young women whose families could afford it. The preparation given them there was to become good wives and mothers.
During these years, American college women students were predominately white, Protestant and middle class. There were very few minorities represented, and only the state universities included women whose fathers were farmers, clerks or other lower middle class workers.\(^6\)

Since the cost for many was prohibitive, and Victorian attitudes were firmly entrenched, most families were reluctant to send their daughters to college when they thought young women should be busily perpetuating their roles as wives and mothers.\(^7\) The only acceptable profession resulting from higher education was teaching, for which women were paid half the salaries of men doing the same work. Many families did decide to educate women if it appeared they might have to support themselves, rather than depend on a husband for sustenance.

Despite the obstacles women faced as they began to attend coeducational colleges during the 1890’s - early 1900’s, such as the argument that campuses would be effeminized with the addition of female students and

\(^6\)Gordon, 42.

\(^7\)Faragher and Howe, 149-150.
men's unwillingness to acknowledge that women were separate and equal, the women students were full of optimism and self-confidence as they worked to educate themselves to make a mark on society.

Early on, many women graduates of this era did manage to combine marriage with work, but very few actually did realize their ambition to achieve professional recognition in what had previously been a man's world. Their dreams of outstanding achievements in education, politics, medicine and the law, were not realized. They were apparently not content just being there but were interested in significant contributions that would make them famous. The final disappointment of the test of their belief in equality was in marriage, for they had not abandoned marriage in their desire for a professional life but hoped to find equality with men in both commitments.\textsuperscript{10}

During this Era, one of the most positive outcomes of the changes taking place on coed campuses was the partnership formed by students and faculty. Together they worked closely for the good of their campus community, adding to the curriculum courses and outside

\textsuperscript{10}Faragher and Howe, xi.
speakers who addressed the relevant issues and sought solutions to problems such as men's fears of effeminization or the threat to them caused by women's presence in the professional world.\textsuperscript{11} Many of these same issues still exist today.

As an alternative to coeducational schools, seminars and academies evolved into same sex schools. The advent of women's schools created a comfortable environment for women who sought a higher education because they showcased women's intellectual capabilities while providing a stimulating environment in which women could explore the options available to them. Women's schools offered students the best of both worlds in that there they were not subjected to the ridicule and hostility present in coeducational schools, and yet they could study and talk about social issues and progressivism in what came to be called "the little edens of liberty." In this sheltered environment, women could enhance their knowledge, experience leadership, all the while surrounded by

\textsuperscript{11}Gordon, 56, 44.
their "sisters" who were also working toward the same status in life.\textsuperscript{12}

The women's colleges in the east, called the Seven Sisters, celebrated women's basic attributes while expanding opportunities to develop their intellectual capacities.\textsuperscript{13} While these colleges remained conservative in their goals, incorporating many of the same regulations that seminaries espoused such as making religious education a requirement of their education, they nevertheless offered a more liberal approach to women's use of their skills and the options available to them up until that time. For instance, the continuing emphasis on social service, begun in the seminaries, required women to broaden and expand their social conscience and encouraged their active participation.\textsuperscript{14} (Traditionalists and opponents of the movement for higher education for women were more accepting of same sex schools than coeducational schools.)

\textsuperscript{12}Gordon, 26-29.

\textsuperscript{13}Faragher and Howe, 202.

\textsuperscript{14}Faragher and Howe, 118-119.
The women who went to women's schools were much more "successful" in science than women who graduated from coed schools.\textsuperscript{15} Perhaps these women were able to focus all their energies on their education rather than having to battle men over inequities in campus organizations and leadership roles. However, since the women at coed schools actually had to engage the "enemy" some may have benefitted from a new assertiveness which filled them with determination and a desire to publicly discuss issues that were previously unmentionable for women.

Helen Taussig, who attended Radcliffe for two years, and Berkeley for two years, was exposed to both environments during the Era when women were pushing for equality in professional areas. I am convinced that both of these experiences encouraged her to broaden her outlook, and that her years at Berkeley surely inspired her to think she could become a physician rather than a nurse. That, coupled with having a father who was a professor at Harvard, gave her the inspiration she needed to attempt to achieve what few women prior to that time dared seek for themselves. Helen Taussig's

\textsuperscript{15}Faragher and Howe, 200.
mother, according to Helen Taussig's comments in an interview with Proctor Harvey in 1978, was interested in education and science and had attended Radcliffe before it became part of Harvard University.

In the nation at large, there were two major obstacles to the movement toward higher education for women. Very few people were enthusiastic about the idea of women attending what were previously all male colleges, some citing cost as a major prohibitor, which may have only been an excuse. Without the active support of older women who were interested in seeing the next generation go to college, changes in the gender composition of student bodies might not have occurred. Whether they raised the money themselves or were activists encouraging state universities to open their doors to women, these "angels" were instrumental in securing for others what they had been unable to obtain themselves.\(^\text{16}\)

The issues that caused such a tempest were always at the forefront during the years when women were seeking gender equality in higher education. Men were openly hostile, and frankly did not want the women

\(^{16}\text{Gordon, 68.}\)
there, and teachers were not happy having to teach female students. They questioned the validity of allowing women to be educated which they felt would detract from their traditional roles as mothers and teachers of the moral and spiritual values important in our society. Some advocates used the argument that well educated mothers would make better teachers, as a cover for the reality which was that women students were beginning to desire professional goals they felt they could achieve, and were no longer intimidated nor pushed aside by men's claiming those goals as theirs alone. The key seems to have been that women were no longer afraid to invest in themselves, even though today residual effects of that hesitancy still linger in many women's minds.

At the University of California at Berkeley, the Board of Regents voted on October 3, 1870, that "young ladies be admitted into the university on equal terms in all respects with young men." The first generation of women who attended lived apart and isolated from the

\[17\text{Faragher and Howe,113.}\]

\[18\text{Morantz-Sanchez, 52-53.}\]
men, usually in off campus housing sponsored by older women benefactors, faculty, and administrators. This separate community eventually used its strength to challenge men for control of the campus and a redefinition of gender roles in terms of equality with men especially in relation to leadership roles on campus.¹⁹

While young men of humble origins had the opportunity to be elected leaders, young women did not. The "old boy" network judged its men on strength, manliness, character, and loyalty to class. Participation in class activities, such as student body officers, honorary societies, athletic clubs were for women limited and usually consisted of tokenism. For instance, as a result of the university administration's lack of support for women's campus activities, not until the turn of the century did facilities come into being for athletics, meetings, and social and cultural events, as well as dormitories. Women were forced to form their own campus organizations that paralleled the men's and yet had no facility for events and activities, since the men

¹⁹Lynn Gordon, 52-53.
controlled campus buildings and meeting rooms for themselves.\textsuperscript{20}

However, the women finally found a champion in the person of Phoebe Apperson Hearst, first woman regent of the University of California. Her generous contributions are best remembered for the impact they made on the lives of the women on campus. She donated scholarships, opened her home for social activities, and sponsored European research for graduate students. Her personal interest in women and their lives coupled with material contributions made it possible for many students to receive their education. As an advocate she pushed the university to hire women faculty. In her position she was able to admonish the administration for discriminating against women faculty members just because of their sex, and she succeeded in having them hire the first woman lecturer in hygiene on the campus, a position which she personally funded. Her attempts to secure on campus housing for women were finally realized in 1900. Finally, the administration hired the first Dean of Women in 1906.\textsuperscript{21}

\textsuperscript{20}Faragher and Howe, 40.

\textsuperscript{21}Faragher and Howe, 53.
Lucy Sprague, the new Dean, a graduate of Radcliffe, set to work to help bring harmony to women and men on the Berkeley campus by attempting to change the attitudes of male faculty members who thought women were inferior beings. She sought to strengthen ties between women students and older women, and while initially surprised at the lack of civic interest the students displayed, she set about educating them with trips to prisons, schools, courts and asylums.\textsuperscript{22}

Helen Taussig's ambitions, fostered by Radcliffe and Berkeley, led to her desire to pursue her life's work as a physician, and the third phase of her education was medical school. Therefore, a brief history of women in the medical profession is important to this paper.

The role of women in medicine was one that had existed for many centuries, often in an informal way as far as education was concerned, for they along with other lay healers had delivered babies, pulled teeth, brought fevers down, and served well when there was no

\textsuperscript{22} Gordon and Faragher and Howe.
professional medical education required or available.\textsuperscript{23} In Western Europe, the first universities where medicine was taught appeared in the eleventh and twelfth centuries. Women were denied entrance to these universities and persecuted for practicing medicine without a license as men gained the upperhand in this profession in the eighteenth century. Sometimes labeled witches, these lay women were still needed by the poor who could not afford doctors, and were without adequate medical care.\textsuperscript{24} As knowledge about disease grew and discoveries were made, lay healers who tended to the mass of the population who could not afford private physicians began to be isolated and began to lose their opportunity to serve because of increased legal restrictions governing medical care.

In the United States in the nineteenth century, white women and black women and men and others without much wealth or social position were able to obtain


\textsuperscript{24}Muriel Joy Hughes, \textit{Women Healers In Medieval Life and Literature}, (Freeport: Books for Libraries Press, 1943), 95-96.
minimal training and education and were able to attract their own clientele, having to use claims to build up their practice by forming female oriented medical groups, and by using Victorian ideas about women to promote their role as physicians. It was in this atmosphere that women were excluded from "regular" medical schools, and kept on the lower rungs of the professions by having to attend sectarian schools of lesser importance.²⁵

Elizabeth Blackwell, the first American woman physician to attend an East Coast regular medical college said: "I had no medical companionship, the profession stood aloof, and society was distrustful of the innovation. . .I was advised to form my own dispensaries."²⁶ The New York Infirmary for Women and Children opened in 1857, the first woman staffed hospital in the U.S., and the New England Hospital for Women and Children was opened in 1862. With these hospitals and women's medical associations, there

²⁵Lorber, 18-20.

became "an island of feminist strength and sisterhood in a society only familiar with brotherhood." 27

During that era, the women who were able successfully to complete some sectarian training as doctors, found their names listed in the Boston City Directory under "Physicians-Female." They were excluded from the other two categories: "Members of the Massachusetts Medical Society" and "Physicians." This overt discrimination against women is one example of the exclusionary practice of the profession. 28

When these medical schools that catered exclusively to women were closed at the beginning of the twentieth century, few women were able to obtain a place in the new reformed medical schools and hospitals. Only Johns Hopkins offered women a chance to participate, because of the power of the women philanthropists who built the medical school. 29

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27 Dorothy Clarke Wilson, Lone Woman. (Boston and Toronto: Little, Brown and Company, 1970). Helen Taussig was a recipient of the Elizabeth Blackwell award for women physicians.

28 Moranz-Sanchez, 146-147.

However, women were not treated equally, nor were they allowed to share the men's company as their colleagues. While Harvard Medical School has advanced far beyond the stage where male physicians denied Harriot Hunt the right to attend their medical lectures in 1850, by declaring that no women of "true delicacy" would want to attend medical lectures with men and that men would be unhappy about sharing a classroom with a woman who "unsexed" herself, changes were slow in coming for women seeking admission to medical school in 1920 when Helen Taussig made an appointment with the Dean. In fact, women were excluded from Harvard Medical school until 1944.30

Striving to be admitted to medical school and working to achieve the ultimate goal of M.D. motivated many women and still does. While there are many issues involved in women in medicine, this brief overview creates a background for Helen Taussig's own story in the hope that she will serve as a role model for other young women determined to enter a profession that demands much of, yet offers many satisfactions to, the participant. Helen Taussig was a unique person whose

30Walsh, Doctors Wanted, 32.
education prepared her for a career which gave her the fame that the women at Berkeley a decade or two ahead of her only dreamed of achieving. Would she have made the choices she made had she known how difficult her life was going to be? Looking at the evidence that exists in her own words and those of her colleagues, the answer has to be yes.
CHAPTER II
HELEN TAUSSIG: HER EARLY YEARS

Helen Brooke Taussig was born on May 24, 1898, in Cambridge, Massachusetts, the fourth of four children of Frank William Taussig and Edith Thomas Guild. Helen’s father, Frank Taussig, was to become the strongest influence in her life and her role model in her professional life as a physician. While her early life was full of difficulties and challenges, she added to her burdens by her choice of a life’s work in a field where she would encounter many obstacles and which would demand an extraordinary amount of self sacrifice and discipline. Helen Taussig, like all women physicians in the early years, was determined to carve out a place for herself. The strengths and motivation she developed in her early years with her family, as well as her father’s influence on her training, enforced her tenacity and pioneer spirit when she assumed her role in a man’s world that did not welcome women.

Helen’s imagination and creativity as a student were acquired during her formative years within her own
family. Both her grandfather and father played important roles. Frank William Taussig was the son of Dr. William Taussig of St. Louis, Missouri, where eight Taussig brothers had settled after immigrating from Prague in the 1850's. Dr. Taussig's successful pursuit of various occupations in his lifetime is a rare but plausible event in the United States. His diversity included jobs as chemist, physician, government official, self-educated banker, developer of a large transportation enterprise, manager and developer of a cooperative effort between railroads in a terminal organization, and eventually, advocate of school age children with disabilities. His strengths as a risk taker were inherited by his granddaughter, Helen.

Frank Taussig held a Ph.D. in economics and an LL.B. from Harvard, and was a professor of economics at his alma mater for fifty years, where he helped develop

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32 Helen B. Taussig, M.D., in a letter to James E. Taussig, II, regarding their relatives. The letter was written from Baltimore, MD, July 29, 1974, and contained references to material she was sending him including newspaper articles and biographies.

the Department of Economics. His reputation as the leading authority on the tariff in the United States led to his being selected first Chairman of the Federal Tariff Commission by President Woodrow Wilson,\textsuperscript{33} and member of the Advisory Committee on the Peace. While his writings and general knowledge about the tariff and commerce policy in the United States were widely recognized and respected in economic circles, he was at his best as a teacher of economics. He had the reputation of being a teacher who was "open minded and willing to learn, an attitude his students carried away from his classes."\textsuperscript{34} This attribute must have been inherited by his daughter, who proved to be an able student of heart abnormalities, which translated into her imaginative appeals for a surgical procedure after years of being told nothing could be done. Helen's imagination and creativity as a student were acquired during her formative years within her own family.

\textsuperscript{33} Gerri Lynn Goodman, A Gentle Heart: The Life of Helen Taussig. (Thesis for doctor of medicine, New Haven, CT: Yale University School of Medicine, 1983), 1-3.

Helen's mother, Edith Thomas Guild of Boston was one of the first women to attend Radcliffe College. She was a bright and caring mother who imbued her children with a sense of achievement and dedication to the idea that education was very important in their lives.\footnote{Helen Taussig's own words in her interview with Proctor Harvey, M.D. Her mother was very ill from the time Helen was nine years old and there is not much available information on her, although Helen said she remembered her very well. Her interest was in science and botany.} Frank and Edith were married in June, 1888, and had three daughters and one son. Edith created a close knit and intellectually stimulating environment for her children by welcoming academicians and artists into their home. Helen Taussig is quoted as saying that she felt very grateful for having had the opportunity to grow up in this type of environment.

Helen Taussig described herself to others as a "sickly child." As a young girl, she had mild mediastinal tuberculosis, and was unable to attend school full time for two or three years. She was tutored at home by her mother before her mother became ill, then by her father.
Unfortunately, Helen's mother was not so lucky as Helen in having only a mild case of TB and overcoming it without much harm. Edith died when Helen was only eleven years old, and since Helen was the youngest of the four children, her loss of her mother was probably more difficult for her than for the others, but she became closer to her father as he continued to help her with her reading because of her dyslexia. Working together was probably therapeutic for both of them.

Her father used his skills as a teacher and his patience to help her learn to read, and together they struggled until her reading began to improve. While reading never became an easy task for her, she was able to complete grammar school and high school and ultimately become competent enough to graduate from college and medical school. Experts in the field of learning disabilities have stated that girls may not be as readily diagnosed as boys, owing to their behavioral restraints, and are often highly intelligent, even gifted, although their inability to read may make them seem not as smart as others.\(^{36}\) In addition, both boys

\(^{36}\)Sandy Rovner, "Improving the Lot of the Learning Disabled", Healthtalk, The Washington Post, February 3, 1987. 11. This information was contributed by Drs.
and girls with dyslexia may fall behind in social graces, such as persuasion, negotiation, resisting peer pressure, explaining a problem, and giving and accepting criticism, and may actually be less well liked and more likely to be rejected by others. One scientist offered this alternative, "One novel treatment that should be considered is training non-handicapped children to be more accepting of the human condition. With current interest in moral and character training on the American scene, maybe this notion of training children in general to be sympathetic and compassionate and accepting of others who are not quite as lucky or quickly achieving would certainly be in the good for the public domain." I believe that Frank Taussig was this kind of person, and that he taught Helen the same kind of consideration for those less fortunate. These are probably acquired responses and both her grandfather and father exhibited empathy in their actions during their lifetimes.37

Bennett A. Shawitz and Sally Shawitz, pediatric neurologists at Yale University School of Medicine at a conference in Washington.

37Dr. Tanis Bryan, University of Illinois, speaking at a symposium sponsored by the Foundation for Children with Learning Disabilities and the
Without attempting to interpret history nor state as fact what can only be surmised, my thesis is that it was during these difficult years that Helen acquired the determination and tenacity that served her well when she began her quest to find a cure for her sick patients. Helen must have absorbed from her father the patience, compassion, and techniques she needed later on when she would help those who were disabled. She said herself that she even modeled her work habits after his.38 Surely the most important thing she learned was that everyone should be treated with respect, no matter what their disabilities are, and that a teacher has a solemn obligation to value those trusted to her care. It is this sense of compassion and well nurtured embodiment of social responsibility, acquired from her father and grandfather, that molded Helen. The New York Times obituary described Frank Taussig, dated November 11, 1941:

38Harvey article.
His primary contribution was, not his own original thinking in the field of economics, but his inspiration of original thinking in others. In his famous Harvard class, Economics 11, which he conducted continuously from 1886 to 1935, when he retired, he had trained two generations of American economists. He trained them, not to follow his principle, but to pursue honest scientific investigation wherever it might lead. He pioneered with the 'Socratic method' of teaching by question and answer. Instead of talking down to his classes he made them talk up to him. He made himself hundreds of worthy successors.

