Chapter 1

HISTORY OF MILITARY EYE CARE

FLOYD L. WERGELAND, JR, MD*

*Colonel, Medical Corps, US Army (Ret); Adjunct Clinical Professor of Surgery, Division of Ophthalmology, Uniformed Services University of the Health Sciences, 4301 Jones Bridge Road, Bethesda, Maryland 20814-4799, and Eye Physicians Medical/Surgical Center, 681 Third Avenue, Chula Vista, California 92010; formerly, Consultant to The Surgeon General in Ophthalmology and Chief, Ophthalmology Service, Walter Reed Army Medical Center, Washington, DC 20307-5001

INTRODUCTION

The practice of ophthalmic care in the US military has evolved during peacetime and wartime. Beginning with the Revolutionary War, military medicine was the responsibility of general physicians, only some of whom had some training in the provision of eye care. Some surgeons performed cataract surgery but not as a specialty. By the American Civil War, however, ophthalmology had become recognized as a specialty in its own right by national organizations.

The demands of World War I and World War II made evident the need to maintain well-trained military ophthalmologists on continual active duty to provide care for military personnel. To meet this demand, residency training programs were established. The development of the ophthalmoscope and retinoscopy further improved methods of examination and treatment of trauma and medical eye disorders. Other improvements in surgery (not specific to ophthalmology but including enhancements in anesthesia, asepsis, and drug development) propelled the specialty forward.

The tradition of providing high-quality care to the military (active and retired), their dependents, and selected civilians has continued to this day. Military conflicts, peacekeeping efforts, and civilian medical assistance programs have challenged Army ophthalmologists, but as their history reveals, they have met these challenges and will continue to do so.

EVOLUTION OF OPHTHALMIC CARE IN THE US ARMY

Revolutionary War

The history of the US Army Medical Department begins with the outbreak of the American Revolution (1775) and particularly with the siege of Boston. The Army formed at Cambridge after the Battle of Lexington had little semblance of organization. Among those gathered were many physicians, none of whom held commissions or had any means of establishing hospitals. During the early phase of the Revolution, the sick and wounded were treated in their regiments or companies.

General George Washington, after taking command of the Army, recommended to the Colonial Congress the establishment of a hospital service with a director and necessary assistants. In July 1775, Congress passed a bill that established a medical service for the Army of 20,000 men by creating a hospital department and named Dr Benjamin Church of Boston, Massachusetts, as its first director general and chief physician.[1]

Army ophthalmology, as a part-time specialty, had its beginning at the start of the Revolutionary War. Several surgeons who were skilled in ophthalmic surgery became prominent during this period. Dr William Shippen (Figure 1-1), a noted surgeon from Philadelphia who performed cataract surgery, served as superintendent of the Army hospitals in New Jersey and later (1777–1781) as Director General of Military Hospitals of the Army.[2] Dr John Jones, a surgeon's mate who served during the French War of 1758 and the American Revolution, did eye surgery and wrote the first American medical book, *Plain, Concise, Practical Remarks on the Treatment of Wounds and Fractures*, published in New York in 1775 (Figure 1-2). This book became the Revolutionary War surgeon's text on military surgery.[3] Another ophthalmic surgeon of the day, Dr John Warren (Figure 1-3), served in the Army and later founded the Harvard Medical School. Lastly, Dr Hall Jackson, an Army surgeon, was noted for his ability in couching cataracts and curing the blind.[4]

A common eye injury during the Revolutionary War was related to the type of weapon used—the flintlock musket and the Kentucky rifle—which, on firing, would occasionally cause burns to the face and eyelids.

War of 1812

No formal Army medical department existed at the beginning of the War of 1812, but on 3 March 1813, one was established. During the War of 1812, many noted part-time ophthalmologists served with the Army, including doctors William E. Horner, Professor of Anatomy at the University of Pennsylvania (Figure 1-4), Horatio Jameson, Hosea Rich, and William Gibson.[4]

Anesthetics were not known, medical training was poor, and asepsis was unheard of at this time. Treatment of many eye conditions was the same as that for other wounds: "blistering and bleeding." Minimal surgery was performed for eye wounds, the only exception being enucleation.[3]

After the war, Congress passed an act in 1818 that provided for an Army Medical Department, this time to be headed by a Surgeon General. Of interest, in December 1822 at Fort Pitt, Pennsylvania,

