

AN EXAMINATION OF STUART’S PROPOSED CAVALRY

CHARGE ON JULY 3, 1863—PART 3

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Figure 16 shows the topography of the photograph in Figure 14. The map section is taken from John Bachelder’s map of the battlefield for July 1. This map was chosen because the southern part of the area is unencumbered by army units as on July 3, allowing for a clearer view of the landscape. The map shows the approximate location of its photographer and the southward direction of the photo. The house and barn of a “D. Lightener” and Powers Hill are noted.

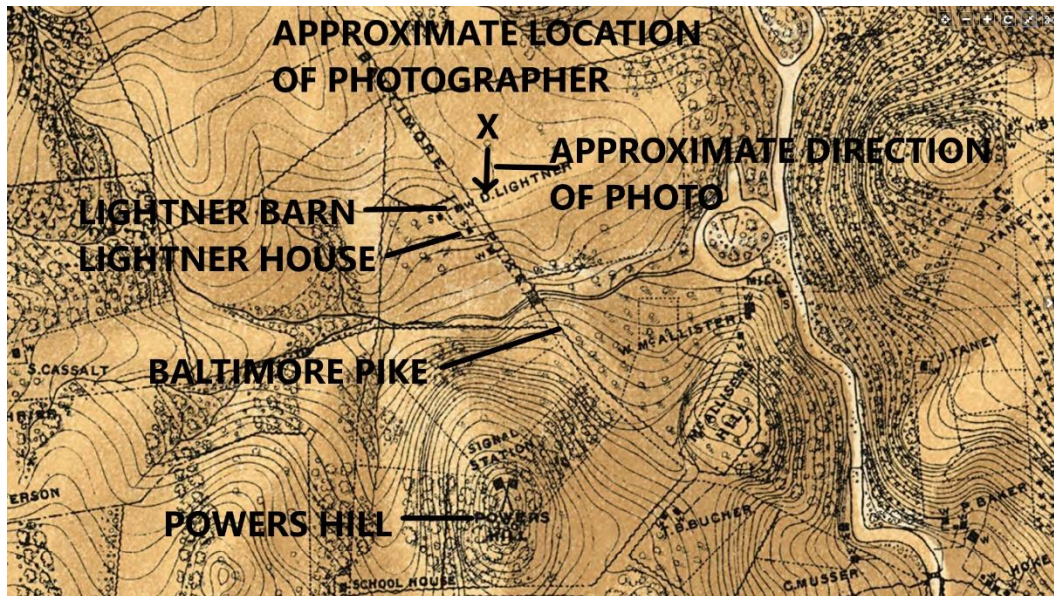


Figure 16. Topography of the photo made circa 1878 showing the Baltimore Pike looking south with the house and barn of Nathaniel Lightener in the foreground and Powers Hill behind the house. Bachelder map of July 1 annotated for this paper, from Library of Congress web site, “Image 1 of Map of the battle field of Gettysburg. July 1st, 2nd, 3rd, 1863,” accessed June 30, 2019, map for “First Day’s Battle,” <https://www.loc.gov/resource/g3824g.cw0325000a/?sp=1&r=0.086,-0.293,0.845,0.695,0> , search on ‘Bachelder map Gettysburg Library of Congress’.

Finally, although it is difficult to find contemporary photos of BP at the location Dr. Carhart proposes for the attack, there is a photo of that road taken in the town looking southeast along the road. Figure 17 shows the intersection of the Emmitsburg Road (on the right) with the Baltimore Pike (on the left). For reference, the Jenny Wade house is to the left and out of the picture. (The point between the two roads facing the camera is occupied by a convenience store today.) The relatively flat surface of the BP’s improved surface is evident. A small wagon on the left of the BP rides away from the photographer, but it gives an idea of the width of the road at this point. From the size of the wagon, it

appears that this part of the road could easily hold a cavalry column of three. The size of the wagon will appear again in the discussion of Federal forces below.