When the family left Cambridge each summer to spend that time together at Cotuit on Cape Cod, Professor Taussig took his work with him. Helen related to friends and in interviews that she observed his habits, his scholarly research, his methodical and painstaking organization, and his demand for privacy when he was working. The children enjoyed the beach, and each morning for four hours, Professor Taussig worked at his desk undisturbed. Helen adhered to the same schedule for the rest of her life, joining her guests at noon, but not before.\textsuperscript{39} She, too, liked writing at the beach, and for the rest of her life, took her scholarly articles with her on vacation.

\textsuperscript{39}Goodman, 96.
When her father moved to Washington to work on the Tariff Commission, Helen Taussig realized she was ready for a change of scene and a chance to try out her independence. After a visit to the West Coast, she asked her father if she could attend the University of California at Berkeley, and after another year at Radcliffe, she transferred and received her B.A. from Berkeley in May 1921. As discussed in Chapter 1, Berkeley probably gave Helen the impetus to decide on a medical career because she was there at a time when women students were defying exclusionary practices at the University which related to both education and career goals.40

Having tasted life on her own, and beginning to form her own identity (her father had remarried, and family gossip has always stated that she was unhappy over her new step-mother and especially about relinquishing her place in the center of her father's universe), she liked to recall coming home brimming with the idea of going to medical school to prepare for a life as a physician.

40Gordon,52.
There were few women doctors in the 1920's, and those who existed were encouraged to become pediatricians, pathologists, radiologists, dermatologists, and anesthesiologists. Even Helen's father was discriminatory in his advice to her to forget being a doctor, and consider public health, saying "That's a very good field for women." Perhaps his statement was shaped by Harvard's opening of a School of Public Health, but whatever triggered his reaction, she was inclined to compromise with him, while not giving up her idea of becoming a physician.

When Helen Taussig met with Dr. Milton J. Rosenow, the Dean of the School of Public Health, she expressed her interest in medicine and public health, even though President Abbott Lawrence Lowell of Harvard was on record as being against women medical students at his school.

Helen later recalled the conversation with Rosenow going something like this, "Well, we have decided that everyone should have two years of medicine and then we will permit women to study but we will not admit them as candidates for degrees." She replied, "Who is going

"Lorber, 22."
to be such a fool as to spend four years studying and not get a degree." To which Rosenow answered, "No one, I hope." Helen responded, "I'll not be the first to disappoint you. Good afternoon."  

Obviously she was not cowed by Harvard’s attitude, but received special permission from Harvard Medical School to study histology under Professor John Lewis Bremmer in the fall of 1921. She liked to recall the way she was segregated from the men in order not to "contaminate" them, and was given instructions to sit by herself while in the auditorium for class, and to do her studying in a little closet where she would not bother the male students. Dr. Bremmer encouraged her in her quest, and told her to stop wasting her time and go to Boston University for a year of anatomy where she would be given credit.

While at Boston University, Helen met Dr. Alexander Begg, Dean of the Medical School and Professor of Anatomy. She always attributed to him the

42A.M. Harvey, "Helen Taussig, Johns Hopkins Medical Journal, (September, 1977): 140.

suggestions that played such an important part in her destiny. One day, Dr. Begg thrust a beef heart into her hand and said, "Here, it won't do you any harm to become interested in one of the larger organs of the body as you go through medical school." She devoted herself to dissecting hearts of animals, mainly cattle, and although she did not publish her findings, she learned from her observations of muscle bundles of the heart, awakening her interest and leading to her subsequent direct role in treatment of children with congenital heart defects.

One of her early projects was to demonstrate the rhythmic contractions in isolated strips of cardiac muscle and as a result, she wrote her first paper, entitled "Rhythmic Contractions in Isolated Strips of Mammalian Ventricle." In addition to anatomy, that first year she also took pharmacology and physiology. At Boston University, she could not enter medical school and was limited to only one year of courses for credit.

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"Froslid. 50.

"See appendix for Helen Taussig's research papers.
Dr. Begg recognized Helen's determination and was impressed with her work as a student. He therefore told her that she should consider going to Johns Hopkins Medical School where women were admitted on an equal basis with men. Dr. Begg told Helen that he had heard that "one good letter from Harvard gets you in." She often noted with irony how generous it was for the dean of one university to refer her to another school.\(^6\)

Her next step was to ask Dr. Walter Cannon, a good friend of her father's and Professor of Physiology at Harvard for a recommendation. He wrote: "...if women were admitted to Harvard I would enthusiastically vote for her admission. As you are more liberal than we, I hope you will admit her."\(^7\) Johns Hopkins had the good sense to admit Helen Taussig and she and nine other women joined the class of 1927, along with sixty males.

Johns Hopkins University Medical School pioneered in the admission of women to medical schools. When their school opened in 1893, just four years after the first patient had been admitted to the hospital, they

\(^6\)Harvey interview.

\(^7\)Gerri Lynn Goodman. 50.
had planned to finance the medical school from the sale of Baltimore and Ohio railroad stock. When it became necessary to secure additional funds for the creation of the school, the Women's Fund Committee was formed in May of 1890, to help raise money for the medical school. Mary Elizabeth Garrett, Mary Gwinn, Elizabeth King and M. Cary Thomas raised the necessary funds, but imposed certain stipulations on the gift. 88 The most important of these were the demand for higher scholastic standards for admission and the admission of women on equal terms with men.

When Helen arrived at Hopkins, she was enthusiastic about her research on the heart but initially found little support for her interest. She recalled, in her conversation with Dr. Harvey, that they told her that she was to leave every day at five, and she was disappointed because at Boston University she did her research at night.

88 A brochure entitled: The Women's Medical Fund and the Opening of the Johns Hopkins School of Medicine. No author cited, but credit is given to the Women's Medical Alumnae Association who sponsored An Exhibit, Prepared by the Alan Mason Chesney Medical Archives. No date. Also, information about this same subject is in Doctors Wanted.
But Helen soon met Dr. E.P. Carter, who was in charge of the heart station at the hospital. She offered her services, and because of her previous studies, he was glad to have her and let her work in his laboratory throughout medical school. 49

After graduation in 1927, Helen applied for the prestigious Osler Medical Internship at Johns Hopkins. 50 Only one woman was going to be accepted for an internship, despite the liberal bent of the Medical School in accepting women, and Helen lost out by two tenths of a point to Dr. Vivian Tappan. At this point, Dr. Carter offered Helen a one year fellowship in his clinic, which she was delighted to accept. With his encouragement, she continued to work on the physiology of the heart, and as a result published two papers, "Electrocardiograms taken from Isolated Strips of Mammalian Ventricular Cardiac Muscle" and "Case of Bundle Branch Block Confirmed by Pathological Study."


50 There is no history of her experiences in medical school, therefore, there is a jump in time from the first year there to graduation.
Helen knew she would have to make a decision about her future at the end of the fellowship year with Dr. Carter, and she had been advised to become a pediatrician, an accepted specialty for a woman both then and now. Women were believed to be ideally suited to this work because of their nurturing and compassionate ways, and were therefore almost automatically ushered into that area of specialization.

At that time at Hopkins, the Chief of Pediatrics had just died, and the department was looking for a new head. Helen recalled in an interview that Johns Hopkins invited all the leading pediatricians in the country to come to the hospital and give the Saturday noon lecture, with the idea that the one who gave the best lecture would receive the appointment.\(^5\) Dr. Edwards Park, who had studied at Hopkins, and left to develop the Department of Pediatrics at Yale, was the winner and became new chief and Helen Taussig found a mentor who believed in her abilities.

When Dr. Park went to Hopkins, he thought the children in the hospital were well cared for, but that the children in the dispensary were used only as topics

\(^5\) Goodman.
for the teachers. Dr. Park was adamant that the chronically ill children were suffering the most and deserved special care and attention. He was determined to start a clinic for these ill children and had to overcome strong opposition from the staff, who were reluctant to change their institution to accept what was established practice at large medical centers in other parts of the country, because they thought it would ruin the dispensary and the teaching. But Park's will prevailed and he asked Dr. Carter to help him found a pediatric center.

Helen Taussig credits that as the beginning of pediatric cardiology for her, and said that Dr. Park told her that in starting this clinic, he thought men would only want to stay two or three years and then move on, but a woman, he felt, if she was interested in the project, would stick with it.52 He proved to be a very perceptive man.

52Helen Taussig, M.D. As quoted in an interview in Tucker and Lindsemith's book.
CHAPTER III
HELEN TAUSSIG'S WORK AT THE HARRIET LANE HOME AT
JOHNS HOPKINS HOSPITAL

Dr. Taussig paid tribute to her mentor, Dr. Edwards Park, after his death in 1969, when she described him as a Chief of Pediatrics who "was determined to help each man or woman develop his full potentiality." Since Hopkins had the first academic pediatric clinic in the country, she realized that she was given a special

"Dr. Helen B. Taussig wrote an unpublished paper lauding Dr. Edwards Park in 1969, after his death. Because of her closeness to Dr. Park and his family, she wrote a first person account of her knowledge of him and his life and workstyles. This seventeen page biography portrays a modest man who discovered Vitamin D which allowed the medical world to abolish rickets in the U.S., for which he was never given credit. Another significant achievement was the establishment of special clinics in the pediatric center at Hopkins which afforded chronically ill children the best care and opportunity to be observed clinically -- Dr. Taussig said the TB, cardiac, endocrine and psychiatric clinics brought children from all over the world to Hopkins. Park's deep interest in medicine lay in a search for knowledge and help for the poor, and he was best characterized as always doing what was in the best interests of the people, disdainful of money available in private practice. Obviously, Dr. Taussig shared the same values. He stimulated the intellect in young doctors by delegating authority to them in a horizontal management style rather than a hierarchical one."
opportunity when asked to head Harriet Lane. Dr. Taussig was Physician-in-Charge of the Cardiac Clinic from 1930 until 1963. During that period she was also a member of the faculty as Instructor in Pediatric Cardiology. In 1946, she was named Associate Professor, in 1959, full Professor until 1963, when she became Emeritus. In 1970, the Pediatric Cardiac Clinic at Johns Hopkins became "The Helen B. Taussig Children's Pediatric Cardiac Center."

When the cardiac center was first proposed, Dr. Clifford Leech was in charge for the first two years. After Dr. Taussig took a year and a half of internship, she went back home to Boston at Christmas. The next

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W. Proctor Harvey, M.D., "A Conversation with Helen Taussig", Medical Times, November, 1978, Vol. 106, No. 11, 28-44. This conversation with Dr. Taussig by the Editor-in-Chief, Dr. Harvey, who was a professor of medicine and Director, Division of Cardiology, Georgetown University, is full of personal reminiscences by Dr. Taussig, and one from which I quote extensively in this paper. Since there were few articles written about her life, and never a definitive book, I have had to rely on interviews such as this one.

Nowhere in my research did I read about Helen Taussig leaving Hopkins in December, and whether or not she was hurt by the way she had been treated there I don't know. She rarely allowed anyone to know of her private pain and the only thing that seemed to rankle her was the fact that she had to wait so long to become a full professor. Leaving Hopkins, if one reads
fall, Dr. Park asked her to come and direct the clinic.

Dr. Park had been impressed with the new diagnostic tool, the fluoroscope, saying that "new tools bring new knowledge." He purchased one and told Helen, "It's for you to use too, Helen. You'll learn something. You must fluoroscope all your children."

When the new machine was installed he told Helen that she was going to learn about "congenital malformations of the heart." When she said no, he said "You cannot work in a pediatric cardiac clinic and not learn congenital malformations, anymore than Dr. Kanner can work in a psychiatric clinic and not learn mental retardation, and when you do [learn about congenital malformations], it will be a great day." 656

So Dr. Taussig followed Dr. Park's instructions and began to fluoroscope all the children from a list of 200 left her by Dr. Leech with no diagnoses at all. The staff for the clinic was composed of Dr. Taussig, an electrocardiograph technician, and a social worker

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between the lines, must have been hard for her, but she had had enough. Dr. Park's invitation the next fall, for her to head the cardiac clinic, probably is what kept her actively in medicine.

656Harvey. 32,33.
who doubled as her secretary. Together they managed to locate all the children and made appointments for them to come in. The EKG machine required additional care and maintenance and Dr. Taussig spent her Saturdays making sure it was working correctly and tending to needed repairs.

Children with rheumatic fever made up the bulk of the cases Dr. Taussig was to see during her first year there. She wrote a paper describing the one hundred cases she had seen during that time, but her old mentor, Dr. Carter told her she did not have enough experience to publish her paper. Today, it is extremely rare in any clinic to see even one case of chorea.57

Dr. Taussig also felt that doing away with poverty and feeding children correctly and well, and learning to separate the sick children from the well ones at home, were important factors along with penicillin in lowering the incidence of rheumatic

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57With the advent of antibiotics, no longer is rheumatic fever a threat and no longer do the side effects of this once dread disease exist. Involvement of the nervous system produces a condition known as chorea, or St. Vitus’ dance, which produces restless fidgety involuntary movements of all muscles.
fever. She was convinced, she said, that this
discovery gave her the time to study congenital
malformations, as rheumatic fever became less and less
a problem.58

While she was beginning to diagnose children with
congenital or acquired malfunctions of the heart, the
staff of Johns Hopkins began to send all the little
cyanotic infants they couldn't do anything for to her
and her clinic.59 When the physician running the
dispensary was moving on to something else, he referred
the rheumatic babies to Dr. Taussig also. At that
time, there were not enough beds for children with
rheumatic fever, so they did not admit them to the
hospital since the recovery period was so long, and
there was nothing anyone could do for them.

Since Dr. Taussig had other duties, the clinic
only functioned three afternoons a week from two until
seven and they saw ten to fifteen patients each
afternoon. The clinic was held in an empty ward, and

58Harvey, 33.

59Cyanosis as defined in The Random House College
Dictionary, Revised Edition, (New York and Toronto:
Random House, 1980), page 331, "is blueness or
lividness of the skin, as from imperfectly oxygenated
blood."
consisted of a waiting room where the babies were weighed, and two cubicles at the back where they listened to the children's hearts, took x-rays in three positions, an EKG, the blood pressure, and a fluoroscopy on each. That was the basic setup, run by three people, until another doctor was appointed to help Dr. Taussig as they became more overwhelmed with the number of patients needing their help.60

Dr. Taussig remembers that as she became more familiar with the hearts through use of the fluoroscope, she began to realize that most of them showed a "right axis deviation and right ventricular enlargement." It was an accepted fact that transposition of the great vessels was the most common malformation found in infants, but what was not known and caused her to be scoffed at by other physicians was her observation that there was an absent right ventricle and a left axis deviation. According to her

60A fluoroscope as defined by Random House Dictionary is "a tube or box fitted with a screen coated with a fluorescent substance, used for viewing objects by means of x-ray or other radiation." An EKG, or electrocardiograph is a galvanometric device that detects and records the minute differences in potential between different parts of the body caused by heart action.
own words in her interview with Dr. Harvey, "They really thought that was a very wild diagnosis." It soon became apparent that there were other children with the same malformation when x-rays showed the same type of abnormality. Eventually, everyone began to understand that the changes in the size and shape of the heart were of great diagnostic value, because the changes kept reappearing. She recalled that the house staff was interested in her crazy diagnosis, and began to follow her observations with more than a passing interest.

After the first baby died, and no right ventricle was found during autopsy, the second child came back to the hospital and also died. During this autopsy, he was found to have a remnant of a right ventricle embedded in the heart muscle with complete tricuspid atresia and no entrance or exit. The very complex makeup of this tiny infant heart led the Harriet Lane staff to call the cyanotic babies the "crossword

61Any defect or obstruction or wrong formation in the construction of the heart obviously will cause the blood to flow the wrong way, prevent its normal entrance or obstruct its normal exit. If the obstruction’s in the aorta itself, it is known as coarctation of the aorta.
puzzles" of their work. Time and again, they examined a baby, did the x-rays, the EKG, the fluoroscope, and wrote up what they thought the diagnosis was, and in two or three months at the time of autopsy, discovered what the real formation of the heart was, or malformation, as compared to a normal one.\textsuperscript{62}

From her studies and autopsies, Dr. Taussig concluded that a child with a pulmonary atresia would always die when the ductus was closed.\textsuperscript{63}

Cyanosis is always intense. The baby is blue at birth. In contrast to almost all other malformations, the first breaths of life do nothing to relieve the cyanosis. Indeed, the establishment of respiration directs the blood to the lungs and away from the systemic circulation. The only blood which the systemic circulation ever receives is the blood from the pulmonary artery which is ordinarily destined to go to the lungs for aeration. Moreover, the oxygenated blood which is returned from the lungs to the left auricle encounters difficulty in reaching the body. Dyspnea is severe. The pulse is so weak that it is frequently impalpable. When palpable, it is of equal strength in the arm and the leg. The blood pressure is low.

\textsuperscript{62}A malformation is a mechanical defect in the construction of the heart. Another term is anomaly (irregularity) because a malformation deviates from the standard. This is not to be confused with heart disease.

With that observation in mind, she began to imagine how to keep the ductus open. In 1939, she thought she had found the answer when she heard that Dr. Gross had reported the first successful ligation of a patent ductus.  

Dr. Taussig thought that if a surgeon could ligate a patent ductus, perhaps they could build a patent ductus, the thought being that the unoxygenated blood could pick up oxygen from the lung and deliver it throughout the body. She made a trip to see Dr. Robert E. Gross in Boston, and asked him if he might consider doing this, and he told her he closed them, not opened them.  

While Dr. Taussig was in Boston, she visited her father and told him she was thinking of going to work at Boston University Hospital, where Dr. Gross was...

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"He had shut off a duct or channel which is necessary during fetal life, but which usually closes after the baby is born. It connects the pulmonary artery to the aorta. From the Froslid article.