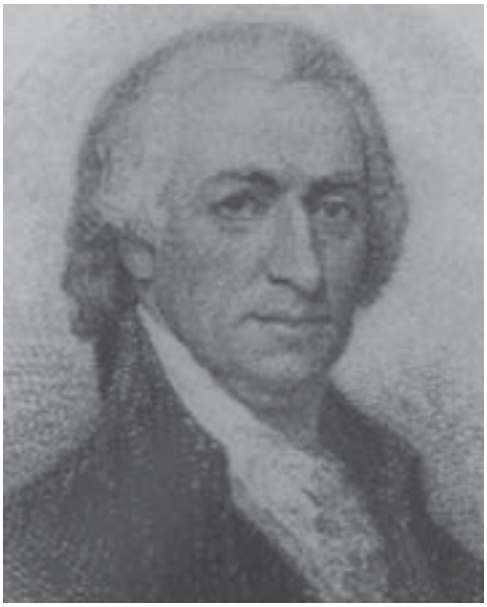
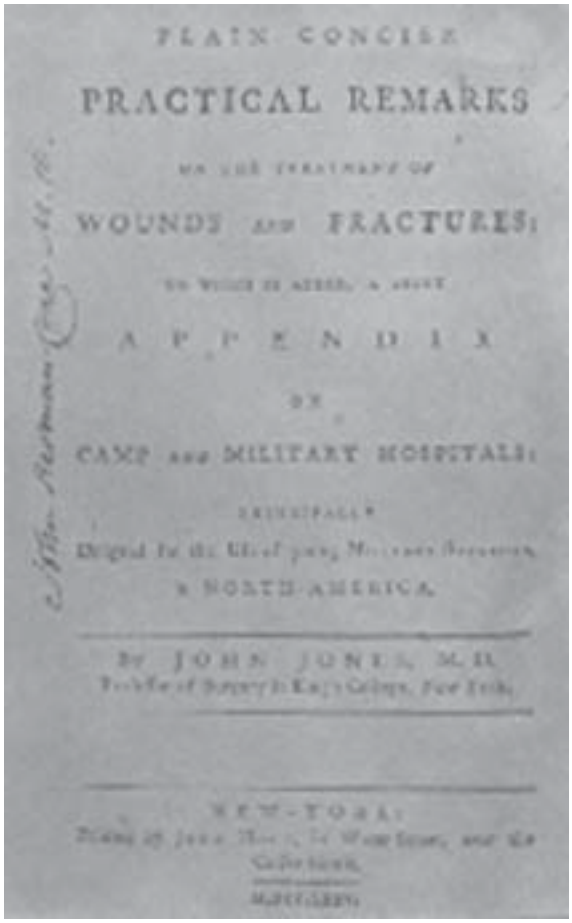


Fig. 1-1. William Shippen, Jr (1736–1808). Reproduced with permission from Packard FR. *History of Medicine in the United States.* Vol 1. New York, NY: Paul B. Haeberdic; 1931: 289.

Fig. 1-3. John Warren (1753–1815). Reproduced with permission from Packard FR. *History of Medicine in the United States.* Vol 1. New York, NY: Paul B. Haeberdic; 1931: 431.


PLAIN CONCISE

PRACTICAL REMARKS

WOUNDS AND FRACTURES;

APPENDIX

CAMP AND MILITARY HOSPITALS;

NORTH-AMERICA.

BY JOHN JONES, M.D.

NEW-YORK:

Fig. 1-2. The title page of the first medical book published in the colonies, entitled *Plain Concise Practical Remarks on the Treatment of Wounds and Fractures,* by John Jones, MD. Reproduced with permission from Ashburn PM. *A History of the Medical Department of the United States Army*. New York, NY: Houghton Mifflin (Cambridge, Mass: The Riverside Press); 1929: facing page 13.

Fig. 1-4. William Edmonds Horner (1773–1853). Reproduced with permission from Packard FR. *History of Medicine in the United States.* Vol 1. New York, NY: Paul B. Haeberdic; 1931: 385.

patients with ophthalmia at the general hospital were treated with silver nitrate in a solution of "lunar caustic in the distilled waters."[5] On 11 February 1847, Congress passed an act that gave military rank to medical officers for the first time.

American Civil War

The onset of the American Civil War found the Army and its Medical Department unprepared for the numerous battlefield casualties. Fortunately, an efficient system of evacuation from the battlefields was developed by Dr Jonathan Letterman, Medical Director of the Army of Potomac[4] (Figure 1-5). Eye injuries in the Civil War constituted about 0.9% (1,190 eyes) of the injuries due to direct hits by missiles and hand-to-hand fighting. However, between 1861 and 1866 in the Union Army, 84,986 cases of purulent ophthalmia and inflammation of the conjunctiva were reported, with four deaths resulting.[6] Although the retinoscope and ophthalmoscope invented by Helmhottz came into use during this time, they were not used in field hospitals on either side of the war.[6] Ether was available, but local anesthesia was not.

Fig. 1-5. Jonathan Letterman (seated, left). Reproduced with permission from Melin GR. The Army Medical Department, 1818–1865. *The American Medical Recorder.* 1862;8:193.

