

## Civil War Topographical Engineering in the Shenandoah

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This study advances knowledge concerning military topographical engineering in the Shenandoah Valley of Virginia during 1861 and 1862 operations. It examines representative historical maps, Union and Confederate official reports, the wartime journals of James W. Abert, Jedediah Hotchkiss, and David Hunter Strother, and a detailed post-war reminiscence by Thomas H. Williamson to illuminate the typical experience of the topographical engineer in early war operations in the Shenandoah. Evidence indicates that Civil War topographers mostly performed the tasks one would expect of them: mapmaking, reconnaissance, and orienteering. They were occasionally required to perform other duties tailored to their individual talents. There is evidence that the role of Confederate topographical engineers was more specific than that of Union officers.

**Keywords:** topographical engineering; American Civil War; Thomas J. "Stonewall" Jackson; Jedediah Hotchkiss; James W. Abert; David Hunter Strother; Thomas H. Williamson; Franz Kappner; historical cartography; military cartography; Corps of Engineers—history.

### INTRODUCTION

*“... no previous studies of Shenandoah mapping . . . investigate the work of other army topographers contemporary with Hotchkiss. Furthermore, the literature has generally ignored the fundamental question of how . . . armies utilized their topographical engineers . . .”*

The cartographic and historio-geographical literature concerning 19th century topographic engineering during the Civil War in the Shenandoah Valley is reasonably extensive, but has exclusively concentrated on the life and work of Jedediah Hotchkiss, Lt. Gen. Thomas “Stonewall” Jackson’s chief topographical engineer. Historians have generally held that the quality of topographic information supplied to Jackson by Hotchkiss (and his *Map of the Shenandoah Valley*) was so superior to that available to Union forces during the 1862 campaign as to constitute a serious tactical advantage fundamental to Jackson’s success in that theater. Further discussion of Hotchkiss’s contribution to Jackson’s success can be found in Krick (1996), Miller (1994a; 1994b; 1993), Nelson (1992), and McElfresh (1999). Specific details about Hotchkiss’s service in 1861 and 1862 as well as later in the war and during Reconstruction, are readily obtained from a variety of sources including Craig (1965), Hotchkiss (1973), McElfresh (1999), Miller (1994a; 1994b; 1993), and Stephenson (1999). In contrast there are no previous studies of Shenandoah mapping that investigate the work of other army topographers contemporary with Hotchkiss.

Furthermore, the literature has generally ignored the fundamental question of how Union and Confederate armies utilized their topographical engineers during the war’s early phases. The Corps of Topographical Engineers was charged with gathering terrain intelligence and conveying this to commanders through maps. Regular army engineers were primarily intended to supervise the construction of roads, bridges, fortifications, and campsites. The Confederacy had no separate topographical corps (Nichols, 1957) and the Union disbanded theirs in 1863 (Traas, 1993) on the assumption that officers from both the Corps of Topographi-

cal Engineers and the Corps of Engineers generally performed the same mix of obligations and thus did not function as separate corps. This assumption has never been tested.

This study addresses these deficiencies first by identifying three Union topographers who mapped the Valley of Virginia during 1861 and 1862 operations: Cpt. James W. Abert, Maj. Franz Kappner, and Cpt. David Hunter Strother. It also identifies Confederate Col. Thomas H. Williamson, an officer who served as topographical engineer for Jackson for a few weeks in early May 1862, but who is not known to have produced any maps. No previous study has associated these topographers with Civil War mapping in the Shenandoah. Representative maps by the Union topographers are qualitatively compared to a sample of Hotchkiss's work.

Next, the paper examines various contemporary sources to ascertain the customary duties of topographical engineers operating in the 1861 and 1862 Shenandoah Valley campaigns. This is presented through analysis of information from Union and Confederate official reports, as well as from the posthumously published journals of Hotchkiss (1973) and Strother (1961), the unpublished military journal of Abert (1861), and the unpublished memoir of Williamson (1883). Observed duties for these topographers are arrayed in a task matrix to quantify their relative balance of responsibilities. From this data it is possible to infer that—contrary to the expectations of the U. S. Army in 1863—topographical engineers in the Shenandoah Valley performed mostly the reconnaissance, mapping, orienteering, and general staff service details for which army topographers were intended in 19<sup>th</sup> century warfare.

### Sample Civil War Maps of the Shenandoah

Most important, of course, to the history of topographical engineering in the Valley of Virginia in 1861 and 1862 is the cartographic record of the army topographers themselves. This study examines maps by Abert, Strother, Hotchkiss, and Kappner.

Figure 1 shows the area of operations during the Shenandoah Valley campaign. The Shenandoah River system is digitized from U. S. Geological Survey 7.5' topographic quadrangles.

### *Abert's Cartography*

The Shenandoah campaign's Cpt. James W. Abert was an experienced topographical engineer who graduated from the U. S. Military Academy in 1842. His father, John James Abert, was head of the Topographical Bureau from 1829 until the 1838 formation of the separate Corps of Topographical Engineers, which he led until his retirement in 1861. During the 1840s, the younger Abert was assigned to various trigonometric, geodetic, and military surveys of the Great Lakes and throughout the southwest. His duties included independent command of important New Mexico (Abert, 1847) and west Texas (Abert, 1846) surveys, as well as subordinate roles in John C. Frémont's California and Great Basin surveys. He served with Cpt. William H. Emory during the Mexican War, and afterwards when that officer directed the joint boundary survey in accordance with provisions of the Treaty of Guadalupe Hidalgo. Although there is no published biography of Abert, scattered sketches and accounts of his western expeditions can be found in the following sources: Carroll (1941a; 1941b), Galvin (1966; 1970), Morris (1999), Ronda (2003, p 48-52, 55), Tyler (1996, p 7-8), and peppered throughout Goetzmann (1959).

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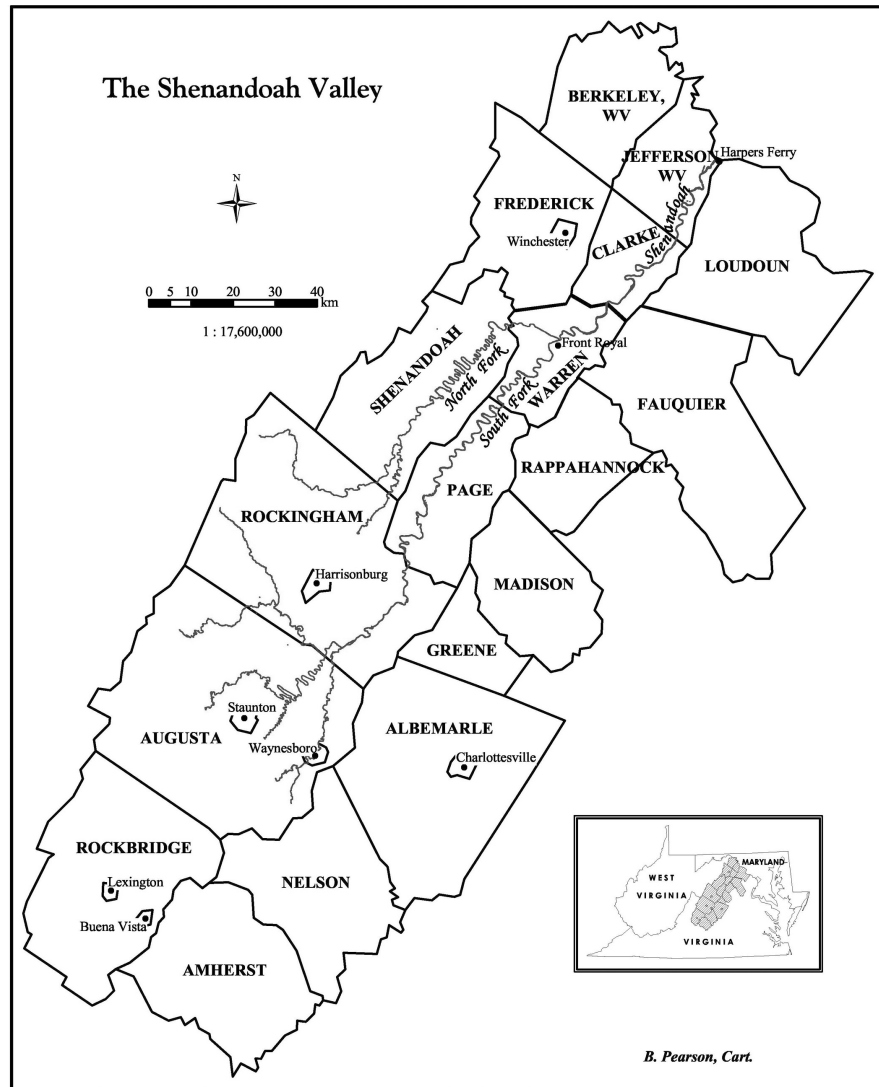