Figure 17. Intersection of Emmitsburg Road (left) with Baltimore Pike (right). Found on eBay, Aug 3, 2019. <https://www.ebay.com/itm/New-5x7-Civil-War-Photo-Baltimore-Pike-and-Emmitsburg-Road-at-Gettysburg-Pa-/162261311345>⁸⁷

In summary, the terrain along the five-mile route starts with good ground for cavalry operations on ECB, which is where the actual battle occurred. Upon crossing the Hanover Road onto BR, one is riding on a farm lane that is limited on both sides by grades of 10 to 20 percent, giving a column little room to maneuver and forcing it to continue onto

the BP. The BP afforded an improved surface, which at first seems to help a cavalry charge. Under normal circumstances, this might be true, except that the BP was the terminus of the AOP's supply line. This feature of this road is covered in the next section.

JUMBLE ON THE PROPOSED ROUTE

Obstacles on the proposed route must be considered in any imagined attack following this route, but aligning them to accommodate Carhart's thesis is a problem. His proposed route from ECB to his attack behind Culp's Hill assumes no obstacles on the five-mile journey (which he counts as three miles). This assumption was made above for the determination of the length and speed of the columns, and the terrain was covered as a singular entity solely to allow for its examination.

Eventually Federal forces must be considered: one cannot simply ignore them. But this presents another problem, that is, which Union forces are wiped off the map? (Please forbear if the rest of this discussion reads like the storyline for a time warp episode of *Star Trek*.) One must find a suitable point in the timeline where the history can change reasonably, and start there. The alternate timeline must exist within the elements established by this environment.

The premise of a "surprise" Confederate cavalry attack on Culp's Hill from behind—from the BP—assumes that the *real* battle around the Rummel farm did not occur. Given the proposition that this paper covers a theoretical study covering a theoretical attack that *did not* occur, it reserves the right to determine which units to disqualify. Based on this, it is easy to determine which Federal units to eliminate, that is, only those units on ECB that stopped Stuart's attack. This allows Stuart unfettered access to BR. All other

units remain, for the simple reason that most of them would have been in position regardless of what was occurring on ECB; indeed, any soldiers along most of the route would have been unaware that a battle occurred there anyway. (Where Gregg's and Custer's units are during this theoretical study is another matter, but unimportant, because they must be not in position for Dr. Carhart's attack to even start.) The breakdown of Federal forces by route is:

Leg Number 1: East Cavalry Battlefield (1.5 miles across). Even conforming to the assumption that no Federal troops were on ECB to oppose Stuart, one is still left with other Union forces in the area. The previous afternoon saw heavy skirmishing on Brinkerhoff Ridge, southwest of Cress Ridge. Although Union cavalry corps commander Pleasonton had ordered division commander David Gregg to depart the area, Gregg did not think it wise to do so: he remained. One regiment held a thin line between Wolf Hill and Hanover Road, a length of approximately 0.5 mile; this line was around 1.5 miles from ECB and directly west of the BR. Shortly after the noon hour, Gregg received a dispatch from Pleasonton relaying a message from General Oliver Howard, XI Corps commander. Howard's pickets near Cemetery Hill had observed a long line of Confederate cavalry, with cannons and ambulances, marching out the York Pike east toward the Federal rear.⁸⁸

It was this observation of the Confederates that led to the appearance of Custer (ordered there by Pleasonton) who later engaged Stuart on ECB. The observation of Howard's pickets would have occurred *regardless* of the location of Union cavalry and the same observation would have alerted Pleasonton to the possible advance of Stuart's cavalry *somewhere* in the area behind the Union lines (assuming somehow Custer does not appear). And then there is David Gregg, who had not departed the area since July 2 and would have

had videttes combing the area. Thus, even eliminating the fighting forces from ECB, there were enough Federal forces in the area to warn the AOP of a Confederate cavalry raid behind its lines.