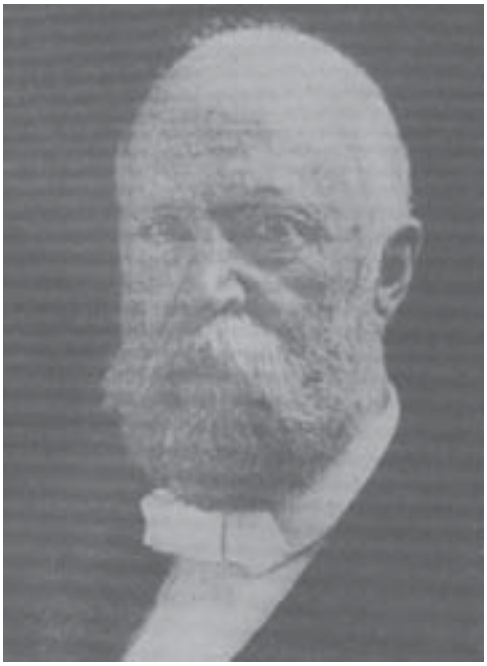


Fig. 1-6. William Fisher Norris. Reproduced with permission from Albert DM, Edward DD. *The History of Ophthalmology*. Cambridge, Mass: Blackwell Science, 1996: 151.

During the American Civil War, many ophthalmic surgeons served in the military, both part time and full time. Doctors Louis Dugas, Francis Cunningham, and Moses de Rosset served in the Confederate Army. Of note, the University of Pennsylvania, the Jefferson Hospital, and the Wills Hospital contributed many well-known ophthalmologists from their staffs to the Union Army, including doctors D. Hayes Agnew, William Henry Pancoast, Charles Robertson, William Norris, Richard Levis, Peter D. Keyser, William Hunt, Addinell Hewson, and Ezra Dyer.

Ophthalmology was established as a full-time specialty in the United States during the American Civil War, and in 1863 the American Medical Association recognized it as a specialty. Likewise, modern ophthalmology had its beginning in the Army Medical Department during the American Civil War. Many of the staff at the Wills Hospital of Philadelphia, one of the first general hospitals that paid particular attention to the diseases of the eye, went as a group into the Army. For example, Dr S. Weir Mitchell of Philadelphia, a neurologist, did his well-known work on eyestrain as a cause of headache and promoted the use of proper eyeglasses. Although not an ophthalmologist, Mitchell realized the importance of systemic ocular examinations as part of a general examination and developed a step-by-step method for ocular examinations that is still used today. Doctors William Norris and William Thomson made valuable microscopic studies that greatly added to the knowledge of the profession. In addition, Norris (Figure 1-6) established an eye-and-ear department at the University of Pennsylvania, and Thomson provided ocular micrographs for the Army Medical Museum.[7]

The period from 1865 to 1898—from the close of the American Civil War to the outbreak of the Spanish–American War—has been alluded to as "the day of small things" in the US Army. However, the Army Medical Museum (Figure 1-7) was established in 1863 for the purpose of preparing the text *Medical and Surgical History of the War of the Rebellion* and to collect all war-related specimens of interest to the study of military medicine and surgery.[8] In addition, the American Ophthalmology Society was established in 1864 and the American Academy of Ophthalmology and Otolaryngology in 1896.

Little is known of Army ophthalmology at the many small Army posts established after the American Civil War, except that cases of snow blindness filled the wards on the Texas frontier in 1876 and that cocaine was used in two eye operations in 1886[3] (Figure 1-8). The only eye disease reported from the more than 130 outposts in the Southwest was "army ophthalmia" from Fort Douglas, Utah. This condition was probably trachoma, which was promoted by the alkali dust that was common to the area.[9]

In 1893, US Army Surgeon General George M. Sternberg established the Army Medical School (the

Fig. 1-7. The large building in the center of this photograph is Ford's Theater, which was the fourth home of the Army Medical Museum and which it occupied from 1866 until 1887. Photograph: Courtesy of National Museum of Health and Medicine, Armed Forces Institute of Pathology, Washington, DC; Reeve Negative 32782.

Fig. 1-8. Fort Seldon, Texas, 1865–1892. Eye care could be provided at this frontier hospital, seen here behind troops. Reproduced with permission from Hart HM. *Old Forts of the Southwest*. Seattle, Wash: Superior Publishing Company; 1964: 133.

forerunner of the modern Walter Reed Army Institute of Research), which offered courses in ophthalmology for Army surgeons. Army medical officers could receive advanced training in ophthalmology in Army general hospitals, medical schools, and even in foreign studies. A large number of Army medical officers became proficient in ophthalmology after the American Civil War; some of the most prominent were doctors John M. Bannister, H. A. Shaw, John L. Sheppard, Theodore C. Lyster, W. D. Crosby, P. S. Halloran, James Bourke, and Louis A. La Garde.