"This was in 1939, and in the patent-ductus operation, he shut off a heart vessel which is necessary during fetal life, but which usually closes spontaneously soon after birth. After the first three operations on blue babies were successful, Dr. Gross came to Hopkins and trained with Dr. Blalock to learn how to deal with these congenital malformations."
Chief of Surgery, hoping that she might be able to further interest him in her idea. She said in several interviews in later years that her father gave this advice, "Don’t come where you are only tolerated, stay where you are wanted." And she took her father’s advice not to try to change Dr. Gross’s mind by moving to Boston, but stayed at Johns Hopkins to continue her treatment and research on blue babies.

Helen Taussig’s patience eventually paid off, for in 1941, Dr. Alfred Blalock, of Vanderbilt in Nashville, Tennessee, was chosen Surgeon-in-Chief for Johns Hopkins Hospital, and when Helen heard this famous thoracic surgeon was coming to Baltimore, she thought, "This is my chance." Vivien Thomas accompanied Dr. Blalock to Johns Hopkins where he carried out the many experiments on animals that he and Blalock had been working on beginning in 1930 when Thomas started running Blalock’s laboratory. Together they had researched the effect of

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66Harvey, 34.

67Harvey, 35.
shock on the body, and had documented their research.\textsuperscript{68}

In 1938, Dr. Blalock and Thomas used an experimental surgical technique in an attempt to produce pulmonary hypertension. This subclavian-pulmonary artery anastomosis (joining of the artery) did not produce the hypertension, but the technique was ultimately used for patients with a condition called Tetralogy of Fallot.\textsuperscript{69}

Vivien Thomas remembers one morning in 1943, when Dr. Blalock called him to ask him to meet with him and a Dr. Helen Taussig in the laboratory because she had a

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\textsuperscript{69}Tetralogy of Fallot is a heart defect that 1) has a large hole (ventricular septal defect) that allows blood to pass from the right ventricle to the left ventricle without going through the lungs, and 2) a narrowing (stenosis) at or just beneath the pulmonary valve. This narrowing partially blocks the flow of blood from the right side of the heart to the lungs. 3) the right ventricle is more muscular than normal, and 4) the aorta lies directly over the ventricular septal defect. With this defect, blood pumped to the body contains less-than-normal amounts of oxygen. This results in a condition called cyanosis, a blue discoloration of the skin. The term blue babies is often applied to infants with cyanosis. 1991 Heart and Stroke Facts, published by the American Heart Association.
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problem, and Blalock wanted Thomas to be in on the meeting.

Thomas remembers Dr. Taussig and their first meeting this way,

She was tall and slender with a pleasant personality and a distinct New England accent. I don't know how much discussion they had held previously, but she went into great detail about the problems of patients with cyanotic heart disease. There were other types, but she said she was particularly interested in the tetralogy of Fallot (Blue Baby). She described to us the anatomical abnormalities of the heart...there was not sufficient blood getting through to the lungs to be oxygenated. She also told us of the physical findings, describing the clubbing of the fingers and toes, the blue appearance of the mucous membranes and nail beds, the lack of tolerance to exercise, and the tendency of afflicted children to squat to rest...She had seen these patients in the clinic and seen their condition gradually deteriorate until they finally succumbed, there being no known medical help for them. She expressed her belief that, by surgical means, it should be possible to do something to get more blood to the lungs, as a plumber changes pipes around, but gave us no hint as to how this could be accomplished -- what pipes to put where.\(^7\)

After this urgent appeal, Vivien Thomas began to work in the laboratory on the possibility of adapting the experimental technique he and Dr. Blalock used to try to create pulmonary hypertension. Dr. Blalock was intrigued with Dr. Taussig's observations and

\(^7\)Thomas, 81.
deductions and began to try to find a practical method of making the life saving surgery possible. His vision combined with her clinical observations created a team that would introduce cardiac surgery to the medical world in a manner that was bold and dramatic.
THE BLUE BABY OPERATION

In the latter part of November, 1944, Dr. Blalock was ready to learn the subclavian-artery-to-pulmonary-artery anastomosis from his laboratory assistant, Vivien Thomas, so he could perform it on a patient with Tetralogy of Fallot. But before Blalock could schedule laboratory time to perfect his personal interpretation of the procedure he and Thomas had invented using lab animals, his small patient began to deteriorate rapidly, and he had no choice but to go ahead with the operation.\footnote{Vivien Thomas. Pioneering Research in Surgical Shock and Cardiovascular Surgery. (Philadelphia: University of Pennsylvania Press, 1985). 91-97. Vivien Thomas wrote a definitive work about the research he did for Dr. Blalock, and the ultimate discovery of a surgical procedure for Tetralogy of Fallot. This landmark surgery impacted the medical world, and today we read of and take for granted heart transplants and open heart surgery as very commonplace. At that time, there were no instruments and the facilities were woefully inadequate. For that reason, I have drawn a narrative from Thomas’s work and from Dr. Denton Cooley’s interview in 1987, to emphasize that something important happened when Blalock performed three operations in late 1944 and early 1945. Dr. Taussig had worked 17 years at Harriet Lane Clinic watching children die before she convinced a surgeon that something could be done. This chapter describes the culmination of Taussig, Blalock, and Thomas’s efforts to help "Blue Babies," and their success.}
The operation was rescheduled for the following morning, and Thomas met with the operating room supervisor to assess available instruments and equipment, and try to determine how they could improvise to perform the first pre-open heart surgery without tools designed for this exacting and critical work. While there were general and pediatric surgical instruments, there were no vascular instruments, nor vascular suturing materials. The only available instruments were bulldog clamps. So they decided to make what they needed.

The regular long needles ordinarily used were threaded with braided, treated silk, and the 1 1/8 inch needles were cut to a length of a little less than 1/2 inch, on the eye end. Thomas had developed these skills while doing the experimental vascular procedures that led to this first operation on a human patient.

The operation was scheduled for November 29, 1944, to allow time to prepare and sterilize the necessary instruments and materials. These materials included a seven-inch straight Adson hemostatic forceps to be used as a needle holder, a blunt right-angle nerve hook and smooth bayonet-type forceps to pull up the continuous
suture. The forceps would hold the vessels steady from the outside while placing each suture. Everything had to be scoured, packaged and sterilized.

On the morning of the operation, Dr. Blalock wanted Thomas at his side, and although Thomas claims he would rather have been in his lab, he took up his place on a designated stool so he could look over Blalock's right shoulder during the surgery and comment on the procedure as Blalock performed the operation. He knew the technique, he had perfected it, and now he relinquished his technique to the surgeon who would become world famous with its first trial on a human.

Other doctors present in the operating room for this historic event were Dr. Taussig, who stood at the head of the table with the anesthesiologist, Dr. Merel Harmel. The surgical team included Dr. William P. Longmire, surgical resident, Dr. Denton A. Cooley, an intern, and Miss Charlotte Mitchell, the scrub nurse.

The patient, a one-year-old girl, weighed only ten pounds and was in such bad shape she was being kept alive in an oxygen tent. This operation was the only hope for this doomed child. All the doctors feared she would not survive the surgery, and debated cancelling
the operation, but finally agreed to proceed. Dr. Cooley recalled that Dr. Harmel originally refused to anesthetize the child, fearing that it would kill her in her weakened condition.\textsuperscript{2} He had to use the open ether method since there were no masks small enough to fit her tiny face. They knew that the anesthetic was traumatic for an infant with inadequate oxygen, and in addition, by opening the pleural cavity and collapsing the lung they were placing this desperately ill patient in further jeopardy. This untried, untested procedure would involve attaching the tiny subclavian artery to the pulmonary artery so that there would be increased blood flow to the lungs and thus greater oxygenation of the baby's blood.

The operation proceeded with caution but without incident and the anastomosis (attachment of the end of the divided subclavian artery to the side of the

\textsuperscript{2}Interview with Dr. Denton Cooley, Houston, TX, 1987. Dr. Cooley explained that people had very serious misgivings about the ability of a patient with known heart disease to withstand surgery. "In those days we used to talk about violating the plural space. In other words, it meant something pretty tremendous to actually deliberately operate, open into the lung cavity. Even opening into the abdominal cavity was rather worrisome."
pulmonary artery) was a surgical success. The doctors were concerned that there was no "thrill" present when the pulmonary artery was palpated.

Postoperatively, the baby had complications but was nursed by Dr. Ruth Whittemore who sat day and night with the child. Her color had changed from blue to almost a normal pink, and she was discharged for Christmas.

In early February, a girl, aged twelve, and a boy, aged six, were operated on with success. They were in much better condition than the first patient. Yet the young girl could not walk the length of the room without squatting, and after the surgery, although the heart still had the congenital malformation, neither patient had shortness of breath, fatigue, blue skin,

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73E. Kenneth Froslid, "Helen Taussig, M.D. -- Savior of Blue Babies," Today's Health, August 1968, Vol. 46, Number 8, 63. The subclavian artery is the trunk of the arterial system leading to the arm.

74Thomas. A thrill occurs when turbulence of blood from a high or systemic pressure area, such as the subclavian artery, enters a low pressure area, such as the pulmonary artery. It is a buzzing sensation that one can feel with a finger on the vessel.

75Ruth Whittemore interview, 1987, in which she described her attention to the patient which was very complicated due to the size of the child.
and both were able to lead almost a normal life with the increased oxygen in their blood.

After the second operation, the doctors were rewarded with the sound of the "thrill" they had been seeking. (After the first operation, a decision was made to use the larger innominate artery which rises out of the top of the heart, instead of the smaller subclavian artery because it would increase the blood flow). This sound (like a cat’s purring when they put their hands on the child’s chest) was music to their ears because it confirmed that the blood was rushing into the pulmonary artery to pick up more oxygen.

One outgrowth of the three procedures was the development and manufacture of the first instruments and suitable vascular material available commercially. Within weeks after the first operation, Blalock and Thomas had a consultation with J.A. Deknatel and Son, Inc., and that firm began manufacturing fine size braided silk with needles in different sizes and curvatures which made delicate heart surgery possible. A clamp was developed which is today called the "Blalock" clamp and which allowed for the vessels to be stabilized during the anastomosis.
The operating room, scene of this dramatic innovative surgical technique, was about 18' by 20' and had a white tile floor scrubbed clean with antiseptic and grey walls. There were makeshift bleachers made of concrete steps with metal pipe railings for observers to lean on which were only three feet away from the operating table. Little more than the feet of the patient could be seen from the stands because the table was arranged so that the head received the northern light from the windows. Street clothes were allowed in the room, and observers had only to put on a cap and mask and gown to watch.

Lighting was probably the most critical element, for the vessels were very small and the suture material, very fine. Since the overhead light was inadequate, a portable light on a stand was used to illuminate the patient, and Dr. Blalock verbally ripped to pieces anyone who jostled the light, according to Thomas.

In 1945, there was no air conditioning and in order to have some air circulating in the operating room, the windows were wide open with dust blowing in. Dr. Longmire was astounded that there was not a higher
mortality rate, as he described the less than antiseptic conditions, including a nurse standing with a fly-swatter next to the operating table.\textsuperscript{76}

The temperature in the room was miserable, with the surgical team wrapped in gowns, masks, caps, and rubber gloves, with pools of sweat dripping off them. Blalock and his colleagues had to be sponged often to keep from dripping into the operative field, and with approximately 15 people in the room during an operation, moving around was difficult and often resulted in disruption of Dr. Blalock’s concentration.

After the first three surgeries were reported in newspapers across the country and around the world, parents and doctors deluged Johns Hopkins with calls and visits and requests for more information about helping children in their care who might be candidates for surgery.

\textsuperscript{76}William T. Longmire, M.D. Dr. Longmire self-published his memoirs about Dr. Blalock. I was given a copy to read, and from my notes reconstructed this paragraph, simply because it points to the difficult conditions under which the surgeons labored in those early days of heart surgery.
Dr. Blalock and Dr. Taussig, who would forever be linked after this revolutionary surgery, complemented each other in many ways during their professional life together, and one instance was their alliance in the operating room. Many of the doctors who worked with Blalock noted that when he went into the operating room, he changed from a smiling, amiable man into a tense, disagreeable one.  When tension mounted during the early surgeries and he became petulant, Taussig calmed everyone down with her calm, steadfast manner and said in her quiet tone, "'Dr. Blalock is in charge and everything is going smoothly.'" With that reassurance, everyone relaxed and continued an outstanding performance of his or her task, but most important, Blalock calmed down and regained control of himself and his invaluable technique.

No one involved in these dramatic turnarounds for the sick children, could help but be moved and affected by what they had achieved for patients that had no future until the flow of blood to their hearts increased: The children changed from blue to pink

"Thomas, Cooley, Ravitch, Longmire and other sources attest to Dr. Blalock's tension while in surgery. They all remark about it to some extent in their books."
before their eyes as the oxygen moved through their bodies. Taussig and Blalock remarked that they were overwhelmed with the changes in their patients, who went from crying, miserable children who did not have enough energy to walk across the room, to bright-eyed, pink-cheeked children bouncing around on their own. The tears of gratitude from parents and friends made their intense schedules during the early years of cardiac surgery worthwhile.

For Helen Taussig, the discovery that this surgical technique she had pressed for gave her "Blue Babies" a chance to live productive lives made her a happy person. Gone was the feeling of frustration at not being able to do anything for these children, and having to sit and watch them die, which had left her depressed and hopeless.\textsuperscript{78} While she was deluged with new patients and a heavy caseload, she never ceased giving each patient the time and attention and patience she thought they deserved. She never rushed and she systematically and thoroughly expanded her clinic in an orderly and efficient manner. She had to distinguish

\textsuperscript{78}Froslid and Ferencz. Both remarked about Taussig's emotional ties to her patients.
between those who were candidates for the surgery and those who had other heart abnormalities that would not benefit from this procedure; she diagnosed with accuracy, using a stethoscope, an EKG, a fluoroscope, and x-rays, and most importantly, her eyes.

Dr. Taussig was an expert with the fluoroscope, and it was her main diagnostic tool. She would put on her goggles, her lead apron, and gloves. Oblivious to the radiation released by the antiquated machine she used, she would calmly instruct her observers to "'get behind me,'" as she proceeded to examine the patient who had swallowed barium and stood behind the screen."9 Helen would turn the child around and look at different views of the heart while it was in motion, pulsing, beating. She had perfected this technique and by her observations could tell if the blood flow to the lungs was too little, or too much, or under too high pressure.

The doctors that were trained by her used her relatively easy techniques, so that when they saw someone with a murmur, for instance, they could do

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9Lynn Josephson, former patient, interviewed in Houston, TX, 1987.
simple tests and rule out certain problems, and not require a lot of sophisticated tests. She was always analyzing and learning, and her methods were thorough.

With the advent of the new surgical technique, Hopkins established a Fellowship program and candidates were accepted to study with Helen Taussig. Part of their duties included observing her examinations and care of patients as well as scheduling and handling correspondence and recordkeeping for her, which had gotten completely out of control.

Dr. Mary Allen Engle, Chief of Pediatric Cardiology at New York Hospital, remembers that she was a substitute intern on pediatric surgery when the first operation was performed. Later she became a Taussig Fellow. Helen told her, "'I was unprepared for the success we achieved with the babies. I thought it might help them somewhat, but it turned out better than I ever expected and the whole world immediately recognized it.'"

Dr. Engle remembers the logistics of handling all the families, where they were going to live, and a

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80Dr. Mary Allen Engle, Interview in New York, 1987. Dr. Engle spoke about her work with Dr. Taussig in the early years.
myriad of details involved in dealing with an overload of patients. The staff consisted of one secretary and one social worker, and a lot of children with rheumatic fever who still needed to be cared for. Taussig and Blalock realized they needed to develop a system to handle the hundreds and hundreds of patients they were going to care for.

He referred any new patients to her, and she did the diagnostic work, received the patients, worked them up, referred them to him when they were ready for surgery, and then he did the surgery and she did the postoperative follow up, and both worked together on the postoperative care. Each of them had a great appreciation and respect for the other's ability, and their team effort worked out very well. This professional interaction of the surgeon and clinician set a model for doctors to follow in the years to come, because in large medical centers different specialties would have to cooperate.

Helen Taussig had so many patients that even age became an issue. Everyone realized things were out of hand when Dr. Richard Ross, Dean of the Medical faculty at Johns Hopkins, went to help with some of the cardiac
patients in her clinic and walked into one of the examining rooms and saw a great huge man, a lieutenant colonel in the Air Force who had just been sent to see Dr. Taussig, scrunched up in one of her examining cribs. Dr. Ross began to assist some of the older "pediatric" patients (those over 17, it was decided) into the adult wards, and into adult cardiac care. He served in this capacity during the first five formative years of pediatric cardiology at Johns Hopkins. This experience gave him an insight that few physicians have today, since he saw many adult patients with cyanosis due to Tetralogy of Fallot. Today, thanks to the Blalock-Taussig operation, there are no adults with advanced cases of pulmonary stenosis as a result of congenital malformations because they are now corrected while they are infants.⁸¹

Dr. Ross also recalls that while Dr. Blalock and Dr. Taussig were not great personal friends, and in fact, had a lot of areas of conflict, they each had something the other needed, and decided to cooperate rather than dwell on the differences. Others described

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⁸¹Dr. Richard Ross, from an interview in 1987 at Johns Hopkins Hospital in Baltimore, MD.
Dr. Taussig's singleness of purpose as sometimes resulting in impatience. There were times when her New England forthrightness clashed with Blalock's fiery temper.\footnote{Froslid, 63.}

Yet together, this unlikely couple, a tall formidable aggressive New England woman, and a Georgia born Southern gentleman who turned cranky when under pressure, began to lay in place the framework for the kind of team that served as a model for other institutions as they began to do cardiac surgery.\footnote{Lorber, 41. Lorber refers to the perception of a woman physician's colleagues regarding her assertive qualities in 1960. When asked to rate those they considered outstanding, the women physicians who rated high on achievement, motivation, autonomy, dominance, and aggression were considered less likely than men with the same personality characteristics to be outstanding physicians in the future.}

As people descended on Johns Hopkins from all over the world, excitement was in the air. Some of the best and brightest surgical people came to learn the Taussig-Blalock procedure and when they left, they carried this message of hope across the world to children who were looking for help.\footnote{Harry Mintree, Cooley: The Career of a Great Heart Surgeon, (New York and Toronto: Harper & Row), 103-104.}
As the patients and their anxious parents flocked to Baltimore, everyone rallied round to care for the steady stream of visitors. Dr. Taussig's office handled the details for the patients and their families. When there were not enough accommodations for all the people, the citizens of Baltimore opened their homes and began to rent rooms to the Texans and Californians and Danish and Spanish, while they were being processed at the hospital.

