

NATIONAL ACADEMY OF SCIENCES

ALFRED BLALOCK

1899—1964

A Biographical Memoir by
A. MCGEHEE HARVEY

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Biographical Memoir

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Alfred Blalock

ALFRED BLALOCK

April 5, 1899–September 15, 1964

BY A. McGEHEE HARVEY

ALFRED BLALOCK was born in Culloden, Georgia on April 5, 1899, the first son of George Z. Blalock and Martha (Davis) Blalock. Blalock's father was a merchant, his mother a "remote cousin" of Jefferson Davis. George Blalock, who was almost thirteen years older than his wife, died in 1931. He exercised a firm hand as head of the house, demanding perfection of his children and laying great stress on education, so that "it was a sad day when anyone brought in a report card that left something to be desired."* Alfred's sister Elizabeth remembers hearing Alfred say "he had rather mother use the hairbrush on him than father look at him hard."† His mother remembered Alfred as a conscientious young boy who was unwilling to go to bed until his homework had been mastered and even cried if forced to bed before he knew every spelling word perfectly. He was characterized as having an attractive smile, a soft manner of speech, a retiring gentle way, and an effective manner of saying clearly what was on his mind.

In view of his father's ill health, when Alfred was eleven years of age the family moved to Jonesboro, a town about

* Mark M. Ravitch, *The Papers of Alfred Blalock* (Baltimore: The Johns Hopkins Press, 1966), vol. 1, p. xv.

† *Ibid.*

forty miles north of Culloden where medical assistance would be more readily available. By the age of fourteen Alfred had completed the ninth grade at Jonesboro and was granted admission to the senior class at the Georgia Military College at Milledgeville. He entered the University of Georgia as a sophomore in the fall of 1915 and graduated from that institution with an A.B. in 1918.

Blalock did not consider himself to have been an excessively diligent student either in college or medical school. His academic record at the University of Georgia, however, revealed a satisfactory performance with most of his grades in the 80's or 90's. The yearbook, of which he was associate editor, listed him as secretary and treasurer of the senior class and a member of the college debating society, the junior cabinet, and the Gridiron Club. Election to the Gridiron Club was considered to be the second highest honor on the campus, members being chosen for overall excellence rather than specific academic achievement. He was a good tennis player and entered many of the college tournaments. Dr. John P. Campbell, Professor of Zoology at the University of Georgia, wrote to J. Whitridge Williams, the dean at the Johns Hopkins University School of Medicine, regarding Blalock's admission application: "As you will see his record is not unusual. He went in for college activities and had no thought of being a 'grind.' He only decided to take up medicine in his senior year. One day he came to me and said that he was going to do his very best in the hope that I might feel that I could give him a strong recommendation for Johns Hopkins. He certainly made good. I have no hesitation in saying that he is mature enough and his habits of study are sufficiently well formed to be admitted. I hope you will take him."*

**Ibid.*, p. xvii.

MEDICAL EDUCATION

Blalock entered the Johns Hopkins University School of Medicine in the fall of 1918. His record in medical school was not outstanding. Tinsley Harrison, one of Blalock's closest friends, wrote about him as follows:

While Al Blalock was in medical school he ran the student bookstore and from this earned a major fraction of his expenses at Hopkins. In addition to this he was devoted to both tennis and golf, and it was our mutual interest in these sports that first made us decide to room together and started a friendship that meant a great deal to me throughout the years. Also, he was very much the ladies' man and often had social engagements, usually at Goucher, two or three evenings a week.

On the other hand, he never wasted a minute. When he was not actively working in the bookstore or following the pursuits mentioned above, he worked at his medical studies continually. I never saw him stop in the living room of the fraternity house just to sit around and gossip. I never saw him waste time—as I did—playing cards.

Because of these several interests, Al was not an outstanding student when it came to grades. As I recall he ranked somewhere toward the bottom of the upper half of the class scholastically, but I am not certain about this. In any case he was not considered to be one of the ten or twenty top students in the class in terms of grades.