Leg Number 2: "Bonaughton Road" (2.1 miles long). As noted above, this leg of the route is mostly under water today and surrounded by a housing development. However, given the function of most roads in the area, including the extant road on ECB, it was a farm lane. The Schaffer and Breiter homesteads appear at the bottom of the Bien map in Figure 3 above, and these mark the intersection of the BR with the BP. These two homesteads are on the lower right side of the Bachelder maps, and the maps cover nothing on the BR. However, the Bachelder map for July 3 shows almost no Confederate forces in its southeast corner and many Federal forces in that area, especially north of Rock Creek.

Leg Number 3: Baltimore Pike (1.7 miles long). This is where the going would become rough for Stuart. The assumption that meager Federal forces lined the route contradicts the facts. As seen on Figure 18, which is based on the Bachelder map for July 3, plenty of Union forces are along or near this leg. First, there are four infantry brigades from VI Corps nearby, Eustis, Shaler, Neill, and Russel (annotated in orange). Second, there are many artillery batteries along the route, with at least 14 guns on Powers Hill right on the road (annotated in blue). (Recall that Stuart would have to deploy after crossing the bridge over Rock Creek and this would be under the guns on Powers Hill.) Finally, units of III Corps are within a half-mile of BR (annotated in green). All these units would have been there regardless of any activity on ECB. In addition, any units shifting position, as well as any arriving reinforcements, would be on this road.

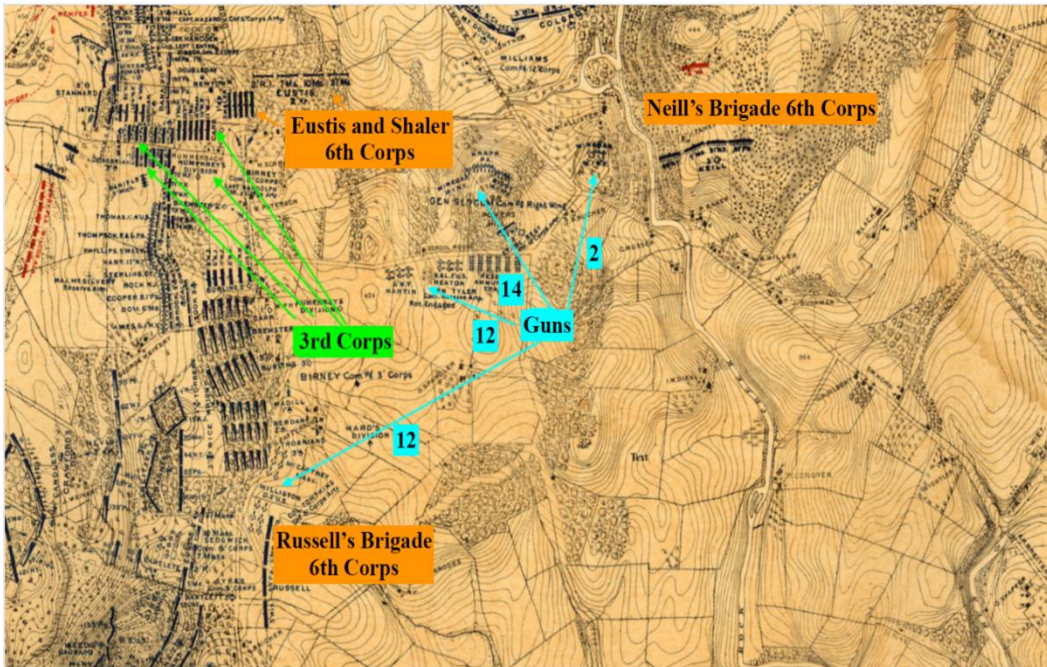


Figure 18. Federal forces on the Baltimore Pike along the proposed attack route. Bachelder map of July 1 annotated for this paper, from Library of Congress web site, “Image 1 of Map of the battle field of Gettysburg. July 1st, 2nd, 3rd, 1863,” accessed July 5, 2019, map for “Third Day’s Battle,” <https://www.loc.gov/resource/g3824g.cw0326000c/?r=0.312,0.805,0.58,0.477,0> , search on ‘Bachelder map Gettysburg Library of Congress’.