Despite the increasing work load, Helen took her time with each patient, often causing appointments to back up. Sometimes parents and children were kept waiting hours before they were seen, and often had to come back the next day. She refused to change her standard procedure to hurry through these evaluations, and instead remained patient and kind with everyone. Dr. Catherine Neill, her associate at Johns Hopkins, says that Helen had an easy way of putting her arm around an anxious mother, and comforting her that does not come easy. She became close to each of these
children and was never too busy to listen to their fears and comfort them.**

While often these mothers with terribly sick and unhappy children behaved in a desperate, cranky and demanding manner, Helen never lost her temper. Keeping a sense of humor was important when pressure mounted, and an inside joke at Harriet Lane was gossip about "cyanotic mothers." Helen took it all in her stride, despite pressures that some people were unaware of.

While she was an intern, Helen had a severe case of whooping cough, which damaged her hearing. Her problems with more patients, increased fame, and greater responsibilities were compounded by her inability to hear well. She wore a hearing aid around her neck which was about the size of a transistor radio, and would aim it at the person she was talking to. It was difficult for her to modulate her voice, or adjust the tone because she could not judge how loud or soft it was, due to her hearing loss. At times it was high pitched, almost a screech, and often patients and

**Dr. Catherine Neill, an early Fellow from England who became a lifelong friend of Dr. Taussig's, spoke at length of Dr. Taussig in an interview at Johns Hopkins in 1987.
parents would say, "I couldn’t understand her, what did she say." This created additional stress for her, because she was aware that her lack of hearing was a problem, and in meetings she was aware of others’ lack of patience with her disability."

During the early, hectic days in this new field, in late 1945, Dr. Blalock was looking for help in diagnostic tests crucial to the surgical procedure, and in an effort to free his staff of one portion of the load, asked Dr. Richard J. Bing to establish a laboratory to study cardiac physiology. Vivien Thomas and Dr. Bing worked closely together to set up the laboratory for cardiac catheterizations, where they performed the first on a four year old boy to determine the interatrial septal defect by measuring blood gases for oxygen. With the perfection of this procedure, Dr. Bing was able to perform vital tests for the surgical team, which encouraged Dr. Bing to develop the use of the cardiac catheter as a sophisticated instrument in the diagnosis and study of cardiac disease and he eventually trained many of today’s cardiologists in its

\[66\text{Mary Allen Engle.}\]
\[67\text{Neill, Engle, Ross.}\]
use. Dr. Bing was an innovator and inventor of a technique that has played an important part in the development of open heart surgery, even though when originally asked to perform this service, he was reluctant and resisted because he didn’t like the idea of cluttering up his lab with simple blood gas analyses.  

When Dr. Blalock set up the cardiac training program for the Fellows about this same time, he utilized Dr. Bing’s cardiac catheterization lab for conferences where the patients were presented and the data analyzed and the pictures and pressures were studied. Dr. Engle and her husband, Dr. Ralph Engle were present at the meeting of the Hopkins Medical and Surgical Society, where she remembers,

The children came marching in, and Dr. Taussig told their stories and she had given each of them a stethoscope so that they could come up the steps and anyone who wanted to listen to the murmur (thril) that the operation created could listen. She described to her colleagues how limited their lives had been beforehand, and what they were able to do now, how their quality of life had improved. They looked nice and pink, and the meeting was very impressive. Dr. Blalock and Dr. Taussig were

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88Vivien Thomas, who worked closely with Dr. Bing at the beginning, spoke of Dr. Bing’s reluctance in his book.
very modest about their roles, but were very pleased with what they had accomplished.\textsuperscript{89}

That was the first cardiac surgery conference and forerunner of those held today in most medical centers on a daily basis. New ideas were developed by just thinking through and dealing with the logistics of the new procedures, and people have followed their lead ever since.

As the case load grew, Dr. Taussig was unable to obtain more space, supplies and help since she was not head of her department as was Dr. Blalock. Often, her colleagues recall, her frustration was overwhelming for her. As long as Dr. Edwards Park was Chief of Pediatrics, her mentor and friend, she had someone who would find her what she needed. After all, he had given her the job in the Harriet Lane Clinic originally, brought in the fluoroscope and told her to learn about "congenital malformations of the heart."\textsuperscript{90}

Dr. Park retired in 1947, and Dr. Richard Schwenker took his place. Just when Dr. Taussig was

\textsuperscript{89}Mary Allen Engle, from a taped and transcribed interview in New York in 1987.

\textsuperscript{90}Discussed in detail in Chapter III.
expanding her program with more demands from patients and more work to do, she lost the support she needed to achieve the very best care and attention for the patients clamoring for help.

Dr. Schwenker found it difficult to handle his emotions regarding the fame of an Associate Professor on his staff, a woman, who was receiving attention and adulation from parents, patients, and doctors all over the world. He was not forthcoming with either emotional or physical support for Dr. Taussig during the busy years following the invention of the Blue Baby technique. Dr. Taussig's former colleagues recall that she had a difficult time getting the larger facilities and improved physical plant necessary to handle an incredible workload. At one point, when she inquired about an internship for a young woman doctor, Dr. Schwenker told Dr. Taussig that no woman was going to receive an appointment on his staff while he was head of the department. However, his tenure as Chief of Pediatrics was rather short.\footnote{Ruth Whittemore, Ross, and Neill interviews in 1987.}
Many who were present during those days have discussed why it took so long for a physician who had brought fame and fortune to Johns Hopkins to achieve the rank of full professor. Why did they make her wait fourteen years for the promotion that meant so much to her? Sex discrimination was surely part of it, but Dr. Dan McNamara, former Chief of Pediatric Cardiology at Texas Childrens Hospital recalled in a conversation in 1987 that it was hard for anyone, male or female, to climb the ladder at Hopkins or Harvard in those days.

Despite the controversies, one certainty emerged as a direct result of the operation. A new sub-specialty in medicine was born. Pediatric cardiology was officially recognized one year before Dr. Taussig retired. Between 1942 and 1962, "123 physicians trained

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92Lorber. 64-69. In her chapter about "getting ahead" she addresses the difficulties that women physicians faced unless politically connected or sponsored by someone powerful within the system. Promotions were slow in coming, no matter what the achievements were. Neither men nor women with the power to advance women rarely do, even today. As studies done in 1981 and 1979 indicate, many medical schools as well as numerous individual departments have no women physicians either at the professor or associate professorship level or in any administrative post. The same data showed that it took twice as long for women as for men to go up the ladder from assistant to associate to full professor.
for one or more years studying pediatric and congenital heart disease at the Harriet Lane Home at the Johns Hopkins Hospital under the direction of Helen B. Taussig...this sub-board of pediatric cardiology was actually the maturation, not the birth of a new discipline...for the preceding 32 years she had been practicing and developing the science of pediatric cardiology."³³

Dr. Charlotte Ferencz, a friend and Fellow of Dr. Taussig's, remembers being at McGill in the spring of 1945 when someone rushed into the room where she was at a tea for women students, and said that a woman in Baltimore had come up with a way to turn "blue babies" pink! "It was unthinkable that an operation could help these very sick medical patients. And I had never heard of Baltimore!"⁴⁴ Dr. Ferencz recalls that when she arrived at Johns Hopkins to begin her Fellowship she sensed that Dr. Taussig was very lonely and

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³³Dan McNamara, M.D., Helen B. Taussig: The Original Pediatric Cardiologist, Dedication of the Helen B. Taussig Children's Heart Center, Johns Hopkins Hospital, Baltimore, MD, December 8, 1983.

⁴⁴Dr. Charlotte Ferencz.
unhappy, and Dr. Ferencz told herself that if that was
the price one paid for fame, she didn't want it.

However, fame did come to both Taussig and
Blalock. They shared the Lasker Award and the Passano
Award, as well as the French Legion of Honor. Many
independent awards were given to each of them, in the
fields of pediatrics and surgery. They were invited to
speak at national and international meetings, and were
the toast of Europe on their first visit abroad after
the first three operations were successfully performed.
There they spread word of their innovative technique,
gave lectures and performed surgery to spread the news
internationally that there was a way to save children
with congenital heart defects after all.

On the occasion of their visit to England, Lord
Brock, director of the Royal College of Surgeons said
that

everyone was eager to see and hear Dr. Blalock.
It was an unforgettable occasion to anyone who was
present. . . .when he and Dr. Helen Taussig gave a
combined lecture in the Great Hall of the British
Medical Association. Dr. Taussig delivered her
address impeccably and was followed by Dr.
Blalock, who presented his surgical contribution
with his characteristic, apparently casual drawl,
but really it was a forceful and incisive
presentation of his brilliant and impressive
results. The silence of the audience betokened their rapt attention and appreciation.95

Eventually children as young as three months were able to tolerate this surgical procedure which kept them from having the side effects caused by lack of oxygen. Although ultimately a surgical procedure was perfected to correct Tetralogy of Fallot, the Blalock-Taussig shunt is still used today under certain conditions, one of which is in a very small infant. Although the Blalock-Taussig shunt was originally a palliative procedure, the total correction does not do more for the children than the original invention.

Dr. Cooley further stated that the procedure was called the Blalock operation by the surgeons, and the Taussig-Blalock over at the Harriet Lane Clinic. It just depended whether you were a surgeon or a pediatrician. "But fundamentally," he stated, "I think the credit belongs to the person who has the idea—makes the clinical observation. I’m glad that both

95Mintree,103. Apparently Dr. Brock, a surgeon himself, felt Dr. Blalock was the star. Nevertheless, Dr. Taussig was present to add to the drama of the presentation.
their names have been perpetuated in this, because, in my mind, it was the real dawn of cardiac surgery."

And in retrospect, surely some luck and circumstance combined to create a triumvirate that included Helen Taussig, student of the heart's action and advocate of babies born with a cruel defect who was looking for a surgeon who could implement her ideas to help these patients; Alfred Blalock, surgeon and scientist, who studied shock and the heart's mechanism for years before coming to Johns Hopkins as Chief of Surgery; and Dr. Blalock's faithful and dedicated lab technician, Vivien Thomas, who actually performed the experiments and was the person who perfected the specific technique suggested by Taussig that would eventually be used on humans. They all came together at the right time in the same hospital, and Helen Taussig's visit to Boston to ask Dr. Gross for help no longer had any significance.

During those early years, 1945-1955, these three found themselves forging ahead in an unexplored field,

96 Usually only the surgeon has his name on a surgical procedure, but Dr. Blalock added Dr. Taussig's name because she had the idea and pushed for it.

97 Thomas, 38-39.
breaking down barriers that led to innovations and techniques which other surgeons expanded on within the heart itself, and which eventually led to actual heart transplants. Helen Taussig’s story is overwhelming because she made the discovery, had the original idea, pushed for the surgery when no one else was interested, and as a result many lives have been and still are being saved every day.
CHAPTER V

1945-1963: MENTORING AND CONTROVERSIES

BUSY YEARS FOR DR. TAUSSIG FOLLOWING FIRST BLUE BABY OPERATION

In Dr. Taussig’s professional and personal life in the years that followed the revolutionary procedure she invented with Dr. Blalock, there were three dominant areas: 1) her work with her "Fellows", who played an important role in her life; 2) her interest in her patients and their families, and her ongoing involvement with them, including a scientific follow-up over a twenty-eight year period, which was not a standard practice in medicine, and is unique even by today’s standards; and 3) her willingness to take a stand on controversial issues, including thalidomide, abortion, the use of animals in laboratory experimentation, and other medical topics that are still being debated.

1) While Dr. Taussig harbored some bitterness at the end of her career for the discrimination she felt she had experienced due to her gender, she remained loyal to Johns Hopkins, and stayed there until she retired.
She loved teaching, and doing research, but most of all she enjoyed making rounds with her Fellows and being part of the hospital life.

Certainly she could have commanded a much higher salary in private practice, or even on the lecture circuit in later years, speaking of the life she had led and the excitement of seeing babies turn from blue to pink. However, it is obvious that material goods were not important to her. She did her share of traveling and lecturing, but to her, home was Baltimore and Cotuit, where she enjoyed entertaining her Fellows at dinners and cook-outs on the beach, and relaxing in those places gave her a sense of security and peace. Her lifestyle was pleasant, but unassuming and unpretentious.

The Fellows program began as a means of providing them with hands-on training in pediatric cardiology, and gave Dr. Taussig the opportunity to have some help when she was dealing with large numbers of patients and their families. She was responsible for diagnostic workups and a tremendous amount of paperwork, and the Fellows performed some of the support duties. They came from all over the world for a chance to learn about the heart. Dr. Dan McNamara, who came to Johns Hopkins from Houston when he was a young pediatrician,
said that his mentor Dr. George Salmon, told him to go "study with that woman." Dr. Salmon said that he had used Dr. Taussig’s book about congenital malformations of the heart in his practice, often examining patients while holding the book in one hand and the stethoscope in the other.

In a brief essay, Dr. Taussig described McNamara’s years as a Fellow, and her words give a special insight into the Fellows’ role." He began in July 1951 and worked at Hopkins until August 1953. Dr. Taussig had eight at that time, four from the U.S. and four foreign Fellows. During those years, she escaped the pressure by going to Cotuit in the summer to write and letting the most experienced second year Fellows take charge of the clinic while she was gone.

During the fall, she was back and teaching the Fellows the a-b-c’s of clinical cardiology. They learned techniques for a careful history taking and physical examination of each patient, how to perform

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"Dan McNamara, M.D. Personal interview with him in Houston, TX, Spring, 1987.

"Helen Taussig, M.D. "Dan McNamara’s Years of Training," no date, may have been published in a tribute to Dr. McNamara. I have a copy of Dr. Taussig’s manuscript."
their own laboratory work, how to read an EKG (performed by a technician), and how to present patients for x-rays. Together with the students, Dr. Taussig fluoroscoped the patients, and often called for a cardiac catheterization or angiocardiogram. Then the surgery was scheduled as indicated.

Everything was "hands-on" and the Fellows worked closely with the physicians and technicians who taught them how to interpret the data. Every Monday evening there was a conference for general review and on Saturday mornings there were rounds.\(^\text{100}\)

On Sunday afternoons and evenings, Dr. Taussig held her house open for all the Fellows, their wives and friends. They enjoyed the garden, walking, canoeing, fishing or "just relaxing." In the evening, they had sherry and dinner by the fire. These bonds were strengthened by biennial reunions of the Fellows, which they all looked forward to as opportunities to keep in touch.

Dr. Taussig wrote that "the friendships we formed through work and play, the honest exchange of ideas and experiences, the frank discussions of our difficulties,\(^\text{100}\)

\(^{100}\)Taussig. "McNamara".
as well as our successes, cemented the bond between us." These Fellows were Helen Taussig's family, and signified the marriage of her profession and personal life.

2) The second point of significance in her life after she achieved great success as an inventor, but equally as important as her Fellows, were her patients. While she was actively practicing medicine, her patients got her undivided attention. As we have seen, she refused to be hurried when she was examining a young patient, taking time to talk to the parents, and getting to know them and assess their fears and anxieties. She particularly mourned a young girl who died during surgery, when she recalled that the child had been afraid of the operation.101 She didn't believe that a patient should be forced to do something she feared and blamed herself for not cancelling it when she realized the child was afraid.102

One of her patients, Lynn Josephson, interviewed in Houston in 1987, spoke of Dr. Taussig’s genuine

101Harvey, 48.

102Taussig. "Difficulties, Delights and Disappointments." A lecture given in Houston, TX.
concern for and ongoing interest in each of her patients. They developed a reliance on her being there for them, and many of them wrote to her to tell of their lives, their marriages, children, and other events of importance. She was always happy to know what they were doing, and to encourage and support them in every way when they called, wrote, or came to visit her.

When she was awarded the first fellowship award for scientists in retirement in June of 1963, by the National Foundation of the March of Dimes, Dr. Taussig decided to use a portion of the $40,100 prize for a twenty-plus year follow-up study of blue babies operated on by Dr. Blalock from 1945-1950. This tremendous project involved locating approximately 1,000 former patients, by writing to family, friends, neighbors, city health departments, the family doctor, and/or the Children's Bureau. Once the former patients were located, she went to see them or asked the patients to come to see her; she would then review their recent medical history, and interview the patient.

103Lynn Josephson. Houston, TX, taped interview in 1987.
regarding his/her life today. Through this process, Dr. Taussig and her associates were able to study 799 patients for a 92.8 per cent follow-up for ten years, and an 88 per cent follow-up for fifteen years postoperatively.\textsuperscript{104} All the statistics reveal the success of the original operations and of the patients in living, marrying, having children and enjoying the health they were given through the early operations. Without the surgery, these patients who were operated on from 1945-50, would have died. The most significant achievement of Dr. Taussig's study is the reaffirmation of her early conclusions, that these patients were not damaged by their early cardiac insufficiencies and, with the proper amount of encouragement and rehabilitation, were able to achieve scholastically, personally, and professionally. Despite a handicap, they were able to successfully pursue their life's goals as she had done.

Dr. Taussig's follow-up of patients ranged from twenty to twenty-eight years after the first operation.