I imagine it was because of the heavy (in my opinion excessive) reliance on grades that he did not get the surgical internship for which he applied.*

Surgical internships at Johns Hopkins in those days were awarded on the basis of class standing. Although Blalock failed to get the appointment in general surgery, he was accepted as "house medical officer—urology" under Hugh Hampton Young. In spite of having a nephrectomy and temporary facial nerve palsy during that internship year, Blalock's performance was sufficiently satisfactory to gain him an assistant residency on the general surgical service for the following year. He was turned down for a reappointment

**Ibid.*, p. xix.

to the surgical house staff (an event to which Blalock never reconciled himself), and in July 1924 he began a year as "extern in otolaryngology" under Samuel J. Crowe.

As a medical student, Blalock was interested in research. In later years he often credited Tinsley Harrison with the awakening of his interest in this area. Of his early research experience Blalock commented:

When I was a medical student, and I think the year was 1920 or 1921, I worked for a short while in the Hunterian Laboratory with Dr. Jay McLean. My problem was on the lymphatics and no publications resulted. It was at this time that Jay McLean found a heparin-like substance in the liver, and subsequently Dr. Howell continued his work with the discovery of heparin.

Two years following my graduation from medical school, that being July 1924, I spent a year as extern in otolaryngology on Dr. Crowe's service. One of the subjects on which I worked was that of regeneration of the recurrent laryngeal nerves of dogs. The thing that distressed me most about the Hunterian was that I was told that I could work in it on Saturday mornings from 10 to 12. I had a good deal of free time and could have gotten along better had I been allowed to work there more. Dr. Halsted had died in 1922 else I suspect he would have given me a better opportunity.*

During his early period at Johns Hopkins, Blalock published two papers with Harrison and C. P. Wilson. The first, "The Effects of Changes in Hydrogen Ion Concentration on the Blood Flow of Morphitized Dogs," appeared in the *Journal of Clinical Investigation* in 1925, and the second, "Partial Tracheal Obstruction. An Experimental Study on the Effects on the Circulation and Respiration of Morphitized Dogs," was published in the *Archives of Surgery* in 1926.

In 1925 Blalock accepted the chief residency in surgery at the newly reorganized school of medicine at Vanderbilt. Again Harrison was instrumental in Blalock's career. Harrison had interned at the Peter Bent Brigham Hospital and

**Ibid.*, p. xxi.

returned to Johns Hopkins in the fall of 1924 as an assistant resident in medicine. The following year he went to Vanderbilt at the invitation of G. Canby Robinson, dean and chairman of the Department of Medicine. Harrison mentioned to Robinson that Blalock was available for the position of chief resident in surgery. Robinson recommended Blalock to Barney Brooks, who was moving from Washington University in St. Louis to assume the chairmanship of the Department of Surgery at Nashville, and Brooks offered Blalock the position.

When he arrived at Vanderbilt, Blalock had hoped that Brooks would allow him to be in charge of the surgical pathology laboratory. He was initially disappointed that Brooks placed him in charge of the experimental laboratory, but subsequently was pleased that Brooks had made this choice for him.

Harrison and Blalock continued work in research together. Of this work Harrison wrote:

During the 1924-25 year at Hopkins, and the subsequent 1925-26 year, when we were both chief residents at Vanderbilt, we managed to do a lot of work in the laboratory together. At that time the Van Slyke apparatus was relatively new, and the availability of a simple and accurate method for measurement of blood oxygen made it possible to, for the first time, perform accurate determinations of cardiac output in the intact animal. Almost nothing had been done about cardiac output before that. . . . Therefore Al and I became interested in studying the influence of various things on cardiac output. After a couple of years my interest was getting more and more toward the heart per se and Al's was moving more and more toward problems of cardiac output that seemed to have some direct application to the clinical problems of surgery. Therefore, we decided to split up as a team and still help each other, but that he would work on shock and I would work on cardiac output. Within a year after this decision he had completed his beautiful work on hemorrhage and trauma and its effect on the circulation of dogs. Then he came down with tuberculosis before he had been able to complete his manuscript. He went up to Saranac for a time, and I made the trip with him because we were afraid of a pulmonary