Second, and equally as important as combat units, are support units, which are often easy to forget. Table 5 illustrates this. After the Chancellorsville Campaign and in preparation for the Gettysburg Campaign, on June 19, General Rufus Ingalls, AOP quartermaster, provided a report on the number of men and transportation available to the army. The transportation section included the number of horses, mules, and wagons. As can be seen from the table, the number of wagons is over 5,000 and for animals, greater than 30,000 assigned to transportation.⁸⁹ During the battle in July, given that the AOP controlled completely two roads, Taneytown and Baltimore, it is not a stretch to believe that much of the latter would contain many wagons bringing supplies up to the army. This

is especially true because the main Union railroad terminus for the campaign was in Westminster, Maryland, approximately, 25 miles distant. At least it is easier to believe that there were *some* supply wagons on the pike rather than none.

Date (1863)	Command	Number of officers, men, and means of transportation in each command.									Pack Mules
		# of Officers	# of Men	Means of Transportation					Horses		
				Horses	Mules	Army Wagons	Wagons, Two-horse	Ambulances	Cavalry	Artillery	
June 1	First Corps	949	14,237	393	2,578	404	6	67	120	543	0
June 1	Second Corps	1,039	14,572	670	2,795	496	7	117	110	455	0
May 1	Third Corps	1,212	20,864	951	2,326	525	13	98	141	1,130	0
May 1	Fifth Corps	1,050	18,324	879	2,621	496	7	166	9	860	0
May 1	Sixth Corps	1,483	26,041	1,001	2,933	557	11	167	159	1,034	0
June 1	Eleventh Corps	621	12,616	1,100	1,549	414	10	83	204	467	216
June 1	Twelfth Corps	530	9,401	879	1,480	365	12	94	102	397	0
May 1	Cavalry Corps	719	11,687	1,085	2,404	313	4	86	12,386	699	0
May 1	Artillery Reserve	51	1,408	489	1,307	291	3	15	1	1,499	0
May 1	Engineer Brigade	83	2,115	757	526	120	2	12	12	0	0
May 1	Patrick's Brigade	138	1,865	67	24	21	1	4	4	0	0
May 1	HQ AoP	62	1,031	600	1,085	300	13	19	65	0	0
Totals		7,937	134,161	8,871	21,628	4,302	89	928	13,313	7,084	216

Table 1 – Recapitulation of June 19, 1863 Report⁸⁰

Table 5. Table from General Rufus Ingalls Report of June 19, 1863. Notable are the numbers of horses, mules, wagons, and ambulances. From Meisel, Christian B., Major, United States Marine Corps, “Logistics for the Gettysburg Campaign: Refocusing an Army in War”, Master’s Thesis, USMC Command and Staff College, Quantico, Virginia, April 19, 2010, p. 24, accessed November 3, 2019, <https://apps.dtic.mil/dtic/tr/fulltext/u2/a602915.pdf>, search on ‘Gettysburg Logistics’.

Third, easier to forget than supply wagons are ambulances: Table 5 shows that the AOP had approximately 900. July 2 saw heavy fighting along the entire Federal line, and

