

## **Some Considerations of the Quality of American Medicine at the Time of the Civil War**

In *Doctors in Blue*, the classic book on Civil War medicine written in the 1940s, Adams described a "time lag between Europe and America in medical ideas." More recent information shows that this statement is grossly misleading. As illustrations, Adams pointed out that "not even the headquarters of the Army Medical Department" acquired its first achromatic microscope until 1863 and that the Harvard Medical School catalogue did not mention possession of a microscope until 1869. These points and his statement that "The ophthalmoscope...had been invented in 1851, yet few could use it in our army 10 years later"<sup>1</sup> warrant discussion.

During the 19th century, American medicine was following developments in Europe closely, implementing them here quickly. Civil War physicians were up to international standards in their knowledge of the medical science of the time, and during the war quickly forged into leadership in military medicine. In later essays military medical developments will be covered in more depth, but at this time I would like to point out where American medicine stood in regard to those two specific criticisms of Civil War medicine, microscopy and ophthalmology, since they figured in the care of sick and wounded soldiers.

### **Microscopy**

The use of the microscope was taught in most American medical schools for a long time before the Civil War. Numerous advertisements by manufacturers of microscopes appeared in antebellum medical journals. Several scientific societies organized specialty sections devoted to microscopy.<sup>2</sup> At Harvard, Dr. Oliver Wendell Holmes used his own battery of microscopes to teach the students. Several major contributions to the field of microscopic pathology were made by American physicians. One of them was written in 1848 by Dr. Alfred Stillé of Philadelphia who later had a major role in the Sanitary Commission. A medical professor in Charleston, Dr. F.P. Porcher, published a valuable book, *Illustrations of Disease with the Microscope*, in 1861.<sup>3</sup> During the war, Porcher's observations about plants as alternative sources of drugs was summarized in the *Confederate Medical and Surgical Journal*.<sup>4</sup>

The fact that a bureaucratic office, "the headquarters of the Army Medical Department" acquired a microscope reveals a revolutionary breakthrough in military medical thinking. This microscope was obtained for the Army Medical Museum where it was used primarily by Dr. Joseph J. Woodward. This museum, which was highly praised by European medical visitors during the war, was itself a unique development in the history of military medicine. It evolved into today's Armed Forces Institute of Pathology,<sup>5</sup> still an internationally respected institution.

Woodward had been at the University of Pennsylvania before the war, serving under Professor Joseph Leidy. Dr. Leidy worked as a contract physician for the army during the war. Before the war Woodward had published a translation of the landmark book on microscopic pathology of that era, the work by Rudolph Virchow which firmly established the cell theory of tissue structure. His summary of the book appeared in *The American Journal of Medical Sciences* in 1860, the same year the original book was published in Germany. In it Woodward correctly pointed out that Virchow had "contributed perhaps more than any other single individual...to the progress which scientific medicine has achieved in recent years."

Woodward was called from field service during the Peninsular Campaign in May, 1862 by the new Surgeon General, William Hammond. Working in the Army Medical Museum, Woodward made tissue sections as best he could, cutting them by hand with a razor or fine knife. (The microtome was not introduced until 1866, and was not perfected until about 1875.<sup>6</sup>) Woodward stained his tissue sections with carmine, the same stain used by Virchow. However, during the war Woodward performed and published observations using aniline dyes to stain tissues in studies of the chronic diarrhea of Civil War troops.<sup>7</sup> Although these dyes had been used primarily by the textile industry in Germany, they began to be used for tissue stains in that country in 1862. The technique was quickly adopted internationally but Woodward had independently discovered their utility as tissue stains and he is credited with making a significant contribution to technique in microscopy.<sup>8</sup> Woodward also did pioneering in photomicrography using true photographic technique although Daguerreotype photomicrographs had been made earlier. Civil War medicine, thus, was not only up to the standards of the time, but was internationally prominent in the field of microscopy, and much of its leadership was due to work done with that microscope, obtained in 1863 for the Surgeon General's office.

Was the microscope used in the care of soldiers during the Civil War? There is clear evidence that Civil War physicians in field and general hospitals had microscopes and used them while evaluating patients. For example, Civil War physicians examined the stools of patients with chronic diarrhea microscopically, looking for "pus corpuscles" and microorganisms which might be responsible. They saw pus corpuscles, bacteria in the form of "cocci in chains" and "bacilli", and budding forms (probably yeast, which they called torula). They doubted that these findings were meaningful since similar bacteria and budding yeast were seen in normal stools.<sup>9</sup> Further, in the discussion of the 9, 454 cases diagnosed as having "inflammation of the kidneys" in the *Medical and Surgical History*, a few individual case histories were recorded. Urinalyses were described as revealing albumin and, by microscopic examinations, red cells, fat globules and even uric acid crystals.<sup>10</sup> In addition, an article published by a Civil War staff physician summarized a clinical study of 100 cases of measles done in a general field hospital in Chattanooga. In evaluating the "urinary organs" in these patients "daily examinations were made to detect albumen and casts..."<sup>11</sup> Since a microscope is needed to look for pus cells and microorganisms in the stool or casts, red cells and crystals in the urine, these reports document the frequent use of the microscope, even in field hospitals.