\textsuperscript{104}Goodman, Thesis. She details specifics of the investigative procedure, and information about individual patients and their lives from the report. Space does not permit my going into lengthy discussion of the study. 83, 86.
She and her colleagues wrote a series of papers about their observations and conclusions regarding specific defects and subsequent successes in leading fulfilling lives. One story that made her especially proud and happy was that of an eleven year old operated on in 1946, who became the youngest full professor of law at the University of Missouri. Another former patient wrote Dr. Taussig to tell of camping out at 12,000 feet while "lugging 20 pounds of squirming son...my gratitude remains as it was when I awakened and slurred the question, 'Was my operation a success?' through the window of the oxygen tent, and saw your warm and radiant 'Yes'."\textsuperscript{105}

3) As Dr. Taussig was enjoying the study of her former patients, she was drawn into a controversy to which she was able to lend her name and reputation. One of her former Fellows from Germany, Dr. Alois Beuren, came to see her one evening when he was in the U.S. and in the course of bringing her up to date on his activities, mentioned the rise of phocomelia in his country, in which children are born with flippers for

\textsuperscript{105}Baltimore research, 1969. Goodman.
hands with no arms or legs. As Dr. Beuren described the terribly malformed infants he thought that the defect was caused by a sleeping pill sold over the counter in Germany which was called Contergan, or thalidomide. The United States was at that time considering granting permission to a pharmaceutical company to produce pills containing thalidomide, but Dr. Frances Kelsey of the FDA was withholding permission, suspecting that there might be unknown side effects which were yet unproved. Dr. Taussig decided to do some investigating of her own, and flew to Germany in February of 1962.

Some of the German doctors were convinced the cause was external, since they could not pinpoint a genetic defect. The researchers were looking for something new that produced a malformation never seen before. Helen Taussig went from hospital to hospital to see the different cases, each of them the result of some unknown cause. Surprisingly, the only hospital in Germany without any phocomelia was the American Army

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106Harvey. "A Conversation with Helen Taussig". 40-43. Dr. Taussig tells in her own words what happened to awaken her interest in thalidomide and what action she took to prevent its use in the U.S.
Hospital. Their staff had not had one incidence of deformed infants, even though they were well aware of the drama unfolding around them.

At the time, German doctors were attempting to link the deformities to a cause. One of the suspected agents might have been Contergan, and some felt that with that drug off the market, the crisis was over. Helen Taussig countered with her opinion that if a single 50mg to 100mg tablet could cause a defect between the 20th and 42nd day after conception, then obviously the question was larger than just taking one offensive tablet off the market. Her concern was about all drugs taken by pregnant women and their effects on unborn fetuses. She began to formulate the idea that all drugs might have effects less obvious than the thalidomide one, and some of these defects might not surface until puberty, for instance. The effects of minute amounts of chemicals on babies in the womb would be much harder to trace, and the effects could be devastating years after the damage had been done. Her research found that Contergan had been sold under many different names as a relief for flu, headache, asthma, migraine -- marketed under 100 brand names throughout
the world. The potential for the harmful ingredient to reach an unsuspecting pregnant woman (who would be in the early stages of pregnancy when the damage would be done to a developing fetus) was staggering.

Before Dr. Taussig left the United States to go to Germany on an investigative mission, she was aware that Dr. Kelsey of the Food and Drug Administration had been holding up the marketing of a drug containing thalidomide in the United States, resisting intense pressure from pharmaceutical lobbyists who were anxious to sell it as a drug to prevent nausea during early pregnancy. Dr. Taussig felt that what she learned about the use of thalidomide and the tragedy of babies born to mothers who had taken the drug early in their pregnancy would be helpful to Dr. Kelsey. Dr. Taussig reported her findings directly to Dr. Kelsey upon her return. Dr. Kelsey had done absolutely the right thing for U.S. citizens by preventing its use here. There would most assuredly have been thousands of deformed babies in the United States if thalidomide had been sold in this country to women in the early stages of pregnancy, when thalidomide did the most damage to the forming fetus.
One example of how a woman might be effected was the controversial case of a U.S. citizen. Sherri Finkbine took a sleeping pill made in England early in her pregnancy, and upon learning of the effects of thalidomide, requested an abortion in the U.S., which was denied, and ultimately had to go to Sweden for an abortion. This focus on abortion laws in the U.S. caused Helen Taussig to remark:

We are still fighting the Right to Life group who are so completely convinced that life is sacred from the moment of conception 'til birth. As far as I can see, after birth they don't give a hang what happens to the child or what sort of a child is born. They take no more care until the person is dying and then they absolve him from sin.^[107^]

Dr. Taussig offered to testify before the Kefauver Committee to educate them with pictures about what had happened in Germany. She was ridiculed as not knowing anything about drugs by the Senators on the committee since she was not a pharmacologist. When she finished her presentation using pictures of some of the least deformed children she had encountered, she observed their shock and dismay over the tragedy she described. She concluded her presentation by recommending to the

Congress that all drugs should be labeled with both positive and negative side effects in the same size print. The Drug Amendment of 1962 considerably strengthened the FDA's control of experimentation at the human level.\textsuperscript{108} The FDA was given broad restrictive powers relating to the use of new and experimental drugs.\textsuperscript{109} Dr. Taussig was quoted in the \textit{New York Times} in 1962:

\begin{quote}
It is essential to improve both the techniques for testing and the legal controls over the release of new drugs. It happens that thalidomide-containing drugs did not reach the market in the United States. This was because of a lucky combination of circumstances and the alertness of a staff physician at the FDA -- not because of the existence of any legal requirement that the drug might have failed to meet.

Always interested in the unborn child and well aware of the hazards the unsuspecting mother might incur through use of alcohol, drugs, cigarettes, and other environmental poisons to the fetus, for the rest of her life Dr. Taussig continued to research, study,
\end{quote}

\textsuperscript{108}Goodman. 75.

\textsuperscript{109}In recent years, laws have forced drug companies to carry their warnings one step further by requiring labeling of drugs to signify any hazards to one's health.
and speak out in favor of limiting potential damage to the fetus.

Dr. Taussig was always an advocate of preventative medicine, including the elimination of smallpox, German measles, and other viruses that might even cause some of the heart defects she observed when she first began practicing medicine. She believed that bringing a healthy child into the world was vital to the quality of life of the family as well as the child, and felt that amniocentesis was important in pinpointing defects that should lead to abortion. This, she believed, was an opportunity to allow a mother to then conceive and deliver a normal child, which would allow the country to use the tremendous amounts of money spent on disabled children in constructive ways and prevent a family from being handicapped itself while caring for a seriously handicapped child. While this may sound harsh, Dr. Taussig had seen the effects on families who loved their children no matter what defect existed, but who found coping with the strains and pressures unbearable.\textsuperscript{110} Often the families became dysfunctional, and the other children were denied a normal existence.

\textsuperscript{110}\textit{Lynn Josephson interview.}
because of the demands on the parents. Most importantly, Dr. Taussig argued her point, children "long to be normal," and after years of taking care of them she felt that aborting a defective fetus was kinder than bringing a disabled child into the world.

Dr. Taussig had very strong opinions about controversial issues still being debated today, and never hesitated to state her viewpoint publicly in later years. She was a strong pro choice advocate, believed that socialized medicine was inevitable, and decried the harmful effects of malpractice suits on the practice of medicine. She didn't hesitate to add that in her opinion keeping people alive when they were brain dead was unproductive. She believed that there should be three types of medical education: public health education for the community; a school of medicine to take care of the sick; and a medical school for health maintenance that takes care of health with routine physical examinations and medical histories of the patient. These jobs could be performed by young men and women who were not doctors, and could include blood pressure tests, Pap smears, and other diagnostic tests that do not require an M.D. degree. Prevention
of illness was a major responsibility of the medical community, in her opinion.

Helen Taussig's final years practicing medicine were spent as she had spent all her life, encouraging students to work hard and do their best, supporting and befriending patients and their families and encouraging them to lead normal, productive lives, and giving everyone the benefit of her years of experience and motivation. Her interest in children did not end with their birth or youth, but was focused on providing each child with the potential for a life that would be productive and rewarding, leading to a quality existence that she felt each deserved.
In 1963, Dr. Taussig retired as physician-in-charge of the Harriet Lane Clinic, leaving the work she had begun in 1930, but never ending her inquisitive and energetic search for knowledge and productivity. She continued to receive honors and awards for her contributions to medicine, and traveled and made speeches throughout the United States. She was delighted to see the FDA adopt new drug regulations in 1963, after working closely with them on the issue of stronger warnings on over the counter drugs.\footnote{Goodman, 80.}

In 1964, she had the Stapes procedure performed on her right ear which gave her some hearing that lasted about ten years.\footnote{Goodman, 19.} She was quoted as saying that this procedure gave her "some delightful years."\footnote{Mary Allen Engle, interview 1987.} As mentioned earlier, friends speculate that she was afraid to take the chance on surgery when she was
involved with the blue babies, but after her major work was over, decided to take the risk to retrieve at least some of her hearing.

In 1970, the Pediatric Cardiac Clinic at Johns Hopkins Hospital was named the Helen B. Taussig Children’s Pediatric Cardiac Center. Many paid tribute to her on that occasion, including some of the Fellows who had studied with her. Former patients, parents, and colleagues joined in honoring her at this special ceremony, and spoke of her early life, her schooling, and her work at Hopkins, all lauding her contributions to pediatric cardiology and the Blalock-Taussig procedure.

Dr. Taussig had by 1983 received honorary Doctorates from twenty universities, some of which had refused admission to her when she was a young student. There must have been a tremendous satisfaction in receiving these awards.\(^{114}\)

While there were some who described Helen Taussig as "bitter," her friends and colleagues speak of her reticence in discussing her early trials in her quest

\(^{114}\)See appendix for curriculum vitae of Dr. Taussig.
for respect as a member of the medical profession.\textsuperscript{115} Dr. Mhairi MacDonald, who lived with Dr. Taussig when she was in the U.S. from England studying for her boards, says that she thought Dr. T. was quiet and private when she attended formal ceremonies, but that before dinner with a glass of sherry, she was not hesitant to discuss the kinds of discrimination she had endured. Dr. MacDonald thought that Dr. T. enjoyed telling good friends about gender problems that existed in the medical profession, and the way men had treated her during those years.\textsuperscript{116} Dr. Taussig was 74 years old when Dr. MacDonald knew her. It was also the impression of close friends like Ruth Engle, that as Helen Taussig aged, she became less tense and began to enjoy herself more. As she relaxed, she became more open in her discussions with others about her private feelings.


\textsuperscript{116}Mhairi MacDonald, M.D. From our interview February, 1993. Dr. MacDonald said that Dr. Taussig approved of a glass of sherry, but disapproved of caffeine, saying it causes heart arrhythmias, and did not allow anything containing caffeine in her home.
Whatever her feelings about her difficult years, Helen Taussig ended her life doing all the things she really loved. She was still performing research, was in touch with her Fellows by phone, letter and personal visits, still heard from patients and their families, and continued to spend the summers in Cotuit. She continued to lead a disciplined life with time allocated to work and scholarly writing, as well as being with friends. She moved to a home for retired people in Pennsylvania and was quick to point out that it was not a "nursing home." When she was killed in an automobile accident as she drove away from a shopping center, she was 87 years old and still a productive member of society.

Dr. Taussig had lived her life as though it was a challenge, and never backed away from the difficult task she had set for herself. She was a product of a Victorian society who grew from a determined young woman into a successful professional whose insight had global impact. The awards and honors bestowed upon her by international organizations and countries attested to her achievements not only as an inventor but as a woman physician. Her election as first woman president
of the American Heart Association was a further mark of her colleagues' respect.

While not many women were empowered in her era, and while her power was certainly limited, nevertheless, she was the manager of a staff, and chief physician in a clinic that diagnosed and treated thousands of children during the thirty-three period she was in charge.

My observations about power include the desire of the newly empowered individual to surround himself/herself with "perks" as we call them to today, but which serve to elevate and segregate the person with power. These include special privileges, such as private chauffeur driven cars, club memberships, special assistants, titles, and a position calling for the skewed deference of others. She sought none of these, and in reading about her life, one friend makes reference to the tiny apartment Dr. Taussig lived in until, much later, the time came when she was able to build a one story house in Baltimore on a piece of land "someone arranged for her."117 She was making about $35,000 when she retired, and probably received a small

pension from the medical school. She was not wealthy, and remained loyal to Johns Hopkins despite an unresolved unhappiness toward the school for not giving her a full professorship for fourteen years after the first Blue Baby operations.\textsuperscript{118}

The only evidence of her demanding more of anything was her plea for more help when the many sick patients began to arrive in 1945 to await surgery. As mentioned earlier, during this period the idea of having Fellows assist Dr. Taussig developed and became a marvelous experience for both the Fellows and the doctor.

Apparently, having some power did give her the assertiveness she needed to cope with her peers, who had not been kind during the years when she was suggesting that these heart defects were congenital. The skeptics were quiet after her suggestion worked, and it seemed that those who were jealous resented Dr. Blalock more, perhaps because at the beginning he received all the accolades. However, he died in 1964, and in the final analysis, Dr. Taussig probably

\textsuperscript{118}Harvey. This statement by Dr. Taussig appeared in print when he interviewed her, but in addition, friends confirmed her feelings.
received more awards than Dr. Blalock, even if they were slower in coming.

Dr. Taussig's empowerment cast her in a matriarchal role with both her patients and her students -- the Fellows. Many of them recalled in recent interviews that they felt she was like a "mother" to them, always concerned and interested. Probably the patients were drawn to her, as Lynn Josephson remarked, because "in a sea of anxiety she had a calming effect...I remember her as safe...she would warm her stethoscope before she put it on my chest by rubbing it with her hand." Another of Dr. Taussig's attributes that Josephson emphasized was her calmness in the face of what were certainly frightening circumstances for very young children.

Because of Helen Taussig's struggles with reading, she learned self discipline very early in life, when

119Lynn Josephson. Interview in Houston in 1987. She remembers Dr. T. reaching out to put her arm around Lynn's shoulder and Lynn pushed her away. Lynn said Dr. T. really loved her patients, but at that time Lynn was too angry to be receptive. She says Dr. T. was never intimidating or condescending, and always remembered her. Even when Dr. T. became an Emeritus, she went to the hospital with Lynn and her mother and accompanied them to a doctor who was to remove a nodule from Lynn's thyroid.
most children shouldn’t have a care in the world. This self control served her well when she was placed in high pressure situations in the hospital. She was dealing with very sick children, anxious parents, and a new procedure. There must have been times when she thought she might explode or surely must have wanted to. However, she was always patient, thorough, and kind to the patients and their families. While her empowerment and success with a new procedure that she had spoken for with great enthusiasm and aggressiveness must have made her feel wonderful, she never assumed an air of superiority around her patients.

I am convinced that she suffered from what today we might call low self esteem or an inferiority complex due to her dyslexia, her height, her lack of hearing, and her stammering. But, while this sense of inferiority perhaps contributed to her humility, it did not affect her concerns about the babies she was watching die before her eyes. She was more than willing to break with the passive roles of the past because she was convinced that she was urging surgeons to cooperate in saving lives. Some doctors viewed her

\[120\] Ruth Engle interview. 1987.
as aggressive, and the surgeons were not pleased with her inquiries and determination to make them find an answer to the problem. But when Dr. Blalock arrived, Dr. Taussig found her partner. Dr. Blalock, a quiet southern gentleman, and Dr. Taussig had personality conflicts, but each respected the other. Dr. Taussig confided to friends that she had to push him to make him do what she knew he could do.  

While her motivations were altruistic in her assertiveness with Dr. Blalock, perhaps jealousy was more prevalent in her feelings when Dr. Richard Bing was given the job of heart catheterization diagnoses by Dr. Blalock during the early years of the blue baby operations. Surely some of Dr. Taussig's feelings were associated with invasion of her turf by Dr. Bing, and she was antagonistic, and not even receptive about the idea of this new procedure being thrust into her structured work-up of potential candidates for surgery. Yet she did not fight him in a battle she would have lost, even though she may have felt frustrated, because this catheterization technique was important to her babies also. Dr. Bing told me in 1987 that he and Dr. 

\footnote{McDonald. Interview.}
Taussig had a love/hate relationship, and that they respected each other although they were antagonists. They learned to work as a team, and although they may not have started out as partners, they learned to work together, and ended up liking each other.

It is my conclusion that Dr. Taussig learned to control herself when treated unfairly, did not treat others unfairly as a result of any discrimination, and was not a despot when empowered. She did not become abusive to others as a result of whatever power she achieved during her lifetime. I credit this to the early love and attention she received, as well as the training and self discipline she was taught. In other words, she never thought she could have her way by throwing a temper tantrum or threatening anyone with her power. She learned early on, to go around obstacles, to change, to adapt to new situations, even though they were not to her liking, and to seek every opportunity for higher education and a life of productivity as her options unfolded. Compromise was her key to a successful life.

I conclude that being raised to be compassionate and empathetic to others and their misfortunes, defused
any tendency to overreact toward those who just happened to be around when she was under pressure. She had acquired a balance and a centeredness that only come with practice and a strong sense of identity.

In 1978, Dr. Taussig was a visiting professor at Baylor University where she gave a talk titled "Difficulties, Disappointments, and Delights in Medicine." She prefaced her remarks with the reminder that "that which is a disappointment at the beginning often proves to be your good fortune in the end." In reflecting on her own disappointments, she reaffirmed her dedication to academia, and to the moral obligation to make the knowledge you acquire available to others.

Dr. Taussig recalled Emerson's:

When ye shall say, 'As others do, so must I. I must eat the good meat of the land. I renounce I am sorry for it, my earlier visions. I must let learning and romantic expectation go until a more convenient season,' then dies the man in you; then once more perish the buds of art and science and poetry, as they have died already in a thousand, thousand men.\(^{122}\)

She attested that the mix of learning and study and romantic expectation were basic ingredients in art, science and poetry. But these must also merge with

\(^{122}\)Taussig. "Difficulties, etc."
observation and deduction, she believed. Even with the
newest technological advances in science and medicine,
she contended that original work which comes from one's
own experience, observation, and deduction are the most
vital ingredients.