Figure 1. Map showing the theater of operations for the 1861 & 1862 Shenandoah Valley campaigns. The river system is from U.S. Geological Survey 7.5' topographic quadrangles. (See page 84 for full-size color version)

*“During the summer of 1861, Abert produced for Maj. Gen. Nathaniel Banks a fine triangulation survey of the Shenandoah River.”*

During the summer of 1861, Abert produced for Maj. Gen. Nathaniel Banks a fine triangulation survey of the Shenandoah River. The carefully executed manuscript *Map of the Shenandoah River from Harper's Ferry to Port Republic* is housed at the National Archives as RG77: Z116. Figure 2 reproduces this 32 x 135 cm work. Although primarily intended to be a survey of the river itself, details such as tributaries, mills and dams, and selected place names facilitate the broader application of this data. The inset to Figure 2 demonstrates Abert's fine draftsmanship as well as the triangulation grid on which the map's features were registered.

Although Abert approved several extant maps of the Shenandoah Valley (see National Archives RG77: G463-9, RG77: G463-11, and RG77: G463-19), the only other surviving map from the period attributable to Abert's cartography is an untitled map of the area northeast of Strasburg (National Archives RG77: G463-12). The map is signed by Abert who lists his title as “Capt. U. S. Army, T. Engrs.”—apparently wishing to stress that he was a regular army officer and not merely a volunteer in Banks's army. The scale of this 22.5 x 33.2 cm manuscript map (Figure 3) is shown through a scale bar which converts to 1:126,720. The map



Figure 2. Abert's Map of the Shenandoah River from Harper's Ferry to Port Republic. Source: National Archives RG77: G463-12.

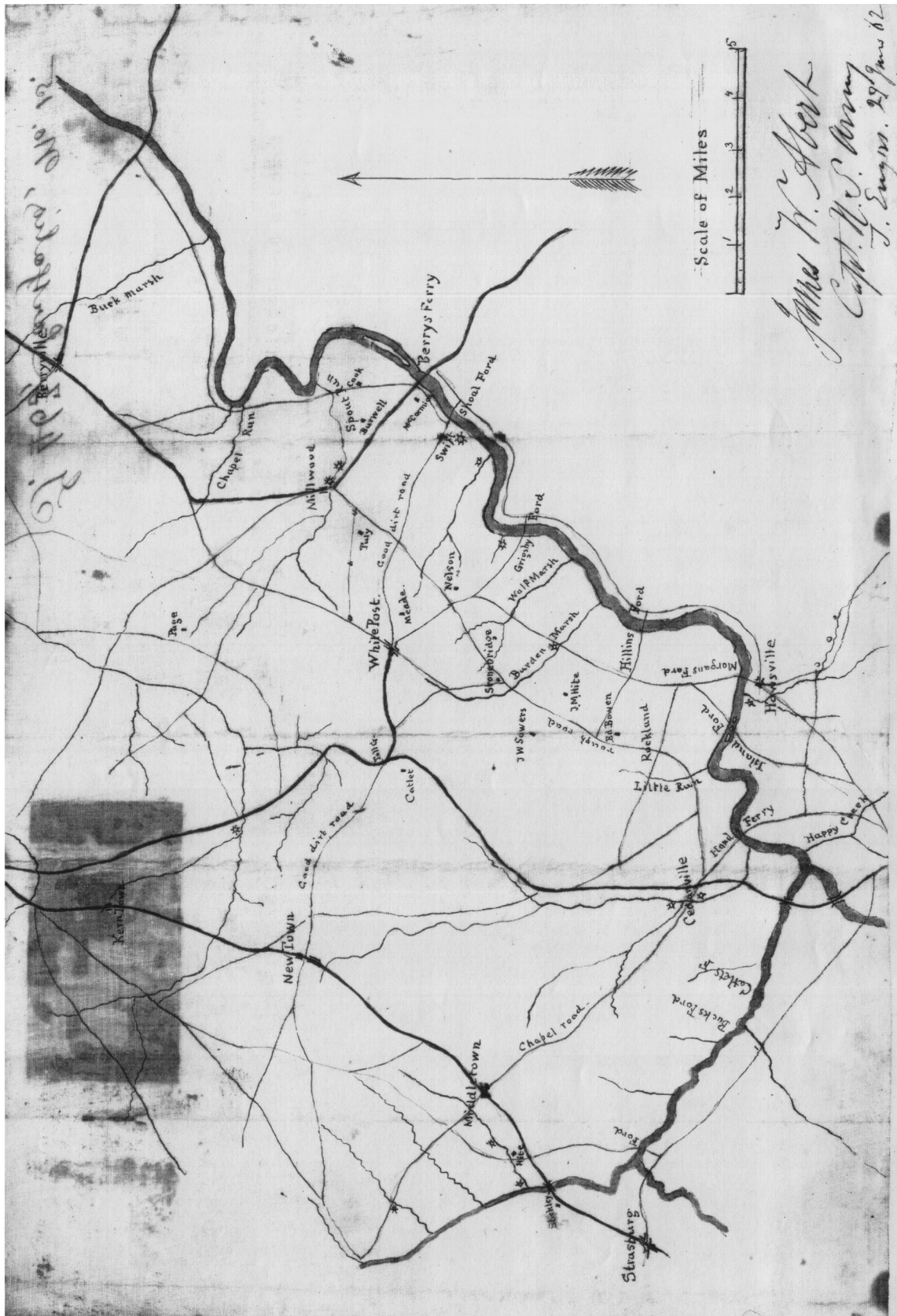


Figure 3. Abert's Map of the Vicinity of Liberty Mills. Source: National Archives RG77: G463-12.

emphasizes the transportation and hydrology networks, although place names and individual property holders' names are also provided. The names and conditions of some roads and fords are noted. Given the map's June 29, 1862 date, it was most likely made to assist in the general shift of Banks's forces eastward around the time of preparations for Maj. Gen. John Pope's 2<sup>nd</sup> Manassas campaign.

### *Kappner's Cartography*

An examination of relevant maps at the Library of Congress (hereafter LOC) and the National Archives suggests a second Union topographical engineer was active during 1861 and 1862 operations in the Shenandoah Valley: Maj. Franz Kappner. As indicated by text on several maps (see National Archives RG77: G122½, RG77: G206, and LOC CW461), Kappner served as chief topographer for Maj. Gen. Franz Sigel's 1<sup>st</sup> Corps, Army of the Potomac. By inference from information on a twenty-nine map series (LOC CW304) portraying forts around St. Louis, one can presume that Kappner was transferred to Missouri before the maps' July 18, 1864 submission date. This study was unable to locate additional information about Kappner's life and career. Since one of Sigel's greatest contributions to the Union war effort was his popularity as a recruiter among German-Americans, the fact that one of his staff officers had a German name is not necessarily instructive. However, the skill with which his maps were executed and their apparent accuracy indicate that Kappner was a trained topographical engineer. It is therefore possible that Kappner had served with Sigel during the latter's unsuccessful military coup in Germany during the 1840s.

Figure 4 reproduces Kappner's *Map of the Valley of Virginia* now housed at the National Archives as RG77: Z403½. The 51.5 x 40 cm map is marked with a regular grid oriented to the cardinal directions. Relief is shown through hachures in this map of the Shenandoah's drainage between the Blue Ridge and the Cumberland Plateau. The North and South Forks, as well as the Shenandoah itself are shown in their entirety. The map also identifies cities and towns in addition to the regional transportation network. Although not embellished with color, the work is otherwise a rather refined general reference map of the Shenandoah Valley which would have been quite suitable for the strategic needs of Sigel's corps.

### *Strother's Cartography*

David Hunter Strother was well known on the advent of the Civil War. His highly popular writings and illustrations were featured in *Harper's New Monthly Magazine* during the 1850s under the penname, *Porte Crayon*. Born in Martinsburg, Virginia (now West Virginia), Strother enjoyed the upbringing of the Southern gentry of his day. As a young adult he studied art under John Gadsby Chapman, the author of the leading drawing primer of the mid-nineteenth century and painter of one of the works in the U. S. Capitol building Rotunda. He also studied under Samuel F. B. Morse at New York University. Most notable today for helping popularize the telegraph through the development of Morse Code, in the 1830s Morse was among America's most celebrated painters. During the 1840s Strother developed a critically praised talent for woodblock printmaking, which skill he combined with a playful, graceful prose to produce his illustrated local color travel narratives serialized in *Harper's*. Details about Strother's life and work are available in Eby (1960) and Cuthbert and Poesch (1997).