Colonel La Garde (Figure 1-9), who spent many years as a frontier surgeon and participated in several Indian campaigns, was one of the first medical officers to become expert in eye diseases after studying at the New York Postgraduate Medical School from 1889 to 1890. Although he filled many administrative posts during his long military service, La Garde's first interest was the practice of medicine, with special emphasis on surgery and diseases of the eye. He had a wide knowledge of surgical pathology and was a skillful surgeon. He is best remembered, however, for his work on wound infections from missiles and on the effects of high-velocity bullets on the human body. He published widely and lectured extensively on the subject, and during World War I he helped train physicians on the treatment of gunshot wounds at various medical training camps.[10]

Spanish–American War

Only 35 eye injuries were reported during the Spanish–American War, which accounted for 2.2% of the total 1,561 who were wounded in combat. With the occupation of Cuba and the Spanish colonies of Puerto Rico and the Philippines, tropical ophthalmology became very important. This made the need for specialization even more important in the military medical services, and after the war, for the first time, the Army concentrated its specialists and special equipment in its general hospitals.

World War I

Soon after the United States entered World War I, it became apparent that the Army Medical Depart-

Fig. 1-9. Colonel Louis A. La Garde, a member of the US Army Medical Department. Reproduced from Mary C. Gillett. *Army Medical Department, 1865–1917*. Washington, DC: Center of Military History, US Army; 1995: 158.

Fig. 1-10. Colonel George E. DeSchweinitz. Reproduced with permission from Albert DM, Edward DD. *The History of Ophthalmology*. Cambridge, Mass: Blackwell Science; 1996: 153.

Fig. 1-11. Brigadier General William Holland Wilmer (circa 1920). Reproduced with permission from Hume EE. *The Golden Jubilee of the Association of Military Surgeons of the United States. A Brief History of its First Half Century 1891–1941*. Washington, DC: The Association of the Military Surgeons, 1941: 128.

ment would have to call to service many physicians and surgeons who were specialists in their particular branches. It was estimated that 500 trained ophthalmologists would be necessary to provide the military ophthalmic work required in the United States and abroad.[11(p659)] Army ophthalmology was established as a section under the Division of Head Surgery.[12] Colonel George E. de Schweinitz (Figure 1-10), a reserve officer and Professor of Ophthalmology at the University of Pennsylvania, served as Chief of the Ophthalmic Section. Colonel Allan Greenwood was appointed the Chief Consultant in Ophthalmology to the American Expeditionary Force (AEF); later, he wrote the ophthalmology section (AEF) of the official history of the US Army Medical Department in World War I.[11]

Colonel William Holland Wilmer (Figure 1-11), a clinical and research professor at Georgetown University Medical School in 1917, laid the foundation for the development of aviation medicine. Wilmer helped map out standards for the US Army Air Medical Service, the Medical Research Board, and the Air Medical Research Laboratory. He served as the first director of the laboratory, which eventually became the parent school for flight surgeons and later became known as the School of Aviation Medicine.[13]

Before the organization of the AEF, a number of Army ophthalmologists were sent to France for duty there with the British Expeditionary Force. The British medical profession, depleted in ranks because of the length of the war, needed medical officers to fill the gaps. These American surgeons gained great experience in the clinical and pathological ophthalmic problems in France and England before the US Army base hospital units arrived in Europe.[1] In addition, eminent men in civilian medicine were sent to France as consultants. This was the beginning of the Civilian Consultant Service, as it is known today. A total of 612 ophthalmologists were assigned to duty during World War I. An example of the type of men who served was Dr George Strong Derby, a professor at Massachusetts Eye and Ear Infirmary in Boston, who was stationed at Hospital 5 in France.[14] After the war, he was instrumental in appointing the first woman, Dr Maud Carvill, to his infirmary staff.[7]

The ophthalmological statistics of World War I plainly indicate the scope of this field in the mili-

Fig. 1-12. Eye Clinic, Base Hospital 68. Reproduced from Greenwood A, ed. Ophthalmology in the American Expeditionary Forces. Section 4. In: Ireland MW, ed. *Medical Department of the US Army in World War I*. Vol 11, Part 2. Washington, DC: War Department, US Government Printing Office; 1924: 670.

tary service. Eye injuries averaged 2% of all the casualties, but a peak of 8% was reached during the static phases of trench warfare.[15] Some 6,400 operations on the eye were reported, such surgical interventions being limited to those (*a*) made necessary by injuries or (*b*) wherein the effectiveness of the soldier could be improved (Figure 1-12).