on the early morning (before sunrise) of July 3, General Henry Slocum's XII Corps had attacked the Confederates in the morning on Culp's Hill. This assault would have produced hundreds of wounded, and they would have been taken by ambulance to their respective corps field hospitals. Figure 19 shows the location of these field hospitals for all seven corps, which were located along the BP with some accessible via the Taneytown Road on the left of the map.⁹⁰ (For reference, Stuart's right-hand turn onto BP from BR at the intersection to the immediate left of "1st Corps Hospitals" on the right of the map.) This makes sense because hospitals need water and these hospitals are all near Rock Creek (the vertical black line midway on the map) or one of its branches. Given the intensity of the fighting on the second and third days, it is easy to imagine scores of ambulance wagons on this road heading south. (One of the modern roads in this part of the battlefield is Hospital Road and it contains the roadside markers for many of the corps' hospitals. The marker for the Second Corps reads, in part, "The division hospitals of the Second Corps were located July 2nd at the Granite Schoolhouse but were soon removed to near Rock Creek west of the creek and six hundred yards southeast of the Bushman House.")

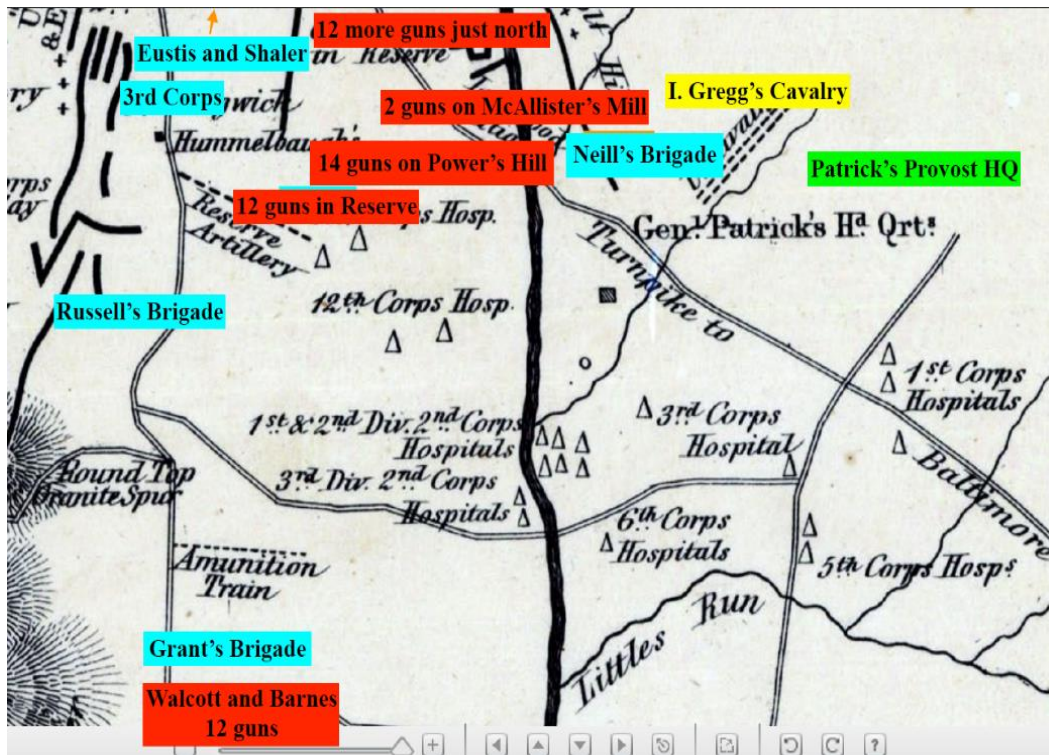


Figure 19. Map of location of Union Corps Hospitals, annotated for this paper. Historic Map Works web site, Item #US14433, Gettysburg Battlefield and Hospitals Map from Adams County 1872, Pennsylvania, Published by I.W. Field and Company in 1872, accessed July 5, 2019, <http://www.historicmapworks.com/Map/US/14433/Gettysburg+Battlefield+and+Hospitals+Map/Adams+County+1872/Pennsylvania/>