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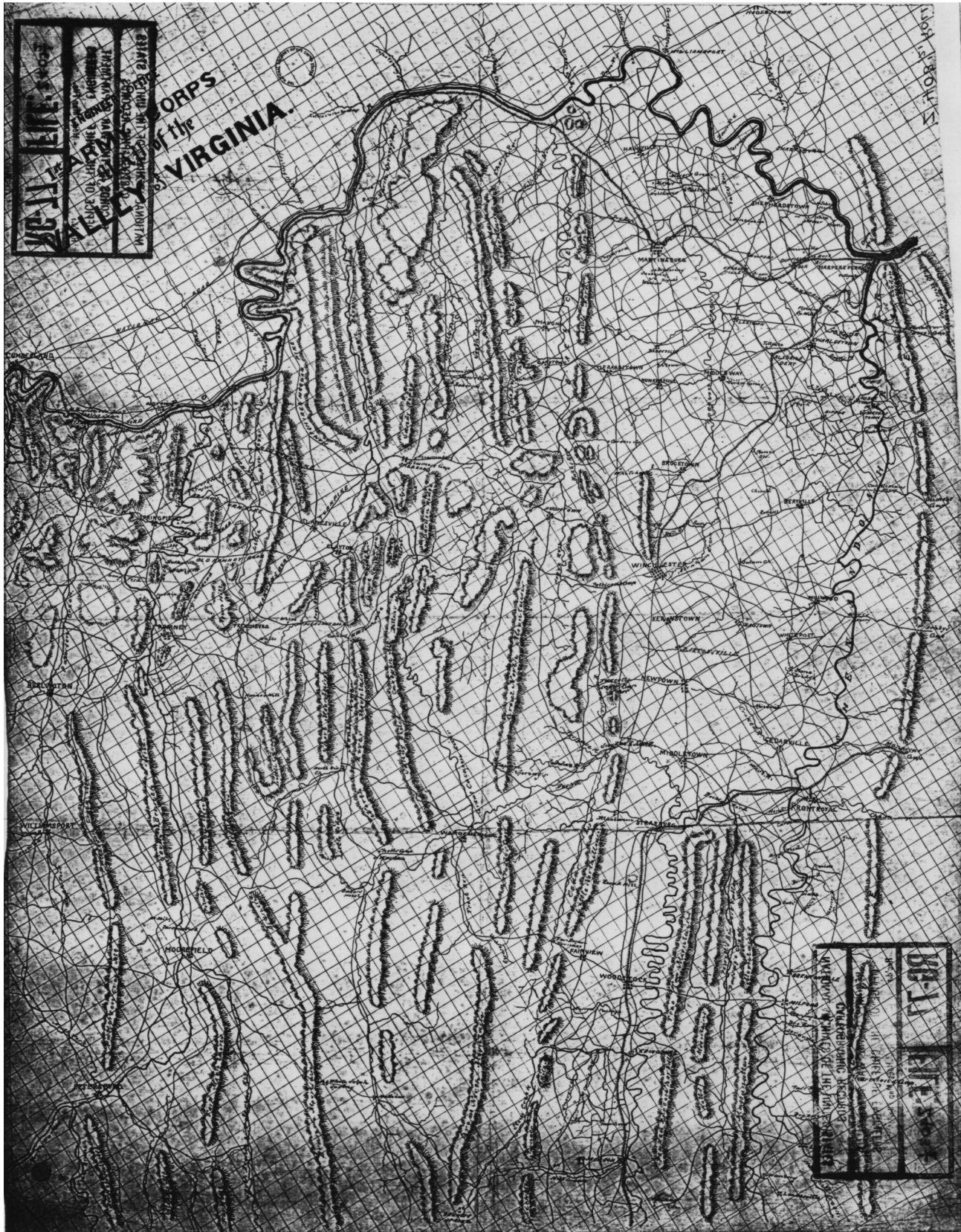


Figure 4. Kappner's Valley of Virginia. Source: National Archives RG77: Z403 1/2.

With the onset of civil war, Strother was like many western Virginians in maintaining a staunch unionist stance. The most dominant factor encouraging this was his complete confidence that the industrial and numerical superiority of the Free States were insurmountable and predicated the North's total victory in the Civil War (Strother, 1961; Strother Collection). Strother joined the Union army on July 9, 1861 following the assassination of his father by local secessionists. During 1861 and 1862 operations in the Shenandoah, Cpt. Strother served alongside Abert on Banks's staff.

The only example of Strother's cartography during the Shenandoah Valley campaign is his 1862 *Topographic Sketch of the Vicinity of Liberty Mills*, which is reproduced as Figure 5. The work clearly demonstrates Strother's cartographic skills. The 23.4 x 14.4 cm pen and ink manuscript map employs two colors and the progressive (for the 1860s) use of contour lines and inkwash shading instead of hachures to represent elevation. The stated scale is 1:7,200. Rivers and roads are named, as are the owners of some properties. Also noted are the destinations to where roads lead, as well as travel distances to those places. The map is augmented by commentary on the construction and condition of the mill, bridge, and ford. Given Strother's training and experience as a successful professional illustrator, it is not surprising that his wartime mapmaking was highly attractive.

### *Hotchkiss's Cartography*

Without question Jedediah Hotchkiss is the most famous personality among Civil War topographical engineers. Scholarly fascination with Hotchkiss has been facilitated by the breadth and quality of his collection of maps and journals from the war, most of which are now deposited at the Library of Congress. The collection is outlined in LeGear (1977) and Stephenson (1989), while the tale of how it came to the LOC is recounted in Roper (1989). The Hotchkiss literature itself has already been introduced.

Hotchkiss was born in Windsor, New York and migrated to the Shenandoah Valley when he was nineteen. During the 1840s and 1850s Hotchkiss served as a schoolmaster until he and his brother, Nelson, opened Loch Willow Academy near Staunton in 1859. During the 1850s Hotchkiss also ran a successful surveying and mapping firm in Staunton.

Hotchkiss officially entered the service of Virginia in March 1862 when he joined state forces as adjutant to Lt. Col. W. S. H. Baylor's regiment with the rank of captain (Hotchkiss, 1973). When Virginia subsequently transferred its troops to Confederate service, commissions were nullified until Richmond could ensure officer merit. It was during this restructuring of the Army of the Valley's order of battle that Jackson took note of Hotchkiss and detailed him to be his chief topographical engineer. This took him out of the cycle for automatic commission in the Confederate States Army. The war's most celebrated topographical engineer thus remained a civilian throughout the conflict, although notable personages from both sides customarily referred to him after the war as "Captain" or "Major" Hotchkiss. The matter of Hotchkiss's illusive commission is discussed in Hotchkiss (1973), and is treated rather decidedly in McDonald (1967).

A civilian employee in the Confederate service, Hotchkiss received a heady charge as his first task as Jackson's topographer: to make a map of the entire Shenandoah Valley. Receiving his commission from Jackson to make the map on March 26, 1862, Hotchkiss diligently commenced