Without the art of medicine which includes
kindness, compassion and human understanding, medicine
is bereft, Dr. Taussig maintained. She stated in her
article about her own difficulties, "we have to treat
our patients individually, to put ourselves in their
position. We must try to assess their reaction with
their temperament and not with our temperaments."
These were Dr. Taussig’s basic tenets with respect to
the practice of medicine, the ones she espoused during
her lifetime.

Dr. Taussig was primarily a teacher, and would go
to great lengths to make a point with her students.
Dr. Cooley said he would never forget the day she
appeared to give his class a lecture about congenital
heart disease, which he described as

boring to a medical student. Why would one want
to know about congenital heart disease since one
couldn’t do anything about it anyway. But Dr.
Taussig was describing Tetralogy of Fallot, and
all the various anatomic features, and to show how
the children assumed a squatting position, Dr.
Taussig, as tall as she was, got down on the floor in front of all the students and squatted like the unfortunate children...and there she was in her skirt and it was all you could do to keep from laughing because she was looking rather ungainly. But she impressed it on all our minds because I remember it almost like it was last week.\textsuperscript{123}

Dr. Taussig explained her philosophy about teaching when she said teachers "want to teach. We want to share everything we can with our students. We want them to excel us and expect them to surpass us. We all try to keep ahead of them just as long as we possibly can. That is just the nature of the teacher. And we do enjoy it."\textsuperscript{124}

At the end of her life, Helen Taussig was asked repeatedly what she thought was the most exciting thing in her career. She always answered, "Nothing would ever give me as much delight as seeing the first patient change from blue to pink in the operating room." Many times over she discussed the problems, the concerns of the first blue baby operations, and always her feelings were quite clear as she described the

\textsuperscript{123}Cooley. Interview. 1987. This event he described occurred in 1943.

\textsuperscript{124}Taussig, "Difficulties, Delights and Disappointments".
little patient "with bright pink cheeks and bright lips. Oh, what a lovely color!" And her ambition to defy a heart defect created in the womb, that promised certain death then and now for the more than 250,000 children still born today with Tetralogy of Fallot, was evidenced by her battle against this defect. Dr. Taussig showed what had motivated her and driven her to succeed when she described the third child waking from the surgery and asking to get up in the operating room. When told to lie still a little longer, he asked for a drink of water, and she recalled with emotion, that "from that day on, he was raring to go, and we realized we had won!"

Helen Taussig would undoubtedly have shared my thesis about her life, that despite the risks the rewards were great. Her abilities to slow down when under pressure and look at another’s misfortune from a different perspective contributed to her maintenance of balance and kindness in her work. The pride and self confidence that had been instilled in her early in life helped offset her concerns about her own inadequacies. All of this evidence points to my conclusion that being under pressure and high stress need not make one
abusive to others. Helen Taussig, M.D., represented a use of power which was balanced by her self discipline and sense of self worth. I am certain that if she were still alive today, Dr. Taussig would be searching for answers to some of the most troubling questions of our time, including those of child abuse. And she would be in the forefront trying to instill in abused children the love and self confidence that sustained her throughout her life. Dr. Taussig’s love and respect for children would have made her a leader today in a world that has somehow gotten off track with respect to the education and rights of children both here and abroad.125

Perhaps more than anything else, Helen Taussig served as a role model for all her patients, her Fellows, her colleagues, and people like myself, who find her struggles and successes inspiring and motivating. There is no doubt that the contributions she made professionally shaped pediatric cardiology, 

125Dr. Thomas McNair Scott, Interview, 1987. He recalled that Helen Taussig was Chairman of the Committee of Responsibility concerned with the care of burned and injured Vietnamese children in 1967, and represented the U.S. as a member of the delegation to the World Health Assembly Conference in Geneva that same year.
and the contributions she made personally shaped the lives of everyone she touched and who reads her story.
APPENDIX

Selected Bibliography of the Writings
of Helen Taussig,M.D.\textsuperscript{126}

1925

Taussig and Faith Meserve. Rhythmic Contractions in
Isolated Strips of Mammalian Ventricle. \textit{American
Journal Physician}.

1926

Taussig. The Anatomy of the Heart in Two Cases of
Situs Transversus. \textit{Johns Hopkins Hospital
Bulletin}.

\textsuperscript{126}This list is copied from Gerri Lynn Goodman’s
thesis simply to give the reader a list of articles and
papers Dr. Taussig wrote during her career that
indicate her observations and findings regarding
malformations of the heart. These scientific and
clinical observations made it possible for her to
describe to surgeons and cardiologists the problems
that existed and provided evidence for her
recommendations regarding surgery for the children who
had no hope until the Blalock-Taussig shunt was
invented. This list does not by any means indicate
that I have read or even seen the papers described
here.
1928

Taussig. Electrocardiograms Taken from Isolated Strips of Mammalian Ventricular Cardiac Muscle. *Johns Hopkins Hospital Bulletin.*

1929

Taussig. A Case of Bundle Branch Block Confirmed by Pathological Study. *Johns Hopkins Hospital Bulletin.*

1931


1934


1935


1940


1941


1943


1945


1947

Taussig. *Congenital Malformations of the Heart.*
Cambridge, Harvard University Press.


1948


1949


1950


1951


1952

Taussig and R. S. Bauersfeld. Follow-up Studies on the First 1,000 Patients Operated on for Pulmonary Stenosis or Atresia (Results up to March 1952). *Cardiologia.* Volume 21, 20-21.


1953

Taussig and R.S. Bauersfeld. Follow-up Studies on the First 1,000 Patients Operated on for Pulmonary Stenosis or Atresia (Results till March 1952). *Annals of Internal Medicine.* Volume 38, 1-8.


1962


1963


Volume 112, 238-247.


1964


1965


1966


Taussig. Possible Injury to the Cardiovascular System from Vitamin D. *American Internal Medicine*. Volume 65, 1195-1200.

1968


Taussig. 'Death' from Lightning and the Possibility of Living Again. *American Internal Medicine*. Volume 68, 1345-1353.
1970

1971


1972
Taussig. Twenty-four Year Follow-up on a Patient with
a Blalock-Taussig anastomosis at 23 months. 

**British Heart Journal.** Volume 34, 9-11.

**1977**


**1978**


**1979**


**1981**

Taussig. How to Adjust to Deafness (Hints Based on Personal Experience). *Medical Times*. Volume 109, 39s-43s.

1982


Note: Unfortunately, the writings of Helen Taussig from 1972-1977 are not in my records and I have been unable to trace them. It is safe to assume she did write during those years, however.
FORWARD AND INTRODUCTION FROM CONGENITAL MALFORMATIONS OF THE HEART

BY HELEN TAUSSIG, M.D.
FOREWORD

HEN a first-year student at Boston University School of Medicine Dr. Taussig began the study of the muscle bundles of the heart and continued studies of an anatomical nature after her transfer to the Johns Hopkins Medical School. It is not remarkable, then, that a year after graduation from Johns Hopkins, when she became an intern in the Harriet Lane Home, she showed special interest in diseases of the heart and a knowledge of the heart far in advance of her associates. A special clinic for children suffering from heart disease had been started in the Harriet Lane Home the preceding year, and by the time that the directorship of this became vacant, which happened at the completion of Dr. Taussig’s internship, it had become clear that she was just the young physician to take over the direction of it. Dr. Taussig conducted the clinic from the beginning with conspicuous ability, and as her experience increased, she became the acknowledged authority in the Harriet Lane Home on all matters pertaining to the heart of the child.

At first Dr. Taussig’s interest lay entirely in acquired heart disease. When she first took up her work in the Cardiac Clinic, as I recall, she remarked that she intended to ignore the study of the cardiac malformations because they were hopeless finalities in which the function of the physician was limited to matters of general advice and prognosis. I replied that it would be as difficult for her to exclude them as for a child psychiatrist to exclude from his field of study mentally defective children. Later on Dr. Taussig confessed to an interest in the malformations, saying that they were her “crossword puzzles,” and this interest, which at first was entirely of an academic kind, grew steadily, much as one’s interest in a game might grow with increase in proficiency. Autopsies on children with malformed hearts, who had already been examined by her, were performed quite frequently, and they furnished checks on the correctness of her observations and interpretations. Before very long Dr. Taussig’s diagnoses began to have an accuracy which surprised us all. Usually they were correct functionally, if not anatomically, and if her diagnosis of the lesion was in error in a given case, the mistake was generally in some detail.

As time went on, Dr. Taussig’s interests in the malformations took on a physiological turn, and on several occasions I heard her express to Dr. Alfred Blalock, who was then particularly interested in developing an operation for coarctation of the aorta, the hope that he could devise an operation which would supply ade-
quate blood flow through the lungs to that group of patients suffering from a diminutive pulmonary artery. Dr. Blalock, already awakened by Dr. Taussig’s suggestion, was actually at the time developing his operation of anastomosis of a main branch of the aorta to the pulmonary artery, a surgical feat which has become so justly famous. The success of this operation has been of great importance, not only to the afflicted children but to Dr. Taussig, for it has given her studies a practical usefulness which was not anticipated.

The methods which Dr. Taussig has employed in making her diagnoses, and which she still relies on, are those in the armamentarium of every clinician. As I have observed her at work, the one most useful is fluoroscopic examination, and by means of it she is able to estimate with accuracy the sizes of the chambers of the heart and the positions, relations, and sizes of the great vessels and also to detect dilatation and filling of the larger branches of the pulmonary artery in the lung substance.

Dr. Taussig reaches her conclusions by gathering meticulously all the facts pertaining to the case and fitting them together in their proper relations by a process of clear, logical thinking carried through to the very end. Her conclusions seem inescapable when her evidence is presented. In her text on the malformations of the heart she has given as much of her scholarship as is possible to convey in that brief form; moreover, wherever possible, she has simplified her difficult task of exposition through the use of diagrams which give visual explanations of conditions extremely difficult to describe in words. By means of this book the diagnosis of malformations of the heart is brought within the power of all physicians who are willing to devote time to its study and to practice its teachings. In attempting to arrive at the correct conception of the case one is greatly aided by a knowledge of the patterns which the malformations of the heart usually take, and these Dr. Taussig’s book makes clear.

It is impossible to predict now how important the special techniques of catheterization of the heart and gas analysis of the blood will be for the recognition of the malformation and consequent circulatory disturbance in a given case. It is clear already that these techniques supply important information, which may either confirm the diagnosis reached by the simple clinical methods or render it doubtful. But the techniques are so difficult and intricate that they cannot be available except at the great medical centers, where, however, they will probably always constitute an essential part of the examination. At best they furnish information which is only adjuvant to that supplied by the methods which Dr. Taussig uses, and they can only supplement, not displace, the latter.
FOREWORD

Years ago, when I was a student at the College of Physicians and Surgeons in New York City, Dr. L. Emmett Holt, Sr., was greatly intrigued by malformations of the heart, but his interest was limited to two aspects, first, the separation (differential diagnosis) from acquired heart disease, and second, the prognosis with respect to life. I am sure that Dr. Holt thought the actual diagnosis of the malformation was beyond human power. I can imagine his pleasure, if he learned that Dr. Taussig had succeeded in penetrating the supposed terra incognita and had furnished a map in the form of her book which would enable others to follow. She has done for the clinician what Dr. Maude Abbott did for the pathologist, namely, made the malformations of the heart understandable and accessible, but her work has a practical usefulness which Dr. Abbott's, owing to its nature, could not possess.

Garrison, Maryland
June, 1947

Edwards A. Park, M.D.
PREFACE

The last fifteen years have deeply impressed upon me how great is my debt to two persons: one is Dr. Edwards A. Park and the other is Dr. Alfred Blalock.

It is to Dr. Edwards A. Park that I am indebted for my life's work. He saw the value of special clinics both for the patient and as a means to study disease. He put me in charge of the cardiac clinic and gave me the tools with which to work. Dr. Park had the vision to see the value of fluoroscopy for the clinician. In 1930 he had a fluoroscope installed in the Harriet Lane Home with instructions to "use it." Moreover, in the early days when my knowledge of children's heart disease was nil, he made a point of referring all children with any and all sorts of cardiac problems to me and urged all the doctors on the Harriet Lane Home staff to do the same. Thereby Dr. Park gave me the opportunity to see a mass of clinical material and furthermore he taught me much by asking me penetrating questions about these children. In a very real sense, the original edition of this book was an effort to express my gratitude to Dr. Park, as he wished me to write a book, "Congenital Malformations of the Heart—Forms That Can Be Recognized Clinically." I gladly undertook the task because to make the knowledge we have acquired available to others is one of the deep obligations of all of us engaged in academic work.

My debt to Dr. Alfred Blalock is also great, for he took my work beyond the realm of academic interest and made it of vital importance. When Dr. Alfred Blalock came to Baltimore, he was already interested in thoracic surgery and in vascular anastomoses. He acted upon my suggestion to try to increase the circulation to the lungs and carried the problem to the laboratory. The results are well known. He did more than make my dream a reality. He boldly opened up the field of cardiac surgery by the demonstration that it was possible to operate on intensely cyanotic and severely incapacitated children, to change their color from blue to pink, and thereby to give them new life. What that means to young children is best expressed in the letter shown in the frontispiece. The letter was written by Jean-Pierre Cablan after his Blalock-Taussig operation when he was not quite twelve years of age. I am glad to report that he is still doing well as I write this ten years later.

Once it was proven that patients with malformations of the heart could be helped by surgery, these patients swarmed to the doctors. All of us interested in
the problem have seen many more such patients than we ever anticipated. A vast number of articles and a substantial number of books have been written on the subject. I wish hereby to acknowledge my debt to the many other workers in the field. This book makes no pretense of reviewing the literature or presenting a statistical analysis of the findings in the various malformations. Therefore, I hope those whose works are not mentioned in this book will forgive the omission.

I have had the unique opportunity and the rare good fortune to study several thousand patients with a wide variety of malformations of the heart. One of my assistants once remarked that "rare has no place in your clinic." She meant thereby that the fact that a condition was rare should never adversely influence the diagnosis, as it was the rare that was referred to me.

In this edition I have tried to incorporate as much of my personal experience as possible. Rather than saying what percentage of cases showed this or that condition, I have tried to emphasize which physical findings go together.

Although for convenience the book is divided into two parts, Volume I dealing with general considerations, methods of diagnosis, and therapy, and Volume II dealing with specific malformations, the basic plan of the book remains the same as in the first edition. This edition is like a deciduous tree: the fundamental outline of the tree remains, but the tree has all new leaves and a few new branches. As a tree grows and bears fruit, so it is hoped that this book will enable others to further extend our knowledge.

H. B. T.

Baltimore, Maryland
May, 1959
ACKNOWLEDGEMENTS

I am greatly indebted to Mrs. Margaret Palmer for the new line drawings, the circulatory diagrams, for the clarification of the angiograms, and for the illustrations in the visual index; to Mr. Leon Schlossberg for the new drawings of gross specimens; to Mrs. Betty Jane Browning Andrus for the original drawings; and to Mr. Chester Reather for the reproduction of the x-rays and the angiograms.

All the x-rays and angiograms not otherwise specifically designated were taken by the X-Ray Department of the Johns Hopkins Hospital, to which I am indebted for the same. The x-rays are ultrarontgenograms, but the angiograms are not. I am especially indebted to Dr. Russell Morgan for the angiograms, which were selected from the museum collection of the Department of Radiology. A number of these have been published in articles from his department and also in Radiology of the Heart and Great Vessels by Drs. Sloan and Cooley. I wish to make special acknowledgement to these authors for these reproductions. The angiograms have been sharpened to delineate the various chambers, but no new lines have been added. All cardiac catheterizations, unless specifically mentioned, were performed in the Surgical Department of the Johns Hopkins Hospital, to which I am indebted for the use of the reports.

My most sincere thanks are due Dr. Catherine A. Neill for her helpful suggestions, and Katrina H. Morse and Helene M. Brewer for the many hours they have spent helping me with the manuscript and the index.

I also wish to thank my many loyal Fellows who have patiently studied the text with me and have helped me with the bibliography and many other details; my thanks also go to my friends who have read and re-read the text and have helped with the index. I wish, also, to acknowledge my indebtedness to Dr. E. A. Park for the inspiration of the visual index.

Last but not least, I am greatly indebted to The Commonwealth Fund for their assistance in the publication of this book. Only those who have had the privilege of working with them realize the magnitude of their help. My indebtedness to them is real and my thanks are commensurately great.

H. B. T.
CURRICULUM VITAE

HELEN BROOKE TAUSSIG, M.D.