## The Ophthalmoscope and the Treatment of Eye Injuries

The Medical and Surgical History of the War of the Rebellion specifically states that the ophthalmoscope was not used by army physicians during the war. Thus, Adams was correct in making that point, but his fact gives a misleading idea of the development of the field of ophthalmology in the U.S. at the time. American physicians had a great interest in the field before and during the war and were beginning to specialize in it, as shown by the found of the American Journal of Ophthalmology in 1864. They were able to use the arrangement of lenses, without a light source, called an ophthalmoscope; they were aware of problems associated with its use as shown by an entry in the Confederate States Medical and Surgical Journal in 1864. The article points out that an extract of the calabar bean could reverse the prolonged blurring of vision resulting from the instillation of atropine to dilate the pupil to aid in ophthalmoscopic examination. Much later such extracts were found to contain physostigmine, which counteracts the effect of atropine.<sup>12</sup>

However, treatment of eye trauma is more relevant to a discussion of the quality of Civil War ophthalmology. A condition called sympathetic ophthalmia causes inflammation in an uninjured eye when one eye is inflamed. This process often develops following injury to an eye. It can cause serious loss of vision, even blindness, in the uninjured eye. We know of an autoimmune mechanism for this process and can treat it but there was no effective treatment during the Civil War. Avoiding it was most important, and the only way to avoid it was to remove a damaged, inflamed eye before inflammation developed in the good eye.

Removal of such a damaged eye to protect the other one was first suggested by a physician named Pritchard in England in 1851. The fact that excision was ineffective once inflammation had developed in the good eye was a subject covered at the first International Conference on Ophthalmology which occurred at Heidelberg in 1863 although medical histories states that the entity was not well established until 1866. Prophylactic excision became the standard treatment, and remained so for decades.<sup>13</sup>

Civil War era surgeons were acquainted with sympathetic ophthalmia. The condition is discussed at length in the Medical and Surgical History in the first surgical volume<sup>14</sup> which was written after the war, in the 1870s and probably reflects post-war knowledge. The article describes 1,190 cases of wounds to one or both eyes treated during the war. Details of 254 cases of gunshot wounds of one eye are given and the statement is made that, "In forty-one of these cases vision in the uninjured eye became affected sympathetically, and in four instances was ultimately lost." The analysis concludes with the statement that, "A general survey of the accounts of gunshot injuries of the eye, reported during the war, instructs us that whenever foreign bodies are lodged in the globe, they should be extracted at all hazards. If it is impracticable to find them, the globe should be extirpated to preserve the other eye." This post-war statement of an important principle is correct, but there is no clear evidence that such prophylactic excision was done during the war. The discussion, however, documents that Civil War era American physicians were up-to-date in their knowledge of traumatic diseases of the

eye.

Specialty hospitals devoted to eye and ear diseases had begun to develop in the U.S. before the Civil War. During the war, the Federal army established such a specialty hospital; on Aug. 23, 1864 it was moved from Washington to Chicago where it was named the Desmarres Hospital. It had 150 beds; Surgeon J.H. Hildreth, USV, was in charge.<sup>15,16</sup> Near the end of the war, an Ophthalmic Hospital also was opened by the Confederate army in Athens, Georgia. It apparently was under the command of Surgeon Bolling A. Pope.<sup>17</sup>

Thus, although Civil War surgeons were using the primitive version of the ophthalmoscope of Civil War times, they were up to international standards in the treatment of eye injuries and even specialized in it.

<sup>1</sup> Adams, George W. *Doctors in Blue, The Medical History of the Union Army in the Civil War*. Dayton, OH: Morningside Press, 1985. (orig. pub. 1945), p 51.

<sup>2</sup> Warner, Deborah Jean. "The campaign for medical microscopy in Antebellum America." *Bulletin of the History of Medicine*, Vol. 69, 1995; p 367.

<sup>3</sup> Porcher, F.P. *Resources of the Southern Fields and Forests, Medicinal, Economic and Agricultural*. Charleston: Evans and Cogswell, 1863.

<sup>4</sup> Editorial, "Indigenous Remedies of the South", *Confederate Medical and Surgical Journal*, Vol. I, 1864, p 106.

<sup>5</sup> Henry, Robert S. *The Armed Forces Institute of Pathology. Its First Century, 1862-1962*. Washington: Office of the Surgeon General, Dep't. of the Army, 1964.

<sup>6</sup> Garrison, Field H. *An Introduction to the History of Medicine*. Philadelphia: W.B. Saunders, 1929, p 522.

<sup>7</sup> Woodward, Joseph J. "On the use of aniline in histological researches, with a method of investigating the histology of the human intestine and remarks on some points to be observed in the study of the diseased intestine in camp fevers and diarrheas." *American Journal of Medical Sciences*, Vol. 49. 1865, pp 106-113.

<sup>8</sup> Burns, Stanley B. "Early medical photography in America (1839-1883), VI. Civil War Medical Photography." *New York State Journal of Medicine*, Vol. 80, 1980, p 1444.

<sup>9</sup> *Medical and Surgical History of the War of the Rebellion, Medical Volume 2*, Washington: Government Printing Office, p 371.

<sup>10</sup> *ibid.*, *Medical Volume 3*, pp 881-883.

<sup>11</sup> Bartholow, Roberts. "A report on camp measles" (Synopsis of a report made to the Surgeon-General). *American Medical Times*, Vol. 8, May 14, 1864, pp 231 & 242.

<sup>12</sup> *Confederate States Medical and Surgical Journal*, Vol. I, 1864, p 197.

<sup>13</sup> *System of Ophthalmology*, edited by Sir Stewart Duke-Elder. Vol. III, *The Foundation of Ophthalmology*. St. Louis: C. V. Mosby & Co., 1962.

<sup>14</sup> *Medical and Surgical History, Surgical Volume I*, p 345.

<sup>15</sup> *ibid.*, *Surgical Volume I*, pp 385-6 & 419; *Medical Volume 3*, p 961.

<sup>16</sup> *National Archives and Records Administration, RG 941, Hospital Register.*

<sup>17</sup> *Cunningham, H.H. Doctors in Gray, The Confederate Medical Service. Baton Rouge: Louisiana State University Press, 1958, p 215.*