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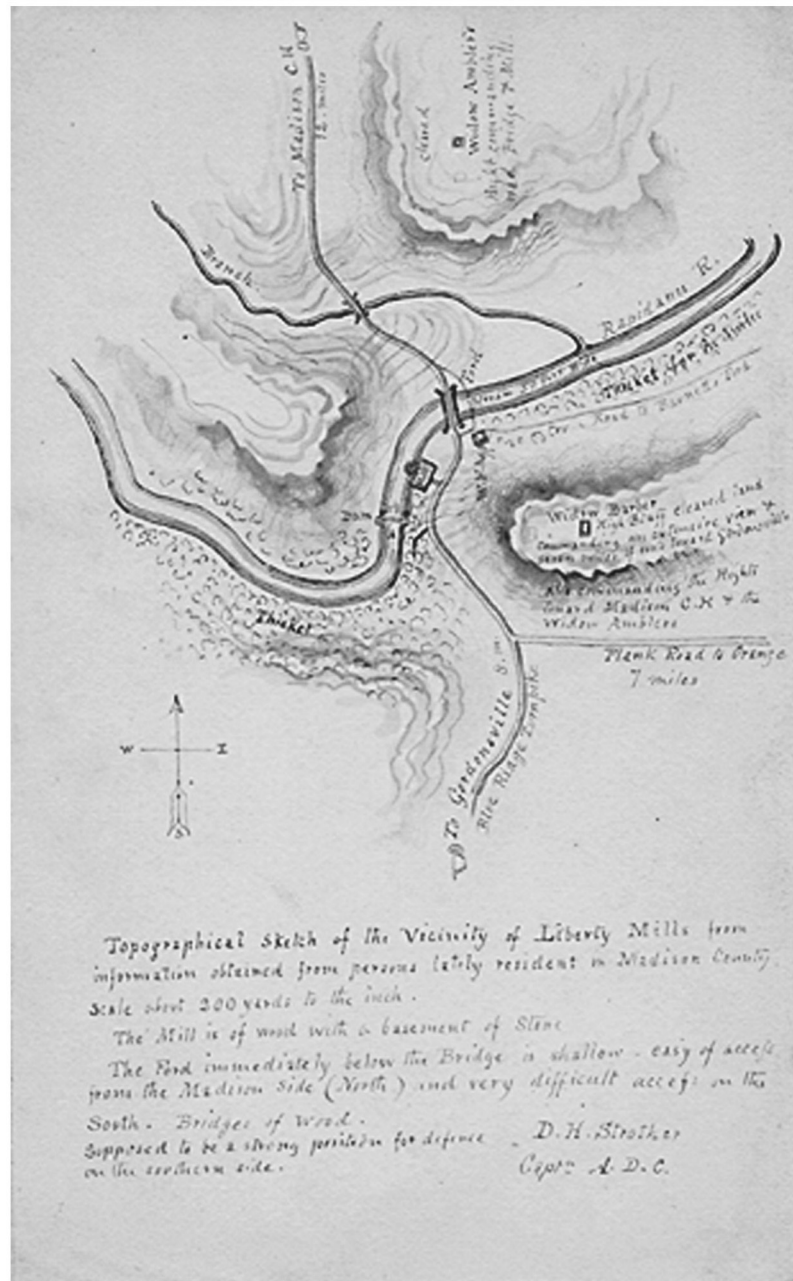


Figure 5. Strother's Topographical Sketch of the Vicinity of Liberty Mills. Source: West Virginia and Regional History Collection. (See page 85 for full-size color version)

work the following morning and then devoted most of his time to it until mid-April (Hotchkiss, 1973). His journal fails to state precisely when the 254 x 111 cm masterpiece was presented to Jackson, but it is obvious that the LOC copy (H89) was never completed. The northern quarter of the Shenandoah River is entirely absent as are most details for the region between Winchester and the Potomac. Because of the map's size, it is not possible here to reproduce effectively Hotchkiss's *Map of the Shenandoah Valley*. However, Figure 6 shows details which illustrate the incomplete sections (such as Inset A from around Winchester) and the completed sections (such as Inset B from around Harrisonburg). The transportation network is red while water features appear in blue. Elevation is shown through contours while populated places are often enhanced with the

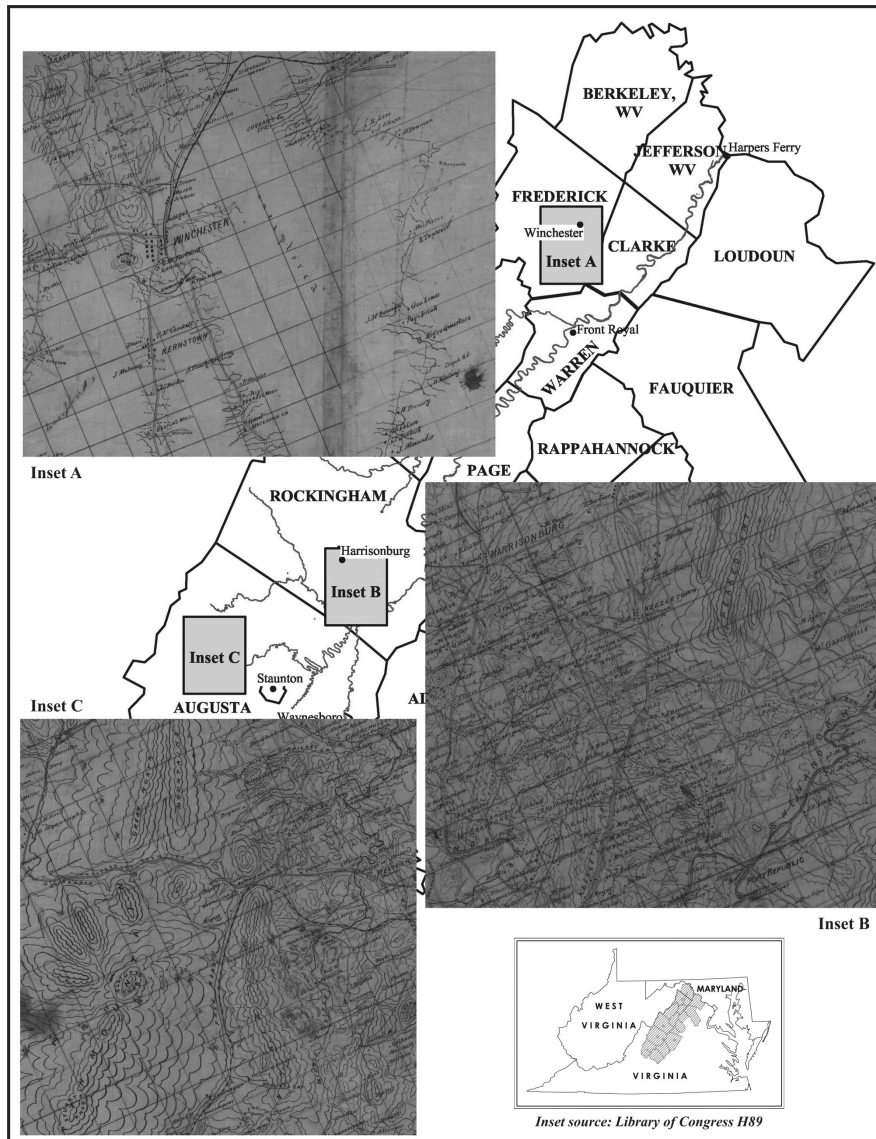


Figure 6. Details from Hotchkiss's Map of the Shenandoah Valley. (See page 86 for full-size color version)

names of individual property owners. Even with its omissions in certain areas, Hotchkiss's 1:80,000 Valley Map is nevertheless impressive and would admirably serve the topographical needs of Jackson during the 1862 campaign.

To provide a more effective parallel to the large-scale sketch maps introduced from Abert and Strother, Figure 7 reproduces Hotchkiss's untitled wartime sketch of the McDowell battlefield (LOC H94). Drawn on tracing paper, the 23 x 31 cm map is monochrome and represents the region at a scale of approximately 1:31,680 (Stephenson, 1989). The map shows roads, drainage, and elevation using hachures. Named features include the village of McDowell, three watercourses, and three local prominences. The residence of R. Sellington is also identified. It is not known whether this map served Jackson's tactical planning needs for the battle or whether it was produced after the action. For the purposes of this study, it will be assumed to have been prepared for the tactical reconnaissance undertaken

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Figure 7. Hotchkiss's Sketch of the McDowell Battlefield. Source: Library of Congress H94. (See page 87 for full-size color version)

by Hotchkiss and Williamson prior to the battle [see Hotchkiss (1973) and Williamson (1883)].

### Discussion of Sample Maps

Surviving maps of the Shenandoah produced by these cartographers demonstrate their relative merits. Strother's small sketch map is an effective and attractive example of field cartography. The sketch maps of Abert and Hotchkiss presented by this study also represent effective mapping of field reconnaissance, and were well-suited to facilitate the maneuvers of Civil War armies.

Overall, Hotchkiss's *Map of the Shenandoah Valley* is the best among those examined by this study, if not for its execution, then certainly for its ambitious conception. Nevertheless, the map remains unfinished. Hotchkiss's map is the only one examined which was likely intended to be a presentation quality piece, as the other maps—with the possible exception of Kappner's—were either drafts or sketches. Whereas Hotchkiss's map was specifically commissioned by the army commander, Kappner's map shows a cartographic economy indicative of a map intended for general distribution, and hence, intended to serve the more generalized topographic needs of an army in the field. Abert's Shenandoah River survey rivals the work of Hotchkiss with regard to the precision of its drafting. In short, the maps produced by these four topographic engineers are similar in terms of their cartographic qualities.