Daughter of FRANK WILLIAM TAUSSIG and EDITH GUILD TAUSSIG

PLACE/DATE OF BIRTH: Cambridge, Massachusetts; May 24, 1898

EDUCATION

Radcliffe College September 1927 - June 1919
University of California, B.A. August 1919 - May 1921
Harvard University School of Medicine -
Special Course Fall of 1921
Boston University School of Medicine (including one year of research) 1922 - 1924
Johns Hopkins University School of Medicine, M.D. 1924 - 1927

ACADEMIC APPOINTMENTS

Archibald Fellow in Medicine 1927 - 1928
Interne in Pediatrics, Johns Hopkins Hospital 1928 - 1930
Physician-in-Charge, Harriet Lane Home, Cardiac Clinic, Johns Hopkins Hospital 1930 - 1963
Instructor, Pediatric Cardiology, Harriet Lane Home, Cardiac Clinic 1930 - 1946
Associate Professor of Pediatrics, Johns Hopkins University School of Medicine July 1, 1946 - June 30, 1959
Professor Emeritus of Pediatrics, The Johns Hopkins University July 1963 -
Thomas M. Rivers Memorial Research Fellowship
First Rivers Award of the National Foundation 1963 - 1968

SPECIAL APPOINTMENTS

Pediatric Consultant - Staff of the Baltimore City Hospitals 1954 -
Member of President Lyndon B. Johnson's Commission on Heart Disease, Cancer and Stroke March 1964
Alternate United States Delegate to the XXth International Conference of the Red Cross, Vienna, Austria October 1965
International Cardiology Foundation, Board Member 1967
Committe of Responsibility, Honorary Chairman, Concerning the war-injured children in Vietnam 1967
Member of the United States Delegation - 20th World Health Assembly Conference, Geneva, Switzerland May 1967
Clinical Professor of Medicine: Georgetown University School of Medicine 1969 -
Member Ad-Honoreum of Sibic International, Instituto-N-De Cardiologia, Mexico City 1970
Member: Board of Managers, The Harriet Lane Home 1972 -
Dr. Helen Brooke Taussig

SOCIETIES

Pediatric Research Society
American Pediatric Society
American Academy of Pediatrics
Sub-Board of Pediatric Cardiology 1960
Maryland Rheumatic Fever Association
Association of American Physicians
Heart Association of Maryland:
  President 1952 - 1954
American College of Physicians,
  Fellow Master 1954
International Academy of Pathology
Tetralogical Society
British Cardiac Society
Medical Women's Foundation, London, England
American College of Cardiology
New York Academy of Sciences
American Academy of Arts and Sciences
  Cambridge, Massachusetts
Sociedad Venezolana de Cardiologia,
  Honorary Member 1957
American Heart Association, Editorial
  Board of Circulation 1963 - 1966
American Heart Association, President 1965 - 1966
American Heart Association, Director
  at Large 1967 - 1970
Maryland Society for Medical Research,
  President 1969 - 1970
Johns Hopkins Medical History Club, President 1974 - 1975

HONORARY DEGREES

D.Sc. Boston University School of Medicine 1948
D.Sc. Goucher College 1949
D.Sc. Women's College of the University of
  North Carolina 1950
LL.D. Hood College 1950
*D.Sc. Northwestern University 1951
*D.Sc. Columbia University 1951
D.Sc. Women's Medical College of Pennsylvania 1951
D.Sc. Middlebury College, Middlebury, Vermont 1952
*D.Sc Professor Emeritus and Doctor of
  Medicine, University of Athens,
  Athens, Greece November 1956
D.Sc. Western College for Women, Oxford, Ohio 1959
**D.Sc. Harvard University 1959
*D.Sc. Gottingen University, Gottingen, Germany 1960
**Doctor of Medicine, University of Wien (Austria)
  Ceremonies of the 600th Anniversary of the
  University of Wien 1965
Dr. Helen Brooke Taussig

Curriculum Vitae

D.Sc. Randolph-Macon Woman's College, Lynchburg, Virginia 1966
D.Sc. Cedar Crest College, Allentown, Pennsylvania May 1966
L.H.D. Colby College, Waterville, Maine June 1966
D.Sc. University of Massachusetts, Amherst June 1966
D.Sc. Jefferson Medical College and Medical Center, Philadelphia, Pennsylvania June 2, 1967
*D.Sc. Duke University, Durham, North Carolina June 3, 1968
D.Sc. Medical College of Wisconsin May 28, 1972
D.Sc. Radcliffe College - Centennial Celebration 1978

HONORARY SOCIETIES

Phi Beta Kappa - University of California 1921
Alpha Omega Alpha - Johns Hopkins University School of Medicine 1927
American Philosophical Society 1973
National Academy of Sciences 1973
College of Physicians of Philadelphia, Honorary Fellow 1979
Royal College of Physicians and Surgeons of Glasgow, Scotland; Honorary Fellow 1982
Deutshe Gesellschaft fur Kinderheilkunde, Honorary Member 1984

AWARDS AND SPECIAL HONORS

**Chevalier Legion d'Honneur, France 1947
Mead-Johnson Award 1948
*Passano Award 1948
Women's National Press Club Award 1948
American College of Chest Physicians - Honorary Medal 1953
**Feltrinelli Prize, Rome, Italy 1954
Albert Lasker Award with Alfred Blalock, M.D. 1954
Elizabeth Blackwell Citation, New York 1954
Eleanor Roosevelt Achievement Award 1957
American Heart Association, Award of Merit 1957
**Gairdner Foundation, Award of Merit with Alfred Blalock, M.D. 1959
American Association of University Women, Achievement Award 1963
American Heart Association, Gold Heart Award 1963
**Medal of Freedom, presented by The President of the United States of America, Lyndon B. Johnson September 1964
*The Helen B. Taussig Abteilung, Kardiologie Kinderklinik, University of Gottingen, Gottingen, West Germany 1964
*Dedication to Dr. Taussig, "The Helen B. Taussig Children's Pediatric Cardiac Center, Johns Hopkins Hospital, Baltimore, Maryland May 25, 1970
American Academy of Cardiology, The Theodore and Susan Cummings Humanitarian Award - "For generous sharing of knowledge with your Colleagues overseas which created good will for our country" 1965
Albert Einstein (Women's Division) College of Medicine, Achievement Award 1966
American College of Physicians, John Phillips Memorial Award (Bronze Medal) 1966
Radcliffe College, Cambridge, Massachusetts, Founders Award June 1966
**Carl Ludwig - Medal of Honor Deutsche Gesellschaft Fur Kreislaufforschung. William G. Kerckhoff-Institut, Bad Nauhein, Germany 1967
Georgetown University Hospital, Medal and Plaque - "In recognition of her outstanding contributions to the field of heart disease," Washington, D.C. 1967
Centennial Citation, Distinguished service to the Baltimore Community. Presented by the Wilson College, Chambersburg, Pennsylvania March 1968
The VIII Interamericn Congress of Cardiology, Award of Merit, Lima Peru 1968
Republic of Peru, Medal "Honoring Dr. Taussig for her Great Work in Medicine," presented by His Excellency, Fernando Belaunde Terry, President of the Republic of Peru April 25, 1968
*Howland Award, American Pediatric Society 1971
The University of Iowa, College of Medicine - Medal: Centennial Lecturer, Centennial Year 1870-1970, Iowa City, Iowa October 21, 1970
Tokoyo Society of Medical Sciences and Faculty of Medicine - Plaque, In Appreciation. Presented by University of Tokoyo, Japan July 23, 1971
Mid-Atlantic Region, National Rehabilitation Association: Plaque - In Recognition of Outstanding Achievement - for Technical Service May 25, 1971


American Association of University Women, The Helen B. Taussig International Fellowship established 1973

*The Helen B. Taussig Lectureship established by the American Heart Association, Section of Diseases of Young People November 10, 1973

Drake Award, The Eugene H. Drake Memorial Lecture given by Dr. Taussig at the 25th Annual Scientific Sessions of the Maine Heart Association, Augusta, Maine October 9, 1974

*Herrick Award - The James B. Herrick Award presented by the Council on Clinical Cardiology at The American Heart Association Meetings, Dallas, Texas November 17, 1974

Deborah Heart and Lung Center, Albert Einstein Medical Center - Symposium on Congenital Heart Disease in Infants, Children and Adults: Honoring Dr. Taussig December 5-6, 1975

**The Milton Stover Eisenhower Gold Medal for Distinguished Service presented at the Johns Hopkins University Commencement Exercises by Dr. Steven Muller, President of The Johns Hopkins University and The Johns Hopkins Hospital. (The third person, first doctor and first woman to receive this award since its creation in 1967.) May 21, 1976

*The Helen B. Taussig International Symposium on Pediatric Cardiology, Turner Auditorium, honoring Dr. Taussig May 24-26, 1976

Award of Excellence - Plaque and Citation, The Washington College, Chestertown, Maryland. May 15, 1977

American Medical Association, Scientific Achievement Award, at Annual Convention, San Francisco, California June 19, 1977

Medical Times, Physicians Award of Excellence November 1978

American Academy of Pediatrics, Section of Cardiology, Special Citation in Recognition of Pediatric Cardiology as a Subspecialty of Pediatrics* October 1978
Asian Pacific Congress of Cardiology, Award - "Pioneer Pediatric Cardiologist" November 1979
American College of Cardiology, Presidential Citation February 1980
American College of Cardiology, Gifted Teacher Award March 1981
*The Helen B. Taussig Childrens Heart Clinic, The Johns Hopkins Hospital, re-dedicated December 1983
Honorary Chairman, Second World Congress of Pediatric Cardiology, New York City June 1985
Sylvian Addman Recital Series - Concert by Stephen Kates, cellist accompanied by Samuel Sanders, pianist - dedicated to Dr. Taussig. Samuel Sanders was a patient of Dr. Taussig's, operated on by Dr. Alfred Blalock in 1946. February 11, 1986

*Significant Awards
**More Significant Awards
Mallformations of the Heart

The Surgical Treatment of
THE SURGICAL TREATMENT OF MALFORMATIONS OF THE HEART

Helen B. Tassie, M.D.
and
Alfred Blalock, M.D.

In Which There Is Pulmonary Stenosis

Coaptation, 1943, by American Medical Association

Presented at the Annual Meeting of the American Medical Association.
The chest rest position is used in this procedure to provide support for the vessels near the heart. The purpose of the chest rest position is to restrict the movement of the chest muscles, which can affect the function of the heart. In a comfortable position, the chest muscles are relaxed and the heart is not hindered by any movement from the chest. This allows for better chest expansion and improved function of the heart. The chest rest position is used in conjunction with other techniques to promote healing and improve overall health.
Experiments were conducted on the performance of the algorithm in various conditions. The algorithm was tested on a set of synthetic data, and the results were compared to those obtained using a traditional method. The performance of the algorithm was evaluated using a variety of metrics, including accuracy, precision, and recall.

The results showed that the algorithm performed significantly better than the traditional method, with a reduction of 20% in the error rate. This was attributed to the ability of the algorithm to handle complex and high-dimensional data effectively. The algorithm was also able to handle missing data and outliers, which are common in real-world applications.

In conclusion, the algorithm is a promising tool for applications requiring high accuracy and efficiency. Further research is needed to optimize the algorithm and explore its potential in other domains.

References:
The condition of the brain, particularly in the area of the thalamus, was the focus of the examination. The macroscopic examination of the thalamus revealed an abnormality that was not consistent with the clinical symptoms. The temporal lobe, which is involved in memory and learning, showed signs of atrophy. The corpus callosum, which connects the two hemispheres of the brain, was noted to be reduced in size. The pituitary gland, which regulates hormonal balance, appeared to be normal.

The magnetic resonance imaging (MRI) scans showed a mass lesion in the left hemisphere of the brain, which was consistent with a glioblastoma. The lesion was situated in the parietal lobe, which is involved in sensory processing. The tumor was found to be hypointense on T1-weighted images and hyperintense on T2-weighted images, indicating that it was not hypercellular.

The patient was admitted to the hospital for surgical intervention. The surgical team, led by Dr. John Doe, performed a craniotomy to remove the mass lesion. The surgery was successful, and the patient's neurological status improved postoperatively. Pathological examination of the resected tissue confirmed the diagnosis of glioblastoma.

The patient was started on chemotherapy and Radiation Therapy. The treatment regimen included temozolomide and concurrent radiation therapy. The patient tolerated the treatment well, and the clinical symptoms improved. The patient underwent regular follow-up appointments to monitor the tumor's response to therapy.

The patient's quality of life was maintained through various support services, including physical therapy and psychological counseling. The family was also provided with educational resources to understand the disease and its treatment options.

The patient's condition was monitored closely, and the treatment plan was adjusted as necessary. The patient died 18 months after the initial diagnosis, despite the best efforts of the multidisciplinary team.
The operation involved the use of a device that was placed on the head of the patient. The device was connected to a machine that monitored the patient's brain activity. The machine displayed the data in real-time, allowing the doctor to observe changes in the patient's condition. The device was connected to a computer, which processed the data and displayed it on a monitor. The doctor could then analyze the data and make decisions based on the information provided. The device was designed to be comfortable and non-invasive, allowing the patient to remain conscious and alert throughout the procedure.
The party was 24 hours old when the 3rd inspection was made at 12:30 p.m. The temperature was 99.0°F. The examiner reported no change since the last inspection. The patient was afebrile and there were no other abnormalities noted.

The examination was repeated at 8 a.m. and 4 p.m. with no change in temperature or other findings. The patient appeared to be improving.

Table 2: Findings on 3rd inspection (case 2)

<table>
<thead>
<tr>
<th>Time</th>
<th>Temperature</th>
<th>Pulse</th>
<th>Respirations</th>
<th>Complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:30 p.m.</td>
<td>99.0°F</td>
<td>70</td>
<td>12</td>
<td>None</td>
</tr>
<tr>
<td>8 a.m.</td>
<td>99.0°F</td>
<td>72</td>
<td>16</td>
<td>None</td>
</tr>
<tr>
<td>4 p.m.</td>
<td>99.0°F</td>
<td>74</td>
<td>18</td>
<td>None</td>
</tr>
</tbody>
</table>

The patient's condition continued to improve, and further inspections were recommended.

6 hours of 1% ear drops and methylprednisolone acetate were administered to the ear. The patient was observed closely for any signs of improvement.

The temperature was again taken at 8 a.m. and 4 p.m., with no change in findings. The patient was alert and cooperative, and there were no new complications noted.
To learn to walk, the infant must develop the ability to sit and bear weight. The infant's posture and balance during this period are crucial. The infant's head is held erect, and the body is supported by the legs. The movements of the arms and legs are coordinated to maintain balance and facilitate movement. The infant begins to explore the environment by reaching, grasping, and manipulating objects. As the infant gains strength and control over these movements, the ability to crawl and eventually stand up is developed. The infant's cognitive development is also significant during this period, as they begin to recognize objects, people, and familiar routines. This period is marked by rapid growth and development, with the infant attaining new milestones in physical and cognitive abilities.
The problem concerning the interaction between the two access areas is caused by the poor understanding of the access areas. The poor understanding is due to the lack of a clear definition of the access areas. The poor understanding also leads to a lack of consistent communication between the access areas.

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In conclusion, the problem concerning the interaction between the two access areas is caused by the poor understanding of the access areas. The poor understanding is due to the lack of a clear definition of the access areas. The poor understanding also leads to a lack of consistent communication between the access areas.
In these exercises and others like them, the problem is to find the number of ways of arranging the digits 1, 2, 3, ..., n in a circular sequence so that no adjacent digits are equal. The approach is to consider the number of valid sequences starting with each possible digit, then use recursion to compute the total number of valid sequences. The key insight is that the number of valid sequences starting with the digit i is equal to the number of valid sequences starting with the digit j for any adjacent digit j. Therefore, the number of valid sequences for digit i is the sum of the number of valid sequences for adjacent digits. By summing over all digits, we obtain a recurrence relation for the total number of valid sequences. The problem is solved by computing the recurrence relation for each possible starting digit and summing the results.
When the phonetic event is perceived, absent of context in and the path or region in which phonetic context and phonetic information in and both the context and the phonetic context are the same, the phonetic event in and the context of a phonetic event is to the path and the phonetic context. The phonetic event should be performed on the right or the center of the context of the diagram.

In the context of the phonetic event, the phonetic event is to the path and the phonetic context. The phonetic event should be performed on the right or the center of the context of the diagram. The context of the phonetic event is to the path and the phonetic context. The phonetic event should be performed on the right or the center of the context of the diagram.

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A decrease in the level of oxygen saturation in the arterial blood leads to a decrease in the level of oxygen saturation in the tissue. The decrease in oxygen saturation in the tissue affects the function of various organs and systems. The decrease in oxygen saturation can also lead to fatigue and other symptoms. It is important to monitor the level of oxygen saturation to ensure proper function of the body.

SYNOPSIS

A decrease in the level of oxygen saturation in the arterial blood leads to a decrease in the level of oxygen saturation in the tissue. The decrease in oxygen saturation can also lead to fatigue and other symptoms. It is important to monitor the level of oxygen saturation to ensure proper function of the body.

Abnormalities in the level of oxygen saturation may indicate underlying medical conditions. It is important to consult a healthcare provider if you experience symptoms related to decreased oxygen saturation.
Tetralogy of Fallot

1. What Is It?
A combination of two things:
(1) A hole in the wall that separates the two sides of the heart.
   This hole is in the lower part of the heart.
(2) A tight narrowing of the path leading from right side of heart to lungs.

2. Why Did It Happen?
Many causes, most unknown. Generally not inherited from parents and definitely not fault of parents.

3. What Does It Do to the Heart?
Blood that should go to the lungs, goes instead through the hole in the wall and goes to the body without getting its supply of oxygen from the lungs.

4. How Does It Affect the Child?
It may cause spells of blueness, grumpy breathing, and fainting. Child tires and turns blue with exercise.

5. Can It Be Fixed?
Yes. It can be repaired completely and safely. Before total repair, symptoms can be controlled in several ways.

6. What Can the Child Do?
Before repair, needs restriction from hard exercise or heavy work. After repair, should be able to play and work normally.

7. What Should the Parents Do?
Follow doctor's advice on:
(1) giving medicines
(2) return visits to doctor
(3) special tests
(4) extreme care with dental procedures. Tell the dentist about the problem BEFORE he fixes child's teeth to avoid infection in the heart.

This information is general. Only your doctor can give you precise details and instructions.
Congenital Heart Defects

1. pulmonary stenosis
2. ventricular septal defect
3. patent ductus arteriosus
4. coarctation of the aorta
5. atrial septal defect
6. aortic stenosis

transposition of the aorta and pulmonary artery
hypoplastic left heart syndrome
tetralogy of Fallot
WORKS CITED

ARTICLES


Harvey, W. Proctor, M.D., Editor in Chief. Special interview with Dr. Helen Taussig for Medical Times, November 1978, Volume 106, No. 11, in special issue honoring Dr. Taussig. This issue has a number of excellent articles by colleagues and Fellows of Dr. Taussig. What makes it special is her personal observations with Dr. Harvey, Director of Cardiology at Georgetown University Medical School. I have relied heavily on her quotes from this article because of their candor, and because there are not many published interviews with her where she tells of her struggles in medical school and in finding someone to perform the surgery that she was convinced would save blue babies.

McNamara, Dan G., M.D. "The Influence of the Report of the Blalock-Taussig Operation on Subsequent Progress in Surgical Treatment of Cardiovascular


Taussig, Helen B., M.D. "Difficulties, Disappointments, and Delights in Medicine", The Pharos of Alpha Omega Alpha, Spring, 1979, Volume 42, No. 2, 6-8.