hemorrhage or something like that. All the way up on the trip he was very unhappy because he had been forbidden to do any work of any kind and his data for the first paper on shock were all set and ready to be prepared for publication. I promised him faithfully that I would write the paper on shock for him and send it to him for his approval. This I did. I have derived a permanent satisfaction from the thought that I was able in this manner to help a dear friend and to play a minor role in a research problem which, looking back after 40 years, seems to have opened a lot of doors.

Do not get me wrong. I had nothing whatever to do with the conception or planning of the work on shock. This was entirely Al's own. I did take his data and wrote the paper for him without a true realization on my own part of the importance of the work. This was done purely to help out a friend in distress.*

After spending a year (1927) at the Trudeau Sanatorium, Blalock went abroad for a few months where he worked in the Department of Physiology in Cambridge under G. V. Anrep and Sir Joseph Barcroft. When he returned to Vanderbilt in the latter part of 1928, he continued to work prodigiously in the laboratory, doing essentially all his own work, making his own animal preparations and doing his own blood gas determinations. He had students working with him from the first and to be chosen by him for a summer's work was considered to be a real plum. His younger collaborators then and later remember the method of writing joint papers. When a project was completed Blalock took the experimental data and rough notes for a clinical paper and, shortly, often by the next morning, would have written the entire paper, longhand, in very close to final form, frequently placing the names of his associates before his own.

In January 1930 Vivien Thomas, a young black who was forced for lack of funds to leave his first year of college, came to work for Blalock in the laboratory. At that point Blalock's increasing obligations were cutting into the time he could spend in the laboratory and he needed someone to free him

**Ibid.*, p. xxii.

from the more routine chores. A more fortunate choice could not have been made. Vivien Thomas learned to perform the surgical operations and the chemical determinations needed for their experiments, to calculate the results, and to keep precise records; he remained throughout Blalock's career as an invaluable associate. As time went on Blalock and Thomas worked together so closely that it was enough to suggest to Thomas the experimental preparation and the measurements to be made. Thomas often contributed his own ideas in developing the operative and manipulative techniques.

RESEARCH AT VANDERBILT

In 1928 Blalock began studies, with the aid of Hubert Bradburn, in which the oxygen content of blood withdrawn from veins in various parts of the body was determined during shock produced by different methods, including the injection of histamine in some cases and trauma to an extremity in others. The difference in the results led to the following statement by Blalock:

These observations suggest a local accumulation of blood at the site of trauma to a large area such as the intestinal tract or an extremity, and are evidence against the action of a histamine-like substance that produces a general bodily effect. The (earlier) prevailing theory . . . was that traumatic shock was due to a toxin, possibly histamine. The strongest evidence that had been put forward in favor of the toxic theory was derived from the experiments of Cannon and Bayliss, in which they found that shock resulting from trauma to an extremity of the cat could not be accounted for on the basis of the local loss of whole blood and plasma. In brief, they traumatized one posterior extremity and, when shock resulted, they amputated the two posterior extremities and determined the difference in the weight. After completing the studies on blood gases, I repeated the experiments of Cannon and Bayliss using anesthetized dogs. It was noted that the swelling extended to a higher level than the uppermost limit of the trauma and suggested that the two physiologists had not performed their amputations at a sufficiently high level. In my experiments the posterior part of the animal was bisected and the difference in the weights of the traumatized

and non-traumatized parts was determined. A comparison of this difference with the results of other experiments in which shock was produced by the slow withdrawal of blood showed that the trauma resulted in a sufficient loss of whole blood and plasma to explain the development of shock. In my paper published in 1930, entitled "Experimental Shock, The Cause of the Low Blood Pressure Produced by Muscle Injury to Dogs," it was stated: "The experiments which are presented in this paper offer no evidence that trauma to an extremity produced a toxin that caused a general dilatation of capillaries with an increase in capillary permeability and a general loss of fluid from the bloodstream."*