Abert's river survey, Kappner's map, and Hotchkiss's Valley map all represent substantial portions of the Shenandoah river system (Abert's

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map lacks the North Fork, while Hotchkiss's is missing the Shenandoah itself). Figure 8 compares the relative merits of these topographical engineers' work, assembled from digitized manuscript maps from both the National Archives and LOC, overlaid with current U. S. Geological Survey topographic data. These layers were then registered to UTM coordinates.

Positional and representational accuracy is overall best for the Hotchkiss and Kappner maps. In many places along the channel, Abert's map is generalized to the point of barely resembling the river system as shown by current USGS information. Furthermore, Abert seriously mislocates the

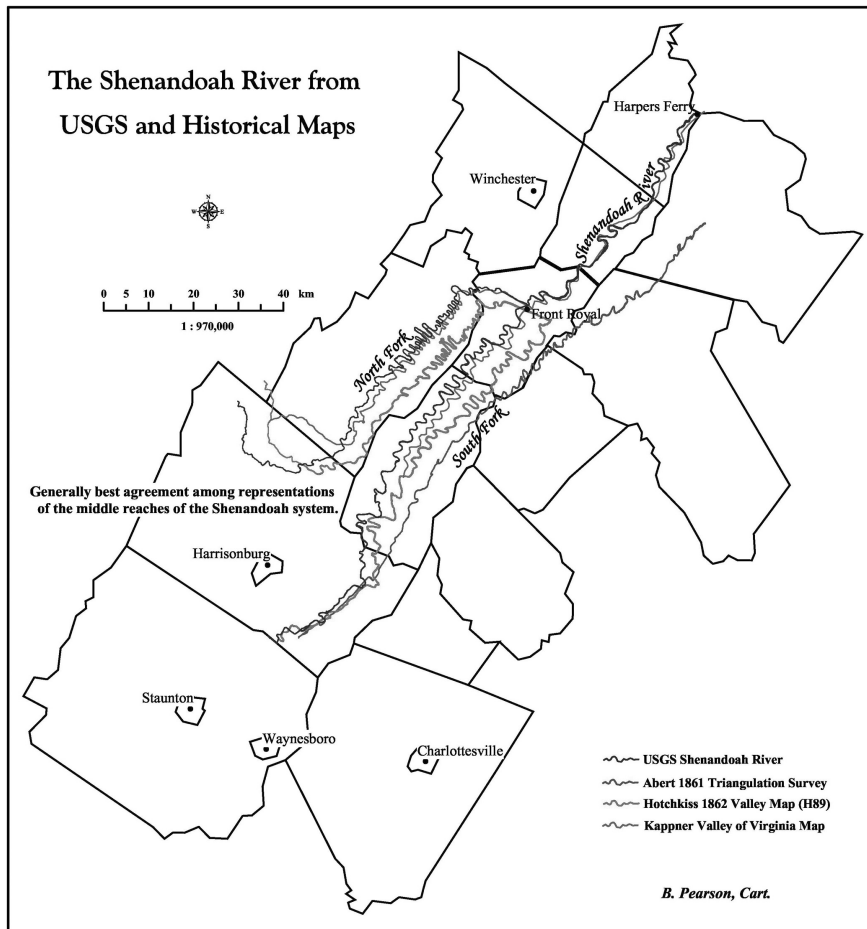


Figure 8. Map showing the Shenandoah river system as represented on historical maps by Abert, Hotchkiss, and Kappner, and in current U.S. Geological Survey data. (See page 88 for full-size color version)

mouth of the Shenandoah River which should have its junction with the Potomac at Harper's Ferry, instead of somewhere in the midst of Loudon County, Virginia. Kappner's map demonstrates the greatest positional and representational precision among the study maps, although Hotchkiss's map is also reasonably accurate for the needs of Civil War armies. In sum, this study has established that other topographers were also producing useful, high-quality maps to support 1861 and 1862 operations in the Valley of Virginia.

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### The Official Record of Topographical Engineering

Although Civil War topographical engineers in the Shenandoah obviously undertook cartographic duties, it is unclear whether these activities were

predominate among their responsibilities. This section examines official records for each army to determine the information about topographer's activities that were available to headquarters, and to assess how commanders in the theater perceived the responsibilities of their topographical engineers.

### *Official Union Records*

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Official Union reports of action in western Virginia in 1861 and 1862 are almost entirely silent in reference to topographic activities. Abert is the only topographical engineer whose activities are mentioned in any official report from the three Union commanders facing Jackson in the Shenandoah. The unofficial documentation is silent on topographic activities as well. For example, the diary of Col. Albert Tracy (1962a; 1962b), Maj. Gen. John C. Frémont's Adjutant during the Shenandoah Valley campaign, contains no reference to topographical engineers. There is no reference in the account to Tracy's superior consulting maps or the advice of topographical officers for any sort of terrain intelligence to support the maneuvers of his army. This apparent lack of interest in topographical engineering gives credibility to the assertion that Union armies in the Shenandoah Valley in 1861 and 1862 were negligent in their efforts to take tactical advantage of terrain.

The "Report of Maj. Gen. McClellan on Army of Potomac Operations July 27, 1861 – Nov. 9, 1862" (Scott 1881 Series 1, Vol. V, Ch. 14, hereafter referred to as *OR* after the series' common name "Official Records") is perhaps the most concise and precise description from Union high command of the topographical engineer's role in supporting an army in the field. To students of 1862 Shenandoah Valley operations this report is important because it outlines McClellan's organizational structure and operational concepts, which he encouraged subordinates to adopt throughout his command that included all forces important to Union operations throughout northern and western Virginia in late 1861 and 1862.

*"McClellan states that . . . 'the corps of topographical engineers was entrusted the collection of topographical information and the preparation of campaign maps' . . ."*

McClellan states that, primarily, "the corps of topographical engineers was entrusted the collection of topographical information and the preparation of campaign maps" (*OR* Series 1, Vol. V, Ch. 14, p. 25) necessary to army operations. This task was not simple since "Owing to the entire absence of reliable topographical maps the labors of this corps were difficult and arduous in the extreme" (*OR* Series 1, Vol. V, Ch. 14, p. 25). In his report, McClellan acknowledges that topographers frequently had to gather necessary information under fire. Overall McClellan's general tone toward topographical service is quite positive, demonstrating admiration of his topographical engineers' abilities to accomplish so much in spite of various obstacles.

McClellan's official report underscores a salient characteristic of topographic engineering in the Union army during the Civil War: that cartography and its requisite data collection were but a component of the actual service required of topographic corps officers in the wartime army. Speaking specifically of the Peninsula Campaign, McClellan declares that

"it was impossible to draw a distinct line of demarcation between the duties of the two corps of engineers, so that the duties of reconnaissance of roads, of lines of entrenchments, of fields for battle, and the position of the enemy [traditional responsibilities for topographical engineers] as well as the construction of siege and defensive works [traditional engineer corps duties] were habitually performed by de-

tails from either corps, as the convenience of the service demanded" (*OR Series 1, Vol. V, Ch. 14, p. 25*).

This perception of a de facto blending of the two corps in the field led to their ultimate merger on March 3, 1863. This is anticipated in McClellan's report when he mentions that he united the two corps to good effect when he reorganized the Army of the Potomac in preparation for the Antietam campaign.

Official records contain a report of Abert's experiences on May 24, 1862 which effectively illustrates the multifaceted duties of the Civil War topographical engineer to which McClellan's report alludes. Upon orders from Banks, that morning Abert led a company of Zouaves to a bridge over Cedar Creek in readiness to burn it. Arriving at the bridge, Abert had the soldiers gather "a tar-barrel, some straw, some commissary pork, and other inflammable materials" from a nearby barn and tender a fire so that the bridge could be razed immediately upon receipt of the appropriate signal from Banks (*OR Series 1, Vol. XII, Part 1, p. 568*). Abert waited until 3:30 pm, when he withdrew, bridge intact, because the ford beneath the bridge "was in much better condition than the bridge" (*OR Series 1, Vol. XII, Part 1, p. 568*).

Arriving at Middletown (see Figure 3) Abert's force encountered Confederates whom they dispersed after a brisk engagement. A few miles south of Middletown, Abert encountered a friendly artillery battery with whom they fought off more Confederates in another skirmish. The group withdrew to Strasburg at which point Abert decided to dash for Winchester despite the array of Rebels between him and that destination. The artillery captain decided to retire his battery separately. Ultimately, Abert prudently avoided Winchester and led his men on a three day circuitous route to Williamsport, Maryland, and thus to safety.