Of patients in base hospitals, 10% required eye examinations and treatment (Figure 1-13).[16] Syphilis was a frequent cause of iritis or iridocyclitis. Influenza was often complicated by ocular lesions, chiefly conjunctivitis. Most eye injuries were produced by flying fragments of shell casing, bits of exploding hand grenades, or gravel blown into the eyes by explosion of shells among sandbags around trenches. The most destructive injuries were caused by high-velocity bullets and shrapnel balls. Careful X-ray localization of intraocular foreign bodies (IOFBs) was stressed. Despite their large size, the use of the Haab giant magnets became routine; the extraction of nonmagnetic foreign bodies (FBs) in the vitreous, however, was more challenging. Forceps were introduced through a scleral incision and the object was visualized with an ophthalmoscope. Colonel Harvey Cushing, a noted neurosurgeon in the AEF, correlated traumatic brain injuries with their visual fields. This was of great importance to the field of neuroophthalmology, as it provided valuable diagnostic information to physicians in determining the site of visual tract lesions in the brain.[14]

One of the striking developments during the war was the effect that certain chemical agents had on

Fig. 1-13. Eye Clinic Camp Hospital 9. Reproduced from Greenwood A, ed. Ophthalmology in the American Expeditionary Forces. Section 4. In: Ireland MW, ed. *Medical Department of the US Army in World War I*. Vol 11, Part 2. Washington, DC: War Department, US Government Printing Office; 1924: 671.

the eyes. Mustard agent (2,2'-dichlorethyl sulfide), which was used by the Germans, produced many Allied casualties who often required prolonged hospitalization in special gas hospitals such as Field Hospital 16 in Luzancy, France. Experienced ophthalmologists were assigned to the staffs of these hospitals to treat chemical conjunctivitis, episcleritis, and keratitis. Acute cases were treated with mild solutions of boric acid or sodium bicarbonate and atropine, then during convalescence with zinc sulfate.[14]

Before casualties began to be returned from overseas, six hospitals in the United States were selected as eye centers and another was designated for the care of blinded casualties. Approximately 300 soldiers were blinded in the war,[17] and many of them received care and rehabilitation at the Army General Hospital 7 in Baltimore, Maryland. Major General Merritte W. Ireland (who was The Surgeon General, US Army, in 1918) had practiced some ophthalmology early in his career, which accounted for his intense interest in the care of blind soldiers during and after the war.[18] However, since 1921, the Veterans Administration (now known as the US Department of Veterans Affairs) has assumed the care and instruction of blinded soldiers.

The most notable advance in training during the war was the establishment in August 1918 of the Army School of Ophthalmology at Fort Oglethorpe, Georgia, although it functioned for only a few months. The course of instruction provided review and postgraduate work for experienced ophthalmologists, with special training in military ophthalmology.[19]

Between World Wars I and II

After World War I, the value of specialists in the proper care of the wounded and in the conservation of manpower was clearly defined. Between World Wars I and II, there were more than 30 men in the Regular Army who were well qualified in the specialty of ophthalmology, including doctors Roderic P. O'Connor, W. T. Davis, and Pfeffer, Keeler, Royalls, and Dale. Younger military ophthalmologists were detailed as understudies in the service and as students in leading postgraduate schools. Some were sent to Vienna, Austria, for postgraduate training.[14]

Two Army institutions that are of great importance to the profession of ophthalmology are the Army Medical Library and the Army Medical Museum. The place in medical science held by the Army Medical Museum was recognized by the leading ophthalmologists in the United States in 1922, when

Fig. 1-14. Helen Campbell Wilder Foerster. Photograph: Courtesy of Armed Forces Institute of Pathology, Washington, DC.

the Registry of Ophthalmic Pathology was established under the guidance of Lieutenant Colonel George R. Callender. The Registry quickly enlarged, and by 1933, civilian and military ophthalmologists had submitted 2,385 specimens. Together with succeeding specimens and records, these have assisted greatly in the publication—in close collaboration with the American Academy of Ophthalmology and Otolaryngology—of several classic textbooks in ocular pathology since 1929 to the present. These titles include Jonas Friedenwald's *The Pathology of the Eye* and his *Ophthalmic Pathology: An Atlas and Textbook;* De Coursey and Ash's *The Pathology of the Eye;* Hogan and Zimmerman's *Ophthalmic Pathology: An Atlas and Textbook;* and Spencer's *Ophthalmic Pathology*.

Several individuals contributed to the outstanding success of the ophthalmic pathology section of the Army Medical Museum and its eventual development into the Armed Forces Institute of Pathology (AFIP) in 1949. In addition to Lieutenant Colonel George R. Callender (mentioned above), they also included Major General Elbert De Coursey, Lieutenant Colonel James Ash, Lieutenant Colonel Lorenz E. Zimmerman, and civilian Helen Campbell Wilder Foerster. Foerster (Figure 1-14), a histopa-