An important paper that originated in Blalock's laboratory described a method for transplanting the adrenal gland of the dog with reestablishment of its blood supply. This successful transplantation of the adrenal to the neck of the dog, apart from such early trials as Carrell and Guthrie's, was the first successful transplantation of an endocrine organ by direct anastomosis of its vascular supply. The most important aspect, however, was the success of the vascular suture techniques that led Blalock to suggest to his laboratory associates that the central end of the divided subclavian artery be connected to the pulmonary artery to see whether this would result in pulmonary hypertension. The results of this investigation were reported in the *Journal of Thoracic Surgery* in 1939 in a paper entitled "Experimental Observations on the Effects of Connecting by Suture the Left Main Pulmonary Artery to the Systemic Circulation." Blalock was to use this operation in 1944 for the relief of the Tetralogy of Fallot. It is a measure of his breadth as a physiologist that he was interested in pulmonary hypertension, a physiological problem that was not to attract the attention of other surgeons or cardiologists until almost two decades later.

The studies in shock, however, were the principal occupation of Blalock's laboratory in Nashville. He and his group

* A. Blalock, "Reminiscence: Shock After Thirty-four Years," *Review of Surgery*, 21(1964):231.

carefully explored every facet of the problem and compiled the evidence that clearly connected shock with the loss of fluid outside the vascular bed and with the resulting decrease in blood volume. His experiments were simple and direct; his discussions and conclusions concerning the results were straightforward, forceful, and convincing. Other investigators, of course, were reaching the same conclusion, particularly Phemister in Chicago, but the massive amount of data that Blalock accumulated on the characteristics of hemorrhagic and traumatic shock, his carefully planned experiments that eliminated one possible cause after another of the then current explanations of shock, and the clarity with which he put forth his views, based on sound experimental work, led to a new understanding of this important problem. The firm recognition of the need for volume replacement was corroborated in the treatment of the wounded during World War II. Large quantities of blood, blood substitutes, and plasma expanders were used, which resulted in the saving of many lives. Blalock himself considered his best work to have been that on traumatic shock.

On October 25, 1930 Blalock married Mary Chambers O'Bryan of Nashville. They had three children: William Rice, Mary Elizabeth, and Alfred Dandy.

THE BALTIMORE PERIOD

In 1938 Dean DeWitt Lewis, then chairman of the Department of Surgery at Johns Hopkins, resigned because of illness. The committee to select a successor recommended several prominent surgeons in the country who turned the position down for one or another reason. One of those who declined was Evarts A. Graham, the distinguished chairman of the Department of Surgery at Washington University. Graham strongly recommended Alfred Blalock to President Bowman of Johns Hopkins. When the offer was made to

Blalock, he accepted without hesitation and assumed the position in 1941.

Establishing himself in Baltimore proved somewhat difficult for a variety of reasons, but Blalock successfully disposed of the numerous problems that arose. He began at once to operate daily and to be actively concerned in the training of the resident staff and in the teaching of medical students. His Friday noon clinics rapidly developed into masterpieces of clinical instruction. George Duncan, an assistant resident in surgery at Vanderbilt, was brought to Baltimore to continue the experiments on shock.

At the time of Blalock's arrival in Baltimore, A. McGehee Harvey, the medical resident, and J. L. Lilienthal, Jr., were studying the physiology and pharmacology of myasthenia gravis. It was their conclusion that there might be a circulating substance, similar to curare, responsible for the neuromuscular blockade and the resulting muscular weakness. The well-known changes in the thymus gland, consisting of hypertrophy of that organ as well as the occurrence of tumors, made this structure the most likely source of such a substance. Harvey and Lilienthal had discussed their evidence on numerous occasions with Frank Ford, who was the senior neurologist of the hospital, and it was decided that a trial of total thymectomy in patients with this disease, regardless of whether there was tumor or simple hypertrophy, was indicated. Ford agreed to present this proposal to Blalock. While in Nashville Blalock had successfully removed a thymic tumor from a patient with myasthenia gravis. The decision was made to do a total thymectomy in a series of patients with myasthenia. The patients were operated on by Blalock and their pre- and postoperative care and study was managed by Harvey and Lilienthal. In the early cases the results were highly encouraging, and objective evidence was obtained for the first time of a function of the thymus gland in man from