One can infer from official reports and pronouncements that the Union topographical engineer faced a varied routine. This staff officer was called upon to provide maps or other topographical information as required by his commanding officer. These duties frequently entailed field reconnaissance under fire. Since the Corps of Topographical Engineers was an officer-only organization (Traas 1993), laborers and escorts had to be impressed from friendly units. Sometimes the topographical engineer was required directly to engage the enemy. The Union topographical engineer could expect to perform Corps of Engineers tasks as well.

It is also evident that the Union official records indicate that the Corps of Engineers and the Corps of Topographical Engineers bore duties that were frequently blurred in practical service. This paper will later examine the wartime journals of Abert and Strother to determine whether the observed duties of U. S. army topographers support this assertion.

### *Confederate Official Records*

Confederate Records lack any direct statements from high command as to the duties required of topographical engineers. This is true for both *OR* and for the Confederate Engineering Department records at the National Archives. However, official Southern records during this period mention the services of topographical engineers more frequently than do Northern records.

Ironically, Hotchkiss does not appear in Jackson's April 14, 1863 official "Report of Valley Operations May 14-June 17, 1862" (*OR Series 1, Vol. XII, Part 1*). But he does warrant mention twice in Jackson's April 14, 1863 "Report of Port Republic Battle" (*OR Series 1, Vol. XII, Part 1*)—once for

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*“. . . Abert served on the staff of Maj. Gen. Nathaniel Banks as his head topographical engineer.”*

his efforts to guide reinforcements through a forest to assail Union artillery batteries at the Coaling above the battlefield, and again for his cartography. Two examples of Hotchkiss’s cartographic work were also included in Jackson’s report. Postwar lithographs of both maps appear in the *Atlas to Accompany the Official Records of the Union and Confederate Armies* (Davis, 1983).

The activities of topographical engineers are also prominent in the report of Army of the Valley Chief Engineer, Cpt. James K. Boswell whose “Report of Operations June 1-9, 1862” (OR Series 1, Vol. XII, Part 1, No. 61) was submitted to the War Department in Richmond on March 27, 1863. Hotchkiss figures prominently in the Chief Engineer’s description of activities around the close of the Valley Campaign. In Boswell’s report, both Hotchkiss and his assistant Sgt. Brown are credited with (1) transmitting orders in the field, (2) successfully wrangling wagons on the march, (3) reconnaissance and signal operations, (4) leading troops to their battle stations, and (5) bridge-burning activities. Interestingly, Boswell’s report fails to mention his topographical engineers undertaking any mapmaking.

In sum, as with the Union army, Confederate topographical engineers operating in the Valley of Virginia in 1861 and 1862 undertook many different responsibilities when they accompanied the army in the field. These responsibilities extended beyond map drafting tasks to other wayfinding and reconnaissance tasks. Only in burning a bridge are Hotchkiss and Brown seen to act outside the customary duties of topographical engineers.

#### **Evidence of Topographer’s Duties from Documentary Sources**

Although the evidence from Union and Confederate official records is instructive, it does not constitute the definitive record of topographic engineering in the Valley of Virginia. The wartime journals of Abert, Hotchkiss, and Strother as well as a detailed postwar reminiscence by Williamson also serve to clarify understanding of the responsibilities of topographers in the Civil War Shenandoah. Each of these sources was examined to determine the relative burden of each topographical engineer’s time occupied by the various tasks he was asked to perform. By counting the number of days each task was undertaken, it is possible to calculate the fraction of days each topographer engaged each task. Results appear in the task matrix in Table 1.

#### ***Abert’s Military Journal***

During 1861 and 1862 operations in the Shenandoah Valley, Abert served on the staff of Maj. Gen. Nathaniel Banks as his head topographical engineer. Between July 1, 1861 and August 31, 1861, Abert kept a military journal now housed at the Filson Historical Society as part of the Abert Collection (MSS A.A991). The journal is a leather-bound notebook of a generally legible script with daily entries in pen. In some places the text has been edited to correct the spelling of names, or to clarify an illegible word. Although Abert offers no explanation for keeping the journal, his systematic composition was most likely inspired by the long-standing Corps of Topographical Engineers’ requirement that its officers keep journals. This practice was useful during the exploration of the frontier since details about landform, flora, and fauna could help natural scientists and policy makers assess the relative merits of unknown areas. Journal keeping was suspended when the Corps of Topographical Engineers was subordinated to the Corps of Engineers in 1863 (Traas, 1993).

### Relative Burden of Different Tasks on Shenandoah Topographical Engineers

| task                                   | Union                                   |                 |   |                 |  |                 | Confederate                                  |                 |      |                 |      |                 |
|--|---|-----------------|---|-----------------|--|-----------------|--|-----------------|------|-----------------|------|-----------------|
|  | Abert<br><i>July 1 to Aug. 31, 1861</i> |                 | Strother<br><i>Feb. 27 to June 28, 1862</i> |                 | Hotchkiss<br><i>Mar. 26 to July 15, 1862</i> |                 | Williamson<br><i>Apr. 30 to May 15, 1862</i> |                 |      |                 |      |                 |
|  | days                                    | fraction of all | days  | fraction of all | days   | fraction of all | days   | fraction of all | days | fraction of all | days | fraction of all |
| reconnaissance                         | 11                                      | 17.7%           | 14  | 11.5%           | 19   | 17.0%           | 7  | 43.8%           |      |                 |      |                 |
| mapmaking                              | 15                                      | 24.2%           | 9   | 7.4%            | 47   | 42.0%           | n/a  | n/a             |      |                 |      |                 |
| general staff service                  | 15                                      | 24.2%           | 15  | 12.3%           | 2  | 1.8%            | 1  | 6.3%            |      |                 |      |                 |
| guiding troops / trains to destination | 8                                       | 12.9%           | 5   | 4.1%            | 7  | 6.3%            | 1  | 6.3%            |      |                 |      |                 |
| furlough                               | 7                                       | 11.3%           | 13  | 10.7%           | 3  | 2.7%            | n/a  | n/a             |      |                 |      |                 |
| bridging / fording                     | 5                                       | 8.1%            | 2   | 1.6%            | 6  | 5.4%            | n/a  | n/a             |      |                 |      |                 |
| provost service                        | 3                                       | 4.8%            | 5   | 4.1%            | n/a  | n/a             | n/a  | n/a             |      |                 |      |                 |
| camp selection and management          | 4                                       | 6.5%            | n/a   | n/a             | 1  | 0.9%            | n/a  | n/a             |      |                 |      |                 |
| leading troops actively engaged        | 3                                       | 4.8%            | 1   | 0.8%            | n/a  | n/a             | 1  | 6.3%            |      |                 |      |                 |
| working with spies                     | n/a                                     | n/a             | 11  | 9.0%            | n/a  | n/a             | n/a  | n/a             |      |                 |      |                 |
| interrogating prisoners                | n/a                                     | n/a             | 10  | 8.2%            | n/a  | n/a             | n/a  | n/a             |      |                 |      |                 |
| fortifications engineering             | 4                                       | 6.5%            | n/a   | n/a             | n/a  | n/a             | n/a  | n/a             |      |                 |      |                 |
| sick                                   | n/a                                     | n/a             | 6   | 4.9%            | n/a  | n/a             | n/a  | n/a             |      |                 |      |                 |
| burn bridge / obstruct road or pass    | n/a                                     | n/a             | n/a   | n/a             | 3  | 2.7%            | n/a  | n/a             |      |                 |      |                 |
| drill troops                           | 1                                       | 1.6%            | n/a   | n/a             | n/a  | n/a             | n/a  | n/a             |      |                 |      |                 |
| translate military textbook            | 1                                       | 1.6%            | n/a   | n/a             | n/a  | n/a             | n/a  | n/a             |      |                 |      |                 |
|  |   | <b>n = 62</b>   |   | <b>n = 122</b>  |  | <b>n = 112</b>  |  | <b>n = 16</b>   |      |                 |      |                 |

Table 1.



*“ . . . Abert’s wartime journal was examined to determine the relative burden of his time occupied by the various tasks he was asked to perform.”*

*“ . . . the overwhelming majority of Abert’s time was spent in typical Corps of Topographical Engineers activities.”*

*“Abert’s duties . . . were not limited to topographical engineering.”*

Most entries in the journal detail Abert’s official duties. He provides lengthy accounts of experiences dining in the homes of Shenandoah locals. Since these encounters frequently involved heated arguments with secessionist hosts, Abert probably considered this noteworthy intelligence. Details of other leisure activities were also recorded, but when Abert tells of vacationing with his family in New York, he does so with more economy.