Fourth, an unintended, but welcome find in Figure 18 is the location of the headquarters of General Marsena Patrick, Provost Marshal of the AOP. The position of provost marshal was established to maintain order and discipline in the ranks, freeing the army commander from such tasks. As established by General George McClellan in 1861, its duties included the prevention of stragglers on the march, suppression of vices such as gambling and drinking, execution of sentencing from courts marshal, and processing prisoners of war (POW). The provost marshal was a staff officer and technically

commanded no units; however, regiments or battalions from regiments were rotated through the provost guard. During the Gettysburg campaign, the provost guard under Patrick numbered approximately 1,500 officers and men, the equivalent of a brigade.⁹¹

The provost guard processed “a great many prisoners”⁹² on the first day and these were processed and sent south. Patrick’s headquarters were originally at the William Patterson house on the Taneytown Road, down the road from Meade’s headquarters, but Patrick was forced to move because of the Confederate artillery bombardment prior to Longstreet’s attack on July 2. The fighting on that day produced 1,360 POWs and on July 3 produced another 2,000, causing Patrick to move his headquarters and POW depot. This new location was the farm of Aaron Sheely, southeast of the BP crossing of Rock Creek, as shown on the map.⁹³ This movement would move the provost guard to the BP just south of the Rock Creek crossing. Thus, in addition to supply wagons and ambulances, the BP would have hundreds of POWs and guards marching about on or near it.

Figure 16 showed the intersection of the Emmitsburg Road with the Baltimore Pike. On the left of that photo, on left of the BP, is the image of a small carriage, presumably moving because the horse’s legs are not visible, indicating that it was not standing still for the duration of the exposure. This carriage is important because it provides a rough idea of the impact of a wagon on the road. The 1862 United States Army guide for staff officers suggests that the width of seven feet for a road carrying artillery carriages. It also states that “A piece of artillery, or a caisson, drawn by six horses, takes a depth” of fourteen yards and a front of two.”⁹⁴ A front of two yards on 1863 roads, even the BP, would cut into its usable width considerably. Although the BP is wide enough to let pass a line of horses in column of three, the wagon in the photo cuts into that

considerably. If three troopers approached this wagon riding abreast, one would have to wait for the other two to go by the wagon. Multiply this wagon by scores and the impact on a column of troopers would be much greater.

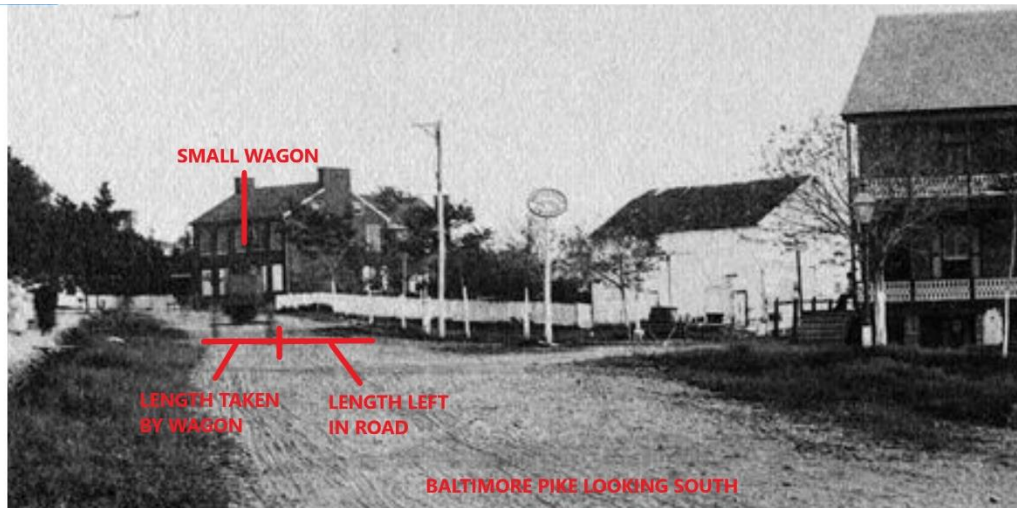


Figure 20. Zoom image of photo in Figure 17 annotated for this paper. The width of the wagon on the left would be an impediment to any large force traveling on the road. Many such wagons would slow a column much more.