the resulting improvement in neuromuscular function. With further experience the results were not uniformly predictable, and Blalock soon lost interest in the project. This operation is still done, however, and in the ensuing years it has become clear that the thymus probably has a definite role in the pathogenesis of the disease.

In 1943 Blalock was called into consultation by Dr. Edwards A. Park, the professor of pediatrics, to see a child who had a congenital lung cyst. Surgery was advised. As Blalock was leaving the ward, Park asked him whether he thought anything could be done for coarctation of the aorta. Blalock's response was noncommittal, but as he walked out of the Harriet Lane Home (the pediatric building) he turned to his resident and said: "I wonder how that could be approached in the laboratory."*

As indicated, Blalock had a special interest and competence in thoracic surgery that already extended to vascular surgery. He had successfully operated on a stab wound of the aorta while at Vanderbilt and ligated the patent ductus arteriosus in several patients at Vanderbilt and at Johns Hopkins. In addition, his published results with the operative treatment of constrictive pericarditis had attracted attention. A few months after Park made his remark about coarctation he found on his desk the manuscript of a paper by Blalock and Park that described an operation for coarctation of the aorta—anastomosing the proximal end of the divided subclavian artery to the distal aorta. Blalock expressed concern to Park about employing this coarctation operation in humans since so many of his dogs had become paraplegic because of the necessity for clamping the aorta during the procedure. Their delay in actually trying the operation resulted in prior operations by Crafoord in Sweden and Gross

**The Papers of Alfred Blalock*, p. xxxvii.

in Boston, both of whom employed excision of the coarctation and direct anastomosis. There need have been no fear of paraplegia from cross clamping the coarcted aorta since the great collateral circulation that develops in individuals with this anomaly provides insurance against this type of paralysis. Nevertheless, Blalock's first coarctation procedure on a patient, using the turned-down subclavian artery, did result in paraplegia because several pairs of intercostal arteries had been carefully divided to facilitate mobilizing the aorta.

At a pediatric conference at which Blalock reported this coarctation work, Helen Brooke Taussig, then in charge of pediatric cardiology in the Department of Pediatrics at the Johns Hopkins University School of Medicine, inquired whether some operation could be devised to improve the pulmonary circulation in children with pulmonic stenosis. Blalock, of course, had the operative remedy at hand—the subclavian–pulmonary artery anastomosis performed in Nashville some years earlier in the attempt to produce experimental pulmonary hypertension. The first question was whether this procedure would relieve the cyanosis in patients with pulmonic stenosis and the second was whether the patients would tolerate the procedure. He and Vivien Thomas had great difficulty in the laboratory trying to produce a satisfactory cyanotic preparation in dogs. Finally, successful preparations were made and the cyanosis was significantly diminished by the subclavian–pulmonary anastomosis.

On November 29, 1944 the first operation was undertaken. At that time all the modern vascular instruments were lacking and there was little but Blalock's determination to carry his surgical team through the procedure. The child had extensive collateral vessels full of thick dark blood. The pulmonary artery was identified with some difficulty and was isolated back into the mediastinum. In the words of William P. Longmire, the surgical resident assisting Blalock at the

operation: "It was quite amazing to see the professor gently but blindly insert a right angle clamp into the mediastinum and after dissecting over his index finger pull out the innominate artery."*

Vivien Thomas stood in back of Blalock at the procedure and offered a number of helpful suggestions in regard to the actual technique employed. The operation was successful at the initial attempt. The acclaim that followed the first report brought a flood of patients and visitors to the hospital.