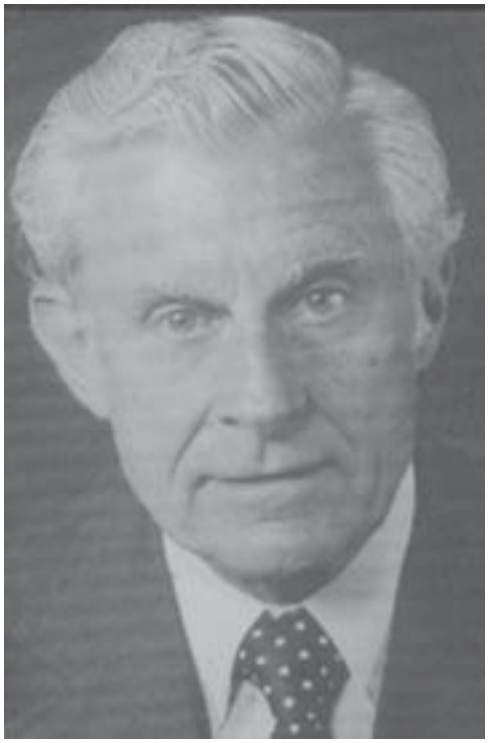


Fig. 1-15. Lorenz E. Zimmerman. Reproduced with permission from Albert DM, Edward DD. *The History of Ophthalmology*. Cambridge, Mass: Blackwell Science; 1996: 99.

thology technician at the museum for 33 years (from the establishment of the Registry), was an outstanding contributor and collaborator in ophthalmic pathology. She published many scholarly writings, especially studies of chorioretinitis caused by *Toxoplasma gondii* and *Toxocara canis*. Zimmerman (Figure 1-15), who became Chief of the Ophthalmic Pathology Section at AFIP in 1953, made significant contributions in ocular pathology with multiple publications and is a great teacher and excellent lecturer. He trained many ocular pathologists in the United States and abroad.

Graduate medical education in ophthalmology was begun in 1920 with the establishment of Army internship programs at several Army medical centers. Practical training was offered at Walter Reed General Hospital Clinic for medical officers designated to receive special instruction in ophthalmology. On 1 September 1923, to further the educational system of the Medical Department of the Army, the Department of Ophthalmology was established at Walter Reed General Hospital. Colonel Ralph H. Goldwaite served as the ophthalmologist at Walter Reed during the war, but Colonel Edward B. Spaeth became the first Chief of the Department of Ophthalmology (Figure 1-16).

Fig. 1-16. (**a**) Colonel Ralph H. Goldwaite. (**b**) Colonel Edward B. Spaeth. Photographs: Courtesy of Walter Reed Army Medical Center, Washington, DC.

World War II

Military ophthalmology reached a new high during World War II, and its accomplishments were many. The bulk of the medical care and practically all specialists were obtained from civilian resources, with most of the members of the Regular Army Medical Corps acting in administrative capacities. The medical and surgical advances in ophthalmology, with modern drugs and better techniques and equipment, were well applied. The increased skill and training of the ophthalmologists, together with better evaluating methods for eye casualties, reduced eye loss.

Consultants in ophthalmology coordinated the care of eye casualties in the various theaters, and specialized centers for the treatment of eye injuries were established throughout the United States. Colonel Derrick T. Vail, Jr, Professor of Ophthalmology at Northwestern University, served as Senior Consultant in the European theater in 1942 through 1944 and briefly as Chief of the Ophthalmology Branch, Office of The Surgeon General (Figure 1-17). In that position in 1945, he participated in the examinations of the American Board of Ophthalmology to observe the performance of candidates for the Army.

Fig. 1-17. Colonel Derrick T. Vail, Jr. Reproduced from Carter BN, ed. *Activities of Surgical Consultants*. Vol 2. In: Coates JB Jr, ed. *Surgery in World War II.* Washington, DC: US Department of the Army, Medical Department, Office of The Surgeon General; 1964: 444.

Fig. 1-18. Lieutenant Colonel M. Elliott Randolph. Reproduced from Carter BN, ed. *Activities of Surgical Consultants*. Vol 1. In: Coates JB Jr, ed. *Surgery in World War II.* Washington, DC: US Department of the Army, Medical Department, Office of The Surgeon General; 1962: 96.

The Ophthalmology Branch of the Surgical Consultants Division, Office of The Surgeon General, was activated on 15 April 1944, with Lieutenant Colonel M. Elliott Randolph as its first Chief (Figure 1-18). Its function was to establish policies, procedures, and consultations in the management of general ophthalmology and the care of the blind in the Army.[19]

In most Army hospitals in the Zone of the Interior, the patient load in the eye centers was heavy, and, especially as the war advanced, staff numbers were limited. Many patients required some type of plastic or reconstructive work or treatment for IOFBs, intraocular neoplasms, and retinal detachments (Figure 1-19). Eye injuries in this war again reached an average of about 2% of all injuries, with a peak of 4%.[15] Approximately 1,700 were totally blinded.[20]