Taussig, Helen, M.D. "Epilogue", Pediatric Cardiovascular Clinics. Edited by Mary Allen Engle, M.D., Published by Davis Co., 1980.

_________, "How to Adjust to Deafness" and "Hints for Doctors Who May be Hard of Hearing", Medical Times, Special Section following page 84. 39s-43s.


BOOKS


Moldow, Gloria. *Women Doctors in Gilded-Age Washington: Race, Gender, and Professionalism*. 


BROCHURES


Johns Hopkins Women's Medical Alumnae Association, The Women's Medical Fund and the Opening of The Johns Hopkins School of Medicine. With selections from an exhibit prepared by the Alan Mason Chesney Medical Archives, with no date.

Dedication of The Lillie Frank Abercrombie Cardiac Clinic at Texas Children's Hospital, Houston, TX, Friday, February 24, 1978.

Dedication of the Helen B. Taussig Childrens Heart Center, Baltimore, MD, Johns Hopkins Hospital, December 8, 1983.

Ravitch, Mark M., M.D. "Alfred Blalock: 1899-1964", Baltimore, MD: Johns Hopkins Press, 1966. Dr. Ravitch wrote a tribute to Dr. Blalock telling the story of Blalock's life and medical career as well as his medical history. Included are the names of all the surgeons who studied with Dr. Blalock.

Laura Opie and Alice Taussig, personal taped interview with Dr. Richard Ross, Dean of the Medical Faculty, Johns Hopkins Medical School, Baltimore, MD. The tapes for these interviews are in the possession of Ms. Opie. (None of the following interviews are published.) 1987.

_______, personal taped interview with Dr. Catherine Neill, Associate Professor, Johns Hopkins Department of Pediatric Cardiology, Baltimore, MD. Dr. Neill was a close personal friend of Dr. Taussig's, who came to the United States from England to become a Fellow. She is well acquainted with all aspects of Dr. Taussig's practice and work at Hopkins, having gone there after the first blue baby operations, and helping with the follow-up over the years. 1987.

_______, personal taped interview with Dr. Charlotte Ferencz, Department of Epidemiology and Preventive Medicine, University of Maryland. Dr. Ferencz was also a close friend of Dr. Taussig's and contributed to the oral history we were trying to preserve. 1987.

_______, personal taped interview with Dr. Mary Allen Engle, Chief of Pediatric Cardiology, New York Hospital—Cornell Medical Center, 1987.

_______, personal taped interview with Dr. Ralph Engle, Department of Epidemiology, New York Hospital, 1987. The two Drs. Engle were close friends of Helen Taussig, and have written extensively about the Blalock-Taussig procedures.

_______, personal taped interview with Dr. Dan McNamara, Chief of Pediatric Cardiology, Texas Children's Hospital, Houston, TX. Dr. McNamara was a Fellow of Dr. Taussig's in the early 1950's, and

1Laura Opie, Dr. Taussig's great-niece, and I, conducted the following interviews from January until April, 1987, when we were collaborating together on a proposed book about Dr. Taussig.
remained a loyal and true friend of Dr. Taussig, who wrote about his Fellowship. 1987.

__________, personal taped interview with Dr. Denton Cooley, Chief of Surgery, Texas Heart Institute, Houston, TX. 1987. Dr. Cooley was a student of Dr. Blalock's and was present at the first three blue baby operations when he was an intern, aged 24.

__________, personal taped interview with Dr. Ruth Whittemore, Department of Pediatric Cardiology, Yale University Medical School. 1987.

__________, telephone interview with Dr. William Longmire, Department of Surgery, UCLA, Los Angeles. 1987. Dr. Longmire was the chief resident on Dr. Blalock's staff when the early blue baby operations were performed.

__________, personal taped interview with Dr. Richard Bing, Chief of Experimental Cardiology, Huntington Memorial Hospital, Pasadena, CA. Interview in New York, 1987. Dr. Bing performed the first heart catheterizations.

__________, personal interview with Dr. George Salmon, Houston, TX. 1987. Dr. Salmon is now retired, but attests to the fact that he used Helen Taussig's book about malformations of the heart when he examined patients, and who told Dr. McNamara to go "study with that woman."

__________, personal taped interview with Ms. Lynn Josephson, a former patient of Dr. Taussig's in Houston, TX, in 1987.

Taussig, Alice House, personal interview with Dr. Mhairri MacDonald, Vice Chairman, Department of Neonatology, Children's National Medical Center, Washington, D.C., February 12, 1993. Dr. MacDonald lived with Dr. Taussig in 1974, when she was studying for her boards in Baltimore. She was kind enough to visit with me regarding my thesis and her impressions of Dr. Taussig when she was 75 and still active and involved.
NEWSPAPERS


_________, "Professor Taussig, Economist, Dead at 80", Boston Globe, November 12, 1939.

_________, Frank W. Taussig Obituary, "Dr. Taussig Dies at 80", Boston Herald, November 13, 1939.

_________, Frank W. Taussig Obituary, "Dr. Taussig Was Authority on Economics", Boston Evening Transcript, November 12, 1939.


THESIS

The Influence of the Report of the Blalock-Taussig Operation
on Subsequent Progress in Surgical Treatment of Cardiovascular Disease

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Introduction

In 1945 few would have predicted the sustained world wide interest and the profound influence on surgical treatment of heart disease that would follow the case report of three children operated upon for a rare cyanotic malformation of the heart. The paper was submitted for publication when the patients were only a few months postoperative, probably leading some critics to question if the report of success was a little premature. The authors acknowledged and defended the promptness of the report as follows: "The results are sufficiently encouraging to warrant an early report".¹

The paper was not a hastily assembled case report of a new procedure, but included first a methodical exposition on the prevailing theories of the mechanism of cyanosis in congenital heart disease, a step-by-step review of how Dr. Taussig developed the concept of surgically increasing the volume of blood to the pulmonary circulation in cyanotic malformations with pulmonary stenosis or pulmonary atresia. Also, the paper described how Dr. Blalock, working independently, had already performed in the experimental animal a systemic-to-pulmonary artery anastomosis to achieve an experimental model of pulmonary hypertension.² As it turned out, the operation did not create pulmonary hypertension in the experimental animal or in the patient.

The main purpose of the paper was to describe: (1) the clinical course of each of the three patients with tetralogy of Fallot, (2) the futile attempts to treat them medically, (3) the deliberations that preceded the first operation, (4) the technique of the new procedure, (5) early postoperative changes, and (6) anomalies other than tetralogy of Fallot that theoretically could be helped by this operation, as well as those that could not.
A. What were the early reactions to the publication?

1. There was immediate world-wide acceptance of the Blalock-Taussig operation as the first effort to treat a child with cyanotic congenital heart disease. Gross had already closed the ductus arteriosus some six years previously. Then, a month before the first Blalock-Taussig operation, Crafoord in Sweden had excised a coarctation of aorta. So, while there was a sporadic but widespread gestalt for operating on congenital heart defects, the surgical palliation of tetralogy of Fallot offered a new approach to complex anomalies of the heart. Closing a persistent ductus seemed like the obvious and logical thing to do; creating a ductus was a new and ingenious concept of indirectly relieving the problem. Furthermore, most patients with ductus arteriosus and those with coarctation had a relatively asymptomatic childhood and reached adult life in large numbers, but only one-fourth of the patients with tetralogy of Fallot reached adolescence and from infancy the patients had severe disabling symptoms obvious to anyone who saw them.

Hundreds of cyanotic children whose parents had either recently or long before already heard the dismal prognosis pronounced, went to Baltimore for the operation. Within the next two years, 500 patients had been operated upon for the Blalock-Taussig operation.

2. What was the early and late result of the Blalock-Taussig operation? Among 389 survivors of the operation, 97 percent were improved. There was an early mortality of 16 percent and in 6 percent of the patients Dr. Blalock found at exploratory thoracotomy a malformation that could not be helped by the anastomosis.

In the five year follow-up, among the patients who had been improved 67 percent had maintained their improvement. While the majority of the patients were still benefited, many of the shunts had closed or become smaller but 36 percent required a second operation. This failure of the Blalock-Taussig shunt to remain patent over a
long period of time served as a stimulus for surgical investigators to learn to repair the intracardiac defect.\(^7,8\)

B. The paper provided new information about the potential for surgical treatment of heart disease. Cardiac surgery for acquired as well as congenital heart disease undoubtedly received a great impetus by this published experience which dispelled some prevailing myths about the limitations of general anesthesia and surgery in general for young and critically ill patients and for operations on the diseased heart:

1. Anesthesia could be given safely to such a patient. In 1945 no equipment for a closed system was available, so drop ether was given! The arterial oxygen saturation proved to be higher with the patient under general anesthesia than when awake and this explained how these patients could tolerate anesthesia so well.

2. The two to three hour operation was tolerated by these three critically ill patients with cyanotic congenital heart disease and no major problems such as arrhythmia, shock, or brain damage were encountered.

3. The patient could tolerate occlusion of a main left or a main right pulmonary artery long enough to perform an anastomosis, periods ranging from 30 to 90 minutes.

4. The arm, deprived permanently of major blood supply by division of the subclavian artery functioned without ischemic symptoms during the period of postoperative observation and now in the 1980's, many years after the early Blalock-Taussig operation, the long-term postoperative patients' arm continues to receive adequate perfusion from other vessels, although the arm is slightly smaller than its mate. Likewise, the innominate artery was divided and brought down for the anastomosis in two patients without the patient suffering a stroke. (However, use of the innominate artery in subsequent patients resulted in cerebrovascular ischemia in some patients and its use was later abandoned.)
5. A popular prevailing theory in the 1940's concerning the mechanisms of arterial hypoxemia in cyanotic congenital heart disease professed that polycythemia interfered with gas exchange in the lung. However, Dr. Taussig had proposed that it was the reduced volume of blood reaching the pulmonary capillary in patients with pulmonary stenosis or pulmonary atresia. The clinical features of the anomaly, single ventricle, helped to explain this as follows:

If [in single ventricle] the great vessels occupy their normal positions, the aorta arises from the common ventricle and is of large caliber, whereas the pulmonary artery which arises from the rudimentary outlet chamber is of small caliber. Under such circumstances a large volume of blood goes to the systemic circulation and only a small volume of blood goes to the lungs. Consequently a large volume of unoxgenated blood is mixed with a small volume of oxygenated blood and cyanosis is intense. When, however, the great vessels are transposed and the pulmonary artery is large and the aorta is small, a large volume of blood goes to the lungs for aeration. Under these circumstances a large volume of oxygenated blood is mixed with a relatively small volume of venous blood and cyanosis is minimal ....

Her theory was confirmed by the fact that the patient's color and arterial oxygen saturation immediately improved as soon as the surgeon completed the anastomosis, removed the temporary occluding clamps and allowed blood to flow from the subclavian artery to the pulmonary artery.

6. The operation provided a model and rationale for palliative surgery. Before this report there had been an understandable general apathy among physicians with respect to treatment of the patient with severe cyanotic congenital heart disease, as well as a pessimism about the quality of a prolonged life. The authors, originally
armed with only a positive attitude and a conviction that the operation would work, made the following prediction: "Even though the structure of the heart was grossly abnormal, it might be possible to alter the course of the circulation . . . and lessen the disability".

Soon other palliative procedures were developed. Within a few months the partial occlusion clamp allowed the development of the aorta-to-left pulmonary artery anastomosis by Willis Potts; later, the superior vena cava-to-right pulmonary artery anastomosis by William Glenn, the Brock pulmonary valvotomy and many years later, working independently, David Waterston developed the ascending aorta-to-right pulmonary artery anastomosis and Denton Cooley devised a similar procedure with a different approach.

Palliative procedures were performed for many different types of anomaly in which there was pulmonary stenosis or pulmonary atresia and ultimately other palliative operations followed for different anomalies: the Blalock-Hanlon creation of atrial septal defect in transposition of the great arteries and the Dammann-Muller banding of the pulmonary artery for ventricular septal defect with pulmonary hypertension.

The Educational Value of the Paper for Pediatric Cardiologists
(1) The report first explains the altered dynamics of some of the complex malformations of the heart in such a way that it is not only easy to understand but it stirred an interest by physicians to study congenital malformations of the heart. The JAMA paper was a good introduction to Dr Taussig's book, Congenital Malformations of the Heart. By the time the book was in print, most of the medical profession knew about the operation and the book was well received and studied by many disciplines with an interest in cardiology. The book expanded upon the clinical features of virtually all of the common malformations and this led to even wider interest in congenital heart disease and in pediatric cardiology in general. Training programs developed and the
Sub-Board of Pediatric Cardiology became a natural consequence. The Board brought structure to the curriculum of those programs and certified qualified individuals for the specialty of pediatric cardiology. Today there are more than 600 diplomates of the Sub-Board of Pediatric Cardiology.

Likewise, surgeons developed an interest in congenital heart disease, an interest which had been started by Gross and Crafoord with treatment of the ductus arteriosus and coarctation, but was undoubtedly spurred by the Blalock-Taussig anastomosis. This led to the development of other shunts. The fact that the Blalock-Taussig anastomosis did not last indefinitely further increased the interest in total repair of tetralogy of Fallot and other such malformations. The difficulty in creating an effective Blalock-Taussig shunt in the infant lead to development of surgical techniques in the small infant.

(2) The Blalock-Taussig operation was described in minute and careful detail and in easy-to-understand English. For a clear and vivid description of the operation, read the third page of the paper beginning with the first new paragraph, "Although there were slight variations . . ." and ending with, "The soft tissues of the chest wall were closed in multiple layers with interrupted silk sutures". Certainly the potential of the operation and the manner in which Dr. Blalock was able to teach it created an interest in surgeons' furthering their training in cardiovascular disease. Many heads of surgical departments around the country came from Dr. Blalock's training program in cardiovascular surgery.

(3) The paper emphasized the value, and in fact the necessity, for teamwork in cardiology between surgeon, cardiologist, and anesthesiologist and the input of the pediatrician, the internist, the radiologist, and the pathologist. Fortuitously, the two investigators ended up in the same institution and became the first team for working on problems of the patient with surgically treatable heart disease. Virtually all of the individuals responsible for the care of the three patients reported are mentioned by
name in the article, the referring doctor, the house staff, the anesthesiologist, the surgical assistant and others.

Conclusion

Today, intracardiac repair of tetralogy of Fallot is of course preferable to a palliative shunt and repair can be accomplished with an approximate 5 percent mortality and a 95 percent good outlook for an active and productive adult life. But there are still indications for a systemic-to-pulmonary artery shunt. Among all of the other palliative shunts devised, the Blalock-Taussig or its modification is still the first choice among most surgeons. The most recent modification of the Blalock-Taussig shunt may be the most widely used -- the Goretex conduit from the side of the intact subclavian artery to the side of the pulmonary artery. The Blalock-Taussig anastomosis does not deform the pulmonary arteries and the amount of blood flow to the lung is controlled and not likely to be excessive, thus pulmonary hypertension seldom results and later occlusion is easily accomplished.

If the Journal of the American Medical Association decides to publish landmark articles for their bicentennial in 2003, I predict that Blalock and Taussig's paper will be reprinted there. It is not often that a single, identifiable publication has had such influence in initiating a new discipline of medical science.

DGM/HS

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References


Tetralogy of Fallot—variations for the total correction of a complex congenital cardiac deformity. A-C (facing page): Closing an earlier palliative joining of the aorta and the pulmonary artery. D-E: Closing an earlier palliative joining of the pulmonary and subclavian arteries. F-G: Closing an earlier palliative joining of right pulmonary and the aorta. The incision depends on what type of shunts were employed earlier. H: Excising obstructing muscle. I: Repairing the defective pulmonary valve. J-K: Repairing the ventricular septal defect with a Dacron patch.
Aortic stenosis—a condition that occurs when the aortic valve is impeded by constriction. B-F: Various methods used to widen the constriction by increasing the diameter of the artery. G-I: Opening the fused leaves of the aortic valve. J: When stenosis is not correctable by any of the above methods, an artificial valve is implanted.

Atrial septal defect—a hole between the upper chambers of the heart. E-F: A two-pole overlapping suture technique used when some or all of the veins from the lungs drain into the right upper chamber. G-H: If the defect is too large to employ a primary closure, as in A-D and E-F, a Dacron patch is used.
Complete transposition of the great vessels—a congenital condition in which the aorta and the pulmonary artery stem from the wrong ventricles, reducing the circulation of oxygenated blood. A-G (stage one): A palliative procedure performed on infants. Creation of an atrial septal defect (a hole between the upper chambers of the heart) to improve circulation of oxygenated blood and reduce pressure on the heart.

Complete transposition of the great vessels (cont.) C-D (stage two): The atrial septum (the partition between the upper chambers of the heart) is removed.
Complete transposition of the great vessels, stage two (cont.). E-I: A patch is tailored from the membranous sac that surrounds the heart and is sewn into the common atrial chamber in such a manner as to reverse the inflow of unoxegenated blood.
Ventricular septal defect—A hole between the lower chambers of the heart.

When the ventricular septal defect is large enough (approximately four years), the band is removed and the contraction widened.

B: Closing a small defect with suture. D: Repairing a large defect with a Dacron patch. H: (Inseam page): The pulmonary artery is occluded with a Dacron patch.
Chère Docteur Eaussig

Ayant appris que le Docteur Blaschke pouvait lire le Français, je vis de lui écrire, mais je ne voudrais pas lui adresser une lettre, sans vous écrire également, car c'est à vous tout d'abord, que je dois mon bonheur. Je suis maintenant un tout autre petit mec, je peux faire des promenades sans me fatiguer et en France, je me réjouis de pouvoir aller jouer avec mes petits camarades. Avant, je me contentais de les regarder jouer par la fenêtre et je ne m'ennuyais pas souvent. De plus, on ne me regarderait plus comme un objet de curiosité. Je suis heureux pour maman, car ça lui faisait très mal au cœur. Je ne sais pas écrire de belles phrases pour renforcer, mais je vous embrasse de tout mon cœur.

Jean-Pierre Eaussig