This monumental accomplishment, resulting from the collaborative effort of a scientifically oriented surgeon and a dedicated pediatric cardiologist, brought fame to them both and ushered in the modern era of cardiac surgery.

If one can be judged by the record of the people he has trained, Blalock stands at the very top; no other surgeon in his era trained thirty-eight residents who hold important academic appointments—most of them full professors and more than ten department chairmen.

A great part of Blalock's success as a teacher, scientist, and medical statesman was due to his philosophy of research. In his presidential address to the American Surgical Association, entitled "The Nature of Discovery," he stated:

Contrary to popular belief, there is nothing magical about science or scientific investigators. The conception of the scientist as an intellectual superman, achieving important results through sheer mental brilliance, is quite unfounded. Too often in talking to a bright young surgeon I have heard the statement that he does not wish to go into academic work because he has no originality, when as a matter of fact he has not had the opportunity or the inspiration to demonstrate his ability. The only way an interested person can determine whether or not he has aptitude in research is to give it a trial.†

**The Papers of Alfred Blalock*, p. xli.

† A. Blalock, "Our Obligations and Opportunities" (Presidential Address, American College of Surgeons, Nov. 19, 1954), *Bulletin of the American College of Surgeons*, 40:1.

Blalock firmly believed in the autonomy of a department chairman. He felt that a conscientious head of a department is better qualified to make many decisions than is a committee composed of individuals from other departments in the school. He always maintained a deep interest in students and generally opposed any changes in the curriculum that might interfere with their elective time and opportunity to develop an interest in creative scholarship.

Blalock lent his best energies to the development of a children's surgical unit at Johns Hopkins. This dream finally culminated in the great Children's Medical and Surgical Center in Baltimore, which was dedicated the year of his retirement. Dr. William P. Longmire, Jr., one of Blalock's residents who realized at an early stage in their acquaintance that this was no ordinary man, began to record some of the comments Blalock made and other events that he witnessed. A notation that Longmire made on April 29, 1948 reads as follows:

The professor said the other day that in looking back over his life, the things that meant the most to him, that gave him the greatest satisfaction, were the contributions to medicine he has made. These creative endeavors meant so much more to him than the positions he had held, the honors he had received, or the societies to which he had been elected, and in many cases in which he had held high offices. One should never try to picture the professor as a saint or a god; one of his chief virtues is his "earthly human shortcomings," faults that color his character and give it a spark and interest that so many men in comparable positions fail to have. Professor Blalock is an active, struggling person, in whom one can take an interest as a man and not just in his accomplishments alone.*

The respect for Blalock's accomplishments as a scientist and particularly his unique contributions to the Johns Hopkins Medical Institutions led the trustees of the hospital and the university to change the name of the clinical science building to "The Blalock Building."

*Remarks by W. P. Longmire, Jr., at the Society of Clinical Surgeons, 1964.

IN THE PREPARATION of this memoir extensive use has been made of the excellent biography of Blalock written by Mark M. Ravitch, *The Papers of Alfred Blalock*, volumes 1 and 2 (Baltimore: The Johns Hopkins Press, 1966), and of material in the Alan M. Chesney Archives of the Johns Hopkins Medical Institutions.

BIOGRAPHICAL MEMOIRS

HONORS AND DISTINCTIONS

DEGREES

1918	A.B., University of Georgia
1922	M.D., The Johns Hopkins University School of Medicine

HONORARY DEGREES

1946	Sc.M., Yale University
1951	M.D., Honoris Causa, University of Turin
1951	Sc.D., University of Rochester
1951	Sc.D., University of Chicago
1953	Sc.D., Lehigh University
1954	LL.D., Hampden-Sydney College
1954	Sc.D., Emory University
1959	Sc.D., Georgetown University
1963	LL.D., University of Saskatchewan