Centers for blind soldiers were established for early care and basic education at Valley Forge General Hospital, Pennsylvania; Diablo General Hospital, California; and the Naval Hospital in Phila-

Fig. 1-19. (**a**) The Ophthalmology Service in a General Hospital (England, 1944). (**b**) Eye surgery in a General Hospital (England, 1944). Photographs: Reproduced from Carter BN, ed. *Activities of Surgical Consultants*. Vol 2. In: Coates JB Jr, ed. *Surgery in World War II*. Washington, DC: US Department of the Army, Medical Department, Office of The Surgeon General; 1964: 448, 449.

delphia. If no further medical and surgical treatment would be beneficial, these patients were transferred to Old Farm at Avon, Connecticut, for social rehabilitation and prevocational guidance and training. At the close of the war, a training center for the blind was established at Hines Veterans Administration Hospital, Illinois, which still fills that role today.

One major contribution that wartime medicine made to the ophthalmologic treatment was the development of an artificial eye. In 1944, Captain Stanley F. Erpf, Dental Corps, working at the Army Dental Section with the 30th General Hospital in England, created an artificial eye from acrylic plastic. The eye was unbreakable and closely resembled the coloring of the human eye. After development of a manufacturing process within the Army, approximately 10,000 eyes were produced.

Korean War

The Army Medical Department was in dire need of specialists after World War II ended. Medical officers who practiced specialties or who had some training received refresher courses at various general hospitals and short courses in civilian institutions. At that time, only seven officers were board certified. To help resolve this problem, Army residency programs in the medical and surgical specialties were established on 11 February 1946. This was the beginning of advanced postgraduate clinical education in Army teaching hospitals. This training provided a cadre of teachers, consultants, and specialty practitioners to the Army Medical Department.

The establishment of ophthalmology residency training programs began in 1947 at Brooke Army Hospital, Walter Reed Army Medical Center, Letterman Army Hospital, and Fitzsimons Army Hospital. By the time the Korean War started, 17 board-certified ophthalmologists were in the Regular Army, and 9 Reserve Army officers were on extended active duty.[17]

At the time hostilities began in Korea in June 1950, the Army had 2 ophthalmologists in the Far East, both at the Tokyo Army Hospital. Eventually, 25 ophthalmologists were assigned to the evacuation hospitals in Japan and Korea and some were assigned to mobile army surgical hospitals (MASHs) and neurosurgical teams on the front lines.[17]

In the first 2 years of the Korean War, eye cases represented 12% of all patients admitted to Tokyo Army Hospital.[17] Of the casualties sustained during the first year of the war, 4.6% had eye injuries. Approximately 150 became totally blind.

With the introduction of the helicopter, many eye patients could be evacuated quickly from the battlefield or frontline medical station to a MASH or an evacuation hospital, where definitive surgery could be performed. The seriously injured were sent to one of the five general hospitals in Japan. If hospitalization was expected to exceed 120 days, the patients were returned to the United States.

All types of eye injuries were seen in the Korean War, including perforating wounds, IOFBs, retinal detachments and hemorrhages, and some burns. The burns were more common among the prisoners of war who were accidentally bombed with napalm. The use of the Lancaster hand magnet and the Berman FB locator were invaluable in the treatment of IOFBs.

Despite the pressure of the war in the Far East,

in 1951 Colonel Forrest E. Hull, Chief of the Eye Service at Tokyo Army Hospital and Consultant to the Surgeon of the Far East Command, organized a course in the basic science of ophthalmology in Japan for ophthalmologists who had not completed their training because of the sudden onset of the war. Also, the American Board of Ophthalmology gave the written examinations in Tokyo in 1951 and 1952.[21]

One of the great advances in Army ophthalmology was in ocular research, which was practically nonexistent until Colonel Austin Lowrey, Jr (Figure 1-20), started a research unit in 1948 at what is now Walter Reed Army Medical Center, Washington, DC. The unit, under the Research and Development Board of The Surgeon General's office commanded by Colonel John H. King (Figure 1-21), Chief of Ophthalmology at Walter Reed and Consultant in Ophthalmology to The Surgeon General, US Army, performed active research and coordinated research projects in progress at other Army general hospitals, military installations, and key civilian institutions. Among many others, studies were conducted on ocular toxoplasmosis and leptospirosis, and, in addition, on problems with atomic radiation, new equipment both for field and stationary clinics, a survey on new drugs, development of protective combat goggles, the use of contact lenses in combat conditions, and vision and muscle balance in accidents.[17]

Fig. 1-21. Colonel John H. King. Photograph: Courtesy of Walter Reed Army Medical Center, Washington, DC.

Fig. 1-20. Colonel Austin Lowrey, Jr. Photograph: Courtesy of Walter Reed Army Medical Center, Washington, DC.