To conclude this section, it appears as though there were many obstacles to Stuart's proposed cavalry attack along the three legs of the proposed route. Near ECB, there were ample forces to provide proper warning, both infantry and artillery. On the BR, David Gregg's division was enough to block movement down that road. Finally, the Baltimore Pike contained just about everything to impede a fast cavalry charge: units redeploying, reinforcements, supply wagons, ambulance wagons, hospitals, POWs (unarmed and frequently lightly wounded), and provost guards. It is difficult to imagine 6,000 troopers performing a high-speed charge of any sort up that road that July 3.

THE ATTACK AREA

The situation on the proposed attack area can be seen clearly from Bachelder's map for July 3, shown in Figure 21. This image covers BP from Rock Creek in the lower right corner past Powers Hill to the attack area between Cemetery Ridge and Culp's Hill in the center.

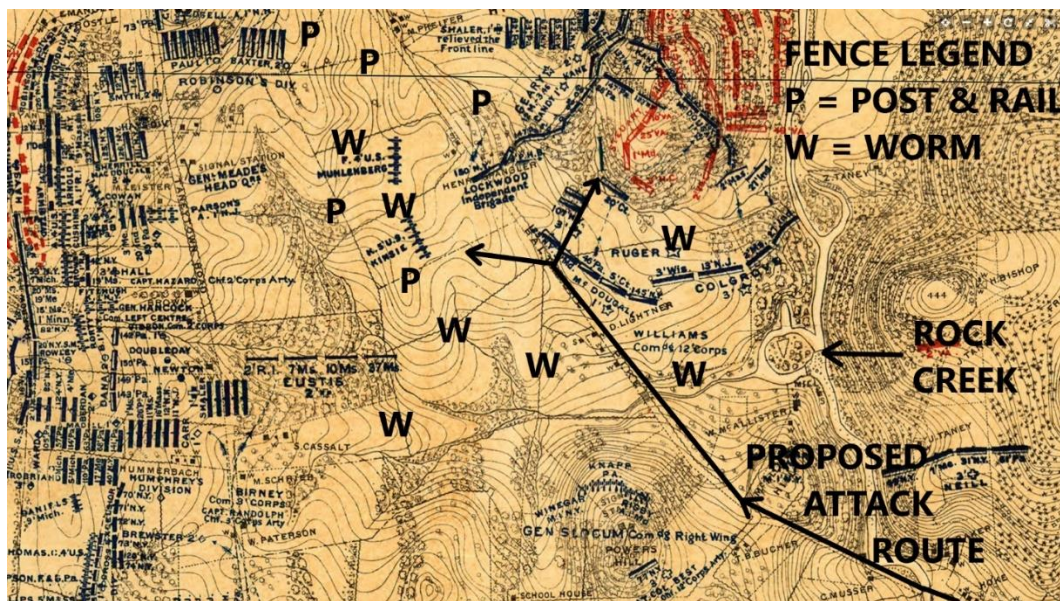


Figure 21. Fences in the proposed attack area. Bachelder map of July 3 annotated for this paper, from Library of Congress web site, "Image 1 of Map of the battlefield of Gettysburg, July 1st, 2nd, 3rd, 1863," accessed July 5, 2019, map for "Third Day's Battle," <https://www.loc.gov/resource/g3824g.cw0326000c/?r=0.312,0.805,0.58,0.477,0> , search on 'Bachelder map Gettysburg Library of Congress'.