For the purpose of this study Abert’s wartime journal was examined to determine the relative burden of his time occupied by the various tasks he was asked to perform. From this it is possible to determine the number of days Abert performed the various tasks required of him, and to determine the fraction of days he undertook each task. The results of this investigation appear in Table 1.

During the summer 1861 campaign, the overwhelming majority of Abert’s time was spent in typical Corps of Topographical Engineers activities. When his time actually drafting maps is combined with his reconnaissance, it becomes clear that Abert spent around 42% of his task days engaged by these basic cartographic activities. During this period Banks’ troops were frequently repositioned in the Valley in skittish response to localized Confederate aggression. It is therefore not surprising that Abert frequently (13% of days) had to guide troops or wagon trains to their destinations, since this was part of army topographers’ orienteering obligations. Abert’s general staff service (24.2% of task days) was expected of him because topographers belonged to an officer-only Corps attached to headquarters. Altogether, traditional topographical officer duties accounted for 79% of Abert’s task days.

Abert’s duties, though, were not limited to topographical engineering. For example, approximately 8% of Abert’s task days saw some sort of fording or bridge duty. Fortifications engineering as well as camp selection and management each occupied him for 6.5% of his days. These tasks were traditionally the responsibility of officers of the Corps of Engineers, and together constituted 21.5% of Abert’s days.

For nearly 5% of his task days Abert performed provost duties. In the Civil War army the provost department served a function similar to military police today. Provost officers were generally drawn from among the regular infantry, not from a highly specialized corps. Another standard infantry duty which Abert performed was the drilling of troops. This is most likely indicative of the general shortage of veteran officers available to help train and organize recruits in the war’s early days. The most unusual service Abert performed was his translation of a brief French military textbook for Banks.

#### *Strother’s Military Journal*

For most of his adult life David Hunter Strother wrote copiously in daily journals. Besides serving a normal diary function, Strother also used his journals like an artist’s sketchbook to serve as studies for his stories. This is seen in the intimate parallel between events in Strother’s Civil War journal, and those in Porte Crayon’s “Personal Reflections on the War” which was serialized in *Harper’s Monthly* between 1866 and 1868. Strother’s twelve volume wartime journal details his activities almost daily, from July 11, 1861 to October 15, 1864. These volumes are described in Eby (1961) and are available at the West Virginia and Regional History Collection in Morgantown.

Strother’s (1961) wartime journal was edited such that there are omissions from the original, although Eby (1961) stresses that he omitted

only frivolous details unrelated to the war, or to Strother's service in it. A careful examination of Strother's diary manuscript verifies Eby's assertion since the entries he omitted reveal no information relevant to Strother's duties as a topographical engineer.

Strother's active service with Banks in the Shenandoah Valley ran from February 27, 1862 until June 28, 1862 when the topographer was called to Washington to make maps for Maj. Gen. John Pope to support the 2<sup>nd</sup> Manassas movement. To determine the relative burden of various duties on Strother's time, his journal (Strother, 1961) was examined for these 122 days. Table 1 provides the results of this investigation.

Overall Strother's duties during the Shenandoah Valley campaign were somewhat different from Abert's. Among individual tasks, general staff service was required of Strother most frequently (12.3% of task days). Nearly 19% of Strother's days involved specifically cartographic duties such as mapmaking and reconnaissance. Provost related duties accounted for over 21% of Strother's task days, including over 17% of which involved interrogating prisoners and working with spies. He was either sick or on furlough almost 16% of observed days. Other activities occupied Strother much less frequently.

Traditional duties of topographical engineers—reconnaissance, mapmaking, orienteering, and general staff service—dominated Strother's obligations, accounting for 27% of his task days. Strother seldom performed traditional Corps of Engineers details, which accounted for only 1.6% of his task days.

Strother's extensive involvement in provost duties is singular. While Abert also performed some provost duties during the same period, they constituted a much smaller fraction of his time. For Strother provost duties—especially work with prisoners—were the most frequent category of activity he was required to perform. Most likely Banks entrusted so much intelligence gathering activities to Strother because of his personal celebrity in, and familiarity with, the Shenandoah region. Strother's connections with local unionists made him well-suited to work with spies. Likewise, Strother's situation as a national celebrity could have encouraged prisoners to be more forthcoming when he interrogated them. Whatever the reason, Banks certainly expected Strother to work with spies and to interrogate prisoners far more frequently than was common for topographical engineers.

### *Hotchkiss's Field Journal*

To quantify the burden that each responsibility had on Hotchkiss's time, the topographer's journal (Hotchkiss, 1973) was examined to determine the number of days he was required to perform the various tasks he mentions undertaking over the 112 days between March 26, 1862 and July 15, 1862. These dates cover the period of Hotchkiss's involvement with activities related to the 1862 Shenandoah Valley Campaign, starting with his receipt of the commission from Jackson to "make me a map of the Valley from Harper's Ferry to Lexington" (Hotchkiss 1973, p. 10) and ending when he reunited with Jackson's command for the 2<sup>nd</sup> Manassas Campaign against Pope. Table 1 provides the results of this investigation.

Hotchkiss's diary indicates that almost 67% of his task days during the Valley Campaign were typical of topographical engineering. Almost 60% of his days involved some sort of cartographic enterprise, either directly drafting maps or performing surveys and reconnaissance. Hotchkiss engaged orienteering duties 6.3% of task days during the campaign. General staff service was undertaken fairly rarely (1.8% of task days).

*"Overall Strother's duties during the Shenandoah Valley campaign were somewhat different from Abert's."*

*"Strother's extensive involvement in provost duties is singular."*

*"... Banks certainly expected Strother to work with spies and to interrogate prisoners far more frequently than was common for topographical engineers."*

Traditional engineering responsibilities occupied comparatively little of Hotchkiss's time, approximately 9% of his task days. Hotchkiss was on furlough for three days (2.7%). He undertook no other type of task during the period of observation.

The evidence presented here suggests that the typical order executed by Hotchkiss either was directly related to mapmaking, involved some sort of reconnaissance, or entailed orienteering troops or material to their destinations. All these are typical responsibilities of military topographical engineers. Occasionally Hotchkiss was called upon to perform other services, but these were almost wholly within the domain of martial engineering. Hotchkiss's service was less diverse than that of the other study topographical engineers, especially his limited role in general staff service. This condition probably resulted from Hotchkiss's civilian status which limited the manner in which he could be employed by Jackson, although evidence presented below from Williamson's memoir might indicate that Jackson defined his staff's responsibilities more narrowly than did Banks.

*"Hotchkiss's service was less diverse than that of the other study topographical engineers . . ."*

#### *Thomas H. Williamson's Wartime Reminiscence*

Unlike the other topographical engineers entertained by this study, there is no published information about the life of Thomas H. Williamson. The Virginia Military Institute (VMI) archives contain a wealth of materials concerning Williamson, but these seem as yet not to have been systematically examined by scholars. The biographical information here is derived from materials in both the Thomas H. Williamson and the William G. Williamson archives at VMI.

*"Unlike the other topographical engineers entertained by this study, there is no published information about the life of Thomas H. Williamson."*

Williamson was born on either August 13 or August 30, 1813 to a banker and the daughter of an influential Norfolk family. He attended the U. S. Military Academy for four years but did not graduate, dropping out in his last term to become a civil engineer. After working at the Naval Yard in Norfolk, Williamson supervised the James and Kanawha Canal and directed various Corps of Engineers projects throughout Virginia. In 1841 he joined the faculty at VMI as a professor of drawing, geology, engineering, and architecture. Except for temporary diversions during the Civil War, Williamson performed these duties at VMI until his death in 1888.

At the beginning of the Civil War, Williamson received a commission of Lt. Colonel of Engineers in state forces. He planned and supervised the construction of the field works at Manassas and Centreville, Virginia, some of which were used in the war's first major battle. In October 1861, most VMI faculty were ordered back to Lexington to resume training future Confederate officers. Otherwise Williamson ventured to active service during the Civil War only briefly during Jackson's 1862 Valley Campaign, during the Battle of New Market when VMI cadets gallantly faced Union forces, and during the spirited but futile attempts to defend VMI from David Hunter's torch in 1864.