Vietnam War

Although US troops were in Vietnam assisting the South Vietnamese regime as early as 1962, casualties with eye injuries were either taken care of by a US-trained Vietnamese ophthalmologist in Saigon or they were evacuated to the United States. In August 1965, the first US Army ophthalmologist was assigned to the 85th Evacuation Hospital in Qui Nhon. As the war escalated, eight additional ophthalmologists arrived in Vietnam and were stationed at evacuation and field hospitals (Figure 1-22).[22] The ophthalmologist at the 24th Evacuation Hospital in Long Binh was designated the Consultant in Ophthalmology to the Senior Medical Commander. However, he had limited authority to correct any deficiencies in ocular care in Vietnam.

Usually only one ophthalmologist was assigned to a hospital unit to provide surgical and medical care to inpatients and outpatients. Because there were not enough fully trained ophthalmologists to staff evacuation and field hospitals, general medi-

Fig. 1-22. US Army Hospitals in Vietnam, December 1968. Reproduced from Neel S. *Medical Support of the US Army in Vietnam 1965–1970*. Washington, DC: US Government Printing Office, 1973: 62.

cine officers were given on-the-job training at the 24th Evacuation Hospital to provide some care. The absence of senior Army eye surgeons in theater made it difficult to obtain needed consultation and assistance to manage difficult cases.

Another prevalent problem was that the Army hospitals were designated and equipped to provide care only for specific combat units, and they were expected to evacuate casualties quickly. Moreover, these hospitals were required to provide care for all patients, including Allied military personnel and some civilians of all ages. Unfortunately, the hospitals had no ophthalmic equipment for outpatient care and had only minimal inpatient surgical supplies and instruments. These shortages necessitated the evacuation of many patients back to the Communication Zone in Japan and the Philippines, where delayed definitive care produced poorer outcomes. The ophthalmic supply problem was partially resolved when the ophthalmologists personally contacted civilian and military sources in the United States to obtain needed items such as standard medications and surgical instruments.

Regardless of the shortcomings experienced during the Vietnam War, the overall standard of eye care was high, and no documented cases of sympathetic uveitis were reported. Of casualties in Vietnam, 9% sustained ocular injuries, the highest in any American war or conflict. Only 25% of the ocular casualties studied could return to active duty, whereas 83% of all surviving wounded could do so. Further analysis also indicated that 39% of the eye injuries could have been prevented by the use of some form of eye armor.[22]

When not involved in their military duties, most Army ophthalmologists provided medical and surgical care for Vietnamese civilians and military in both Vietnamese and US Army hospitals. Several military ophthalmologists were able to actively participate in the Medical Civil Action Program

Fig. 1-23. (**a**) Colonel Jack W. Passmore. (**b**) Colonel Budd Appleton. Photographs: Courtesy of Walter Reed Army Medical Center, Washington, DC.

(MEDCAP), providing medical care and surgery to Vietnamese and Montagnard patients. In addition, they trained ophthalmologists in the Vietnamese army in cataract and ocular plastic surgery.

During the Vietnam War, Army ophthalmology worldwide was led by the Consultants in Ophthalmology to The Surgeon General: Colonel Jack W. Passmore (1964–1967) and Colonel Budd Appleton (1968–1978), both of whom also served as Chief of the Ophthalmology Service at Walter Reed Army Medical Center (Figure 1-23). Many ophthalmologists served well in Vietnam, including William Dale Anderson, Arnulf F. Ehmer, Francis G. La Piana, Albert Hornblass, Richard M. Leavitt, Lewis L. Lauring, F. B. Hoefle, and Bruce E. Spivey.

Errors in the provision of care to ophthalmic casualties in Vietnam could have been prevented if the lessons learned in previous wars had been better known and applied. Efforts are being directed toward improving the treatment of ocular injuries in any future conflict, (eg, blast and laser injuries).

Since the Vietnam War, the US Army has been involved with several conflicts around the world: in Panama, Grenada, Haiti, Somalia, the Persian Gulf, and the Balkans. Military ophthalmic care was important during the Persian Gulf War; Army and Navy ophthalmologists provided care for 221 casualties. Most of the injuries were caused by blast fragments (78%) from munitions.[23]

IMPLICATIONS FOR MILITARY OPHTHALMOLOGISTS

After the downsizing of the Army, the US Army Medical Department currently has training centers for ophthalmologists at three Army Medical Centers: Walter Reed, Brooke, and Madigan. Several centers also provide training for Air Force and Naval officers. In addition, postgraduate courses in ocular trauma and ocular pathology are offered to military ophthalmologists every year. The present role of military medicine and Army ophthalmology is to be prepared for battle and noncombat situations. Military ophthalmologists must now be equipped to provide humanitarian and civic assistance, global disaster preparedness, and combat ophthalmic care. Readiness for all assigned and unexpected missions is the present goal of military medicine.

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