HOSPITAL AND UNIVERSITY APPOINTMENTS

1922-1925	Intern and Assistant Resident Surgeon, The Johns Hopkins Hospital
1925-1926	Resident Surgeon, Vanderbilt University Hospital
1925-1927	Instructor in Surgery, Vanderbilt University School of Medicine
1928-1930	Assistant Professor of Surgery, Vanderbilt University School of Medicine
1930-1938	Associate Professor of Surgery, Vanderbilt University School of Medicine
1938-1941	Professor of Surgery, Vanderbilt University School of Medicine
1941-1964	Professor of Surgery and Director, Department of Surgery, The Johns Hopkins University School of Medicine
1941-1964	Surgeon-in-Chief, The Johns Hopkins Hospital
1955-1964	Chairman, Medical Board, The Johns Hopkins Hospital
1964	Professor Emeritus of Surgery, The Johns Hopkins School of Medicine
1964	Surgeon-in-Chief Emeritus, The Johns Hopkins Hospital

PROFESSIONAL AND HONORARY SOCIETIES

- Allen O. Whipple Surgical Society, Honorary Member
 American Association for Thoracic Surgery (Council, 1944–1948;
 President, 1950; Senior Member, 1954–1964)
 American Board of Surgery (Founders Group)
 American Clinical and Climatological Association, Honorary Mem-
 ber
 American College of Cardiology, Honorary Fellow
 American College of Surgeons (Board of Regents, 1941–1953;
 President-Elect, 1953–1954; President, 1954–1955)
 American Heart Association
 American Medical Association
 American Society for Clinical Investigation
 American Surgical Association (President, 1956; Council, 1957–
 1964)
 Blalock Society
 Board of Thoracic Surgery (Founders Group)
 Buffalo Surgical Society, Honorary Member
 Chicago Surgical Society, Honorary Member
 Halsted Society (Senior Member, 1956–1964)
 International Society of Surgery
 International Surgical Group
 National Academy of Sciences, Member
 Royal Society of Medicine, Honorary Fellow
 Society of Clinical Surgery (President, 1950–1952)
 Society of University Surgeons, Honorary Member
 Society for Vascular Surgery, Charter Member (President, 1951–
 1952)
 Southern Surgical Association (Secretary, 1943–1948; President,
 1949; Council, 1950–1954)

FOREIGN SOCIETIES

- | | |
|------|---|
| 1946 | Académie de Chirurgie, Foreign Associate |
| 1955 | Académie de Medecine |
| 1957 | Académie Royale de Medecine de Belgique, Membre
Honoraire Etranger |
| 1955 | Académie des Sciences, Institut de France, Associé
Etranger |

- 1951 Argentine Academy of Surgery, Foreign Corresponding Member
- 1955 Association of Surgeons of Great Britain and Ireland, Honorary Fellow
- 1947 Belgian Society of Surgery, Honorary Foreign Member
- 1947 British Cardiac Society, Honorary Member
- 1944 Colegio Brasileiro de Cirurgioes, Foreign
- 1947 Greek Surgical Society, Honorary Fellow
- Harvey Society, Honorary
- 1952 Horse Shoe Club (Great Britain), Honorary Member
- 1957 James IV Association of Surgeons
- 1950 Académie Nationale de Médecine (Correspondant Etranger)
- 1948 Royal Academy of Medicine of Belgium, Foreign Correspondent
- 1954 Royal College of Surgeons of Edinburgh, Honorary Fellow
- 1947 Royal College of Surgeons of England, Honorary Fellow
- 1952 Royal Faculty of Physicians and Surgeons of Glasgow, Honorary Fellow
- 1953 Sociedad Argentina de Cardiología, Honorary Member
- 1946 Sociedade Brasileira de Cardiologia, Honorary
- 1947 Society of Thoracic Surgeons of Great Britain and Ireland, Honorary Member

COMMITTEES

- National Research Council, Division of Medical Sciences
- 1939-1951 Medical Fellowship Board
- 1940-1952 Committee on Surgery
- 1940-1946 Subcommittee on Shock
- 1946-1956 Board of Directors, National Society for Medical Research (Vice-President, 1956-1964)
- 1950-1952 Advisory Council, Life Insurance Medical Research Fund
- 1952-1964 Committee on the John J. Carty Fund, National Academy of Sciences

- 1956–1964 Comité de Patronage Scientifique de l'Hôpital Chirurgical de Monaco
- 1957–1960 Board of Scientific Counselors, National Heart Institute, National Institutes of Health
- 1958–1964 Medical Advisory Council of Medical International Cooperation (Medico)
- 1959–1960 Committee of Consultants on Medical Research to the Senate Appropriations Committee
- 1961–1964 Vanderbilt Medical Committee of Visitors
- 1963–1964 Maryland Judicial Selection Council, Inc.