*"He planned and supervised the construction of the field works at Manassas and Centreville, Virginia, some of which were used in the war's first major battle."*

Diary evidence of the type previously examined is not available for Williamson's topographic service, but in 1883 Williamson wrote a detailed account of his service with Jackson during the 1862 Shenandoah Valley Campaign. Williamson's "My Service with Genl. Thos. J. Jackson" is organized diary style, a daily account of the colonel's time working with his former VMI colleague from April 30 to May 15, 1862, around the time of the Battle of McDowell. Williamson's service with Jackson's army at that time is corroborated by orders preserved in the Thomas H. Williamson Collection at VMI as well as by Hotchkiss's journal.

Williamson served on Jackson's staff for only sixteen days and he appears to have been recruited specifically to support operations leading up to the McDowell engagement. Thus, the scope of his actions was necessarily more limited than that of the other topographical engineers discussed in this study for whom longer records are available. As Table 1 indicates, Williamson performed only four types of tasks: reconnaissance, general staff service, guiding troops or trains to their destination, and leading troops actively engaged with the enemy. Of these responsibilities, Williamson was most commonly asked to provide reconnaissance, which he did approximately 44% of the days he was on Jackson's staff. This and other traditional topographer's tasks accounted for 56% of Williamson's task days. The only other activity Williamson performed was to lead troops against the enemy.

All the topographical engineers examined by this study except Hotchkiss at one time or another found themselves leading troops who were engaged by hostile fire. Williamson's experience leading troops under fire was rather different from those of Abert and Strother since his assignment from Jackson anticipated encountering enemy forces. Abert and Strother led troops under fire only when they and their escorts were attacked while performing a non-combat detail.

On May 8, 1862 at the start of the Battle of McDowell, Williamson was ordered by "Genl Jackson to accompany a body of infantry and to feel the enemy on the right of the road and Genl [Bushrod] Johnson did the same thing on the left" (Williamson 1883). The act of "feeling" an enemy in Civil War parlance meant to vigorously engage the enemy's forward skirmishers with the intent of pushing their skirmish line back to the main lines either in preparation for a full-scale attack or to determine the opponent's strength or general readiness to fight. Although there was a reconnaissance function involved, when an enemy was "felt" prior to a planned assault, it was generally considered an infantry obligation. It was most unusual for Williamson to have been asked to lead such a detachment. This probably illustrates Jackson's familiarity with Williamson from their time together on the VMI faculty and indicates he knew he could trust Williamson with this important assignment.

## Discussion of Findings

This study has introduced the cartography of four topographical engineers operating in the Shenandoah in 1861 and 1862: Abert, Hotchkiss, Kappner, and Strother. Only the work of Hotchkiss has been examined by previous studies. The cartographic output of these army topographers is qualitatively rather similar. All produced attractive maps useful and appropriate to their purpose. Positional and representational accuracy was examined for the following historical maps: Abert's *Map of the Shenandoah River from Harper's Ferry to Port Republic*, Kappner's *Map of the Valley of Virginia*, and Hotchkiss's *Map of the Shenandoah Valley*. It was determined that Kappner's map displayed the greatest degree of positional accuracy to current USGS information about the form and location of the Shenandoah river system.

Through this investigation it has become obvious that topographical engineers besides Hotchkiss were active in the Civil War Shenandoah and that those individuals produced high quality cartography to support their armies' operations. There is thus no reason to presume that the terrain intelligence of the Valley of Virginia available to Jackson was inherently superior to that available to Union commanders in the region.

*"Williamson served on Jackson's staff for only sixteen days and he appears to have been recruited specifically to support operations leading up to the McDowell engagement."*

*". . . Williamson was most commonly asked to provide reconnaissance . . ."*

*". . . Kappner's map displayed the greatest degree of positional accuracy to current USGS information about the form and location of the Shenandoah river system."*

*“... the army’s 1863 decision to dismantle the independent Corps of Topographical Engineers was based on the faulty assumption that the Corps’ service was undifferentiated from that of standard army engineers.”*

This study examined the duties typical of Union and Confederate topographical engineers serving in 1861 and 1862 operations in the Valley of Virginia. This was accomplished through investigations of Union and Confederate official records and the wartime journals of Abert, Strother, and Hotchkiss as well as the postwar memoir of Williamson. These four individuals were responsible for much of the mapping and terrain intelligence available to commanders during 1861 and 1862 operations in the Shenandoah Valley. Two of these topographical engineers, Abert and Williamson, had extensive military experience prior to the war. All but Abert were typical of many professional class volunteers of the early war.

As previously introduced, McClellan maintained that topographical engineers were primarily “entrusted [with] the collection of topographical information and the preparation of campaign maps” (*OR Series 1, Vol. V, Ch. 14, p 25*). Evidence examined by this study confirms that this description of the duties of topographical engineers is generally accurate for both armies. Terrain intelligence activities (reconnaissance, mapmaking, orienteering, and general staff service) were decidedly predominate among the tasks topographers were expected to perform during 1861 and 1862 operations in the Valley of Virginia. Topographical duties occupied over 50% of task days for all except Strother.

The evidence examined by this study contradicts McClellan’s assertion that “it was impossible to draw a distinct line of demarcation between the duties of the two corps of engineers” (*OR Series 1, Vol. V, Ch. 14, p. 25*). For all topographical engineers examined by this study, with the exception of Abert, Corps of Engineers duties occupied a trivial amount of their time. Even Abert spent only one-fourth as much time on engineering details as on his topographic duties, so his assignment to them was also comparatively minor. From this analysis it is clear that topographical engineers in the Civil War Shenandoah predominately performed assignments normally associated with topographical engineering. The evidence therefore indicates that the army’s 1863 decision to dismantle the independent Corps of Topographical Engineers was based on the faulty assumption that the Corps’ service was undifferentiated from that of standard army engineers.

The evidence presented in this study also indicates that there was a tendency for topographers’ assignments to be tailored to their individual expertise. For example, Banks frequently used Strother to interrogate prisoners and to work with spies, a reflection of his native knowledge of the Valley and his family’s extensive connections with important unionists throughout the region. These duties and regular provost service accounted for 21% of Strother’s task days, comparable to Abert’s diversion to engineering details. Abert was likewise required to drill troops and to translate a French military textbook into English, tasks indicative of his long service in the prewar army and of his West Point education. Most likely his engineering responsibilities reflected his training and experience, and the value of these skills to a volunteer army in hostile territory.

*“... there was a tendency for topographers’ assignments to be tailored to their individual expertise.”*

This tendency to employ topographical engineers according to their merits is more difficult to assess for the Confederate army. Hotchkiss and Williamson performed a less diverse service than did Abert and Strother. This difference between Union and Confederate engineers could be the result of data compatibility issues introduced by the very short record for Williamson and by Hotchkiss’s lack of a commission. It is possible that Hotchkiss and Williamson both were perceived to have talents confined generally to topographical engineering. It is also quite possible that Jackson defined the role of his topographical engineers more narrowly than did Banks. Although further investigation would be necessary to confirm

and clarify it, evidence from this study indicates that the two armies employed their topographical engineers somewhat differently, at least in terms of the balance of responsibilities placed upon them. In general, Union topographers are seen to have undertaken a greater variety of tasks beyond traditional topographical engineering than was common for Confederates.

### Conclusion and Directions for Further Study

There is evidence to suggest that the duties of Confederate topographical engineers were more narrowly defined than those of their Union counterparts. Contrary to expectations from McClellan's report and from the 1863 restructuring, army topographers in the Valley of Virginia from both sides commonly undertook those tasks most generally associated with Civil War topographical engineering: mapmaking, field reconnaissance, general staff service, and guiding troops or wagon trains to their destinations. Contrary to existing literature about Civil War mapping of the Shenandoah, Jedediah Hotchkiss was but one of several individuals who provided effective terrain intelligence to both Union and Confederate armies in the theater.

This study uncovers several questions for further investigation. Were topographical engineers in the Shenandoah region employed in the same way later in the war? Furthermore, it would be useful to examine the activities of topographical engineers operating in other theaters for a comparison of the employment responsibilities of these officers. As there has been little research completed on the collection and use of terrain intelligence by Civil War armies, there are many opportunities to significantly advance scholarly understanding in this field.

*"... Union topographers are seen to have undertaken a greater variety of tasks beyond traditional topographical engineering than was common for Confederates."*

*"... Jedediah Hotchkiss was but one of several individuals who provided effective terrain intelligence to both Union and Confederate armies in the theater."*

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