EDITORSHIPS

- 1936–1964 Associate Editor, *Surgery*
- 1939–1964 Editorial Board, *Archives of Surgery*
- 1942–1953 Consulting Editorial Board, *Surgery, Gynecology and Obstetrics*
- 1945–1949 Editorial Board, *The American Heart Journal*
- 1946–1964 Advisory Editorial Board, *Journal of Thoracic Surgery*
- 1948–1951 Editorial Committee, *Annual Review of Medicine*
- 1955–1964 Editorial Board, *The American Surgeon*

AWARDS

- 1940 Research Medal, Southern Medical Association
- 1941 Gordon Wilson Medal
- 1947 Chevalier de la République Française, Ordre National de la Légion d'Honneur
- 1947 Charles Mickle Fellowship
- 1948 Passano Award
- 1949 René Leriche Award
- 1950 Matas Award
- 1953 American Medical Association Distinguished Service Award
- 1954 International Feltrinelli Prize for Medicine
- 1954 Lasker Award
- 1955 Roswell Park Medal
- 1956 National Order of Merit "Carlos J. Finlay" (Officer's Degree, Government of Cuba)
- 1959 Holland Society of New York, Potomac Branch Award
- 1959 Gairdner Award

- 1960 Modern Medicine Award for Distinguished Achievement
- 1960 The Johns Hopkins Hospital Distinguished Service Award
- 1960 Alumni Merit Award, University of Georgia
- 1965 Dr. Blalock received a posthumous award of the Henry Jacob Bigelow Medal at the meeting of the Johns Hopkins Medical and Surgical Association on February 27, 1965. He had been engaged in preparation of his address for the presentation of that medal in Boston when he was interrupted by his final illness.

SELECTED BIBLIOGRAPHY*

1924

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- A statistical study of eight hundred and eighty-eight cases of biliary tract disease. *Johns Hopkins Hosp. Bull.*, 35:391-409.

1925

- With Samuel J. Crowe. The treatment of chronic middle ear sup-
puration. *Arch. Otolaryngol.*, 1:267-71.
- With Tinsley R. Harrison and Charles P. Wilson. The effects of
changes in hydrogen ion concentration on the blood flow of
morphinized dogs. *J. Clin. Invest.*, 1:547-68.
- The incidence of mastoid disease in the United States. *South. Med.*
J., 18:621.

1926

- With Samuel J. Crowe. The recurrent laryngeal nerves in dogs.
Experimental studies. *Arch. Surg.*, 12:95-116.
- With Tinsley R. Harrison. Cardiac output in pneumonia in the dog.
J. Clin. Invest., 2:435-55.
- With Tinsley R. Harrison and Charles P. Wilson. Partial tracheal
obstruction. An experimental study on the effects on the circu-
lation and respiration of morphinized dogs. *Arch. Surg.*,
13:81-95.
- With Tinsley R. Harrison. Oxygen lack and cardiac output. Some
clinical considerations. *J. Am. Med. Assoc.*, 87:1984-87.

1927

- A rubber mask for determination of oxygen consumption of the
dog. *J. Lab. Clin. Med.*, 12:378-79.
- With Tinsley R. Harrison. The regulation of circulation. V. The
effect of anemia and hemorrhage on the cardiac output of dogs.
Am. J. Physiol., 80:157-68.

*A complete bibliography of the works of Alfred Blalock is available from the
Archives of the National Academy of Sciences.

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