Federal units in the proposed attack area are marked by blue lines and lettering on the original map. Suitably placed along the Pike are Ruger's division and Lockwood's Brigade on the east side of BP and two artillery batteries, Muhlenberg's and Kinsie's, on the west side. The area is also lined with fences as marked on the map. The type of fence

is based on the legend on the original map—jagged line for worm fence and dash-dot-dash for post and rail. Considering the trouble that both the Federals (on July 1) and Confederates (on July 3) had with sturdy fences, the location and type of these fences must be considered as obstacles to any high-speed, galloping cavalry attack. Finally, the entire Gettysburg area is covered with rocks, and these would detract from a galloping cavalry attack.

SUMMARY AND CONCLUSIONS

This paper examined the route proposed for General Stuart on July 3 by Dr. Tom Carhart in his book *Lost Triumph: Lee's Real Plan at Gettysburg and Why It Failed*. It first presented a background leading the reader to the afternoon of July 3, including a discussion of Carhart's thesis. It seems clear that the proposed number of mounted horsemen is unresolved among various authors, ranging from 2,500 to 6,000. This paper does not try to solve this problem, but evaluated the proposed attack by analyzing theoretical cavalry columns in terms of numbers, length, and speed. The validity of using "theoretical" modes of cavalry columns is established by noting that Carhart's thesis is based on no surviving documentation and because he offers no parameters on the deployment of the column.

A list of horse performance and management items followed, comparing modern criteria to those of 1863, where possible, and using the modern criteria to evaluate the possible condition of horses (of both sides) on that hot and humid afternoon. These items include water, feed, horseshoes, load, climate (mainly the effect of temperature and humidity), and terrain, including the grades of the three legs of the proposed raid. It should

be noted that many authors, including Carhart, do not cover these items in any measure. These sections were augmented by inputs from an equine veterinarian, Dr. Peter Blauner, who offers this assessment:

In summation, it seems highly unlikely that the proposed attack could have been successful under the conditions as presented. Perhaps another question to ask is could this have been a reasonable plan when first conceived, if Stuart had been where he was supposed to be when he was supposed to be with rested troops and horses. Success still seems unlikely to me but I have the advantage of Monday morning quarterbacking!

Finally, the paper covered two features germane to tactical considerations of Dr. Carhart's proposed route, the terrain and possible Federal forces along the route. Analysis of the route is technically incomplete because one of its legs, the "Bonaughton Road," no longer exists, but a parallel road, the Low Dutch Road, offered comparable conditions. This analysis established that the actual route, at approximately five miles, is two miles longer than that suggested by Carhart.

Analysis of the terrain along the route showed that obstacles such as fences and relatively steep grades of 15 to 20 percent existed along the route as did creeks and streams to cross. An accounting of Federal forces in the area found not only first-line infantry and artillery units along the Baltimore Pike, but included the possibility of supply wagons, provost marshal soldiers, stragglers, prisoners, wounded, and ambulance wagons along that road. The attack area between Cemetery Ridge and Culp's Hill appears to have been separated by fences and covered with rocks, typical for the geology of the area.

One unclear item is how much scouting was performed by the Confederates, or at least how much scouting does Carhart think they did. Most of the route under discussion was behind Union lines and it appears from the Bachelder maps that ample Federal units

were in the area and probably clearly visible. It is also unclear if the Confederates made use of its soldiers familiar with the Gettysburg area, such as Wesley Culp, who grew up there, and James Crocker, former judge in Pickett's division, who graduated from Gettysburg College in 1850.⁹⁵ It is inconceivable that Stuart would commit a large cavalry force along a route that had not been properly reconnoitered.

For the record, to limit the scope of this paper, it bypassed these topics:

- a. Resolving the disagreement on the number of troopers.
- b. The problem of timing and how Stuart was to know when to start his attack.

Wittenberg covers this in detail in his Appendix D, "Which Confederate Battery Fired the Four Shots on Cress Ridge to Open the Fighting on East Cavalry Field?"⁹⁶

- c. Carhart's proposed alternate route to attack the Federals. This is presented above quoted directly from his book, but no analysis is presented.

- d. A retreat route if the proposed cavalry attack failed.

- e. This is not directly related to the proposed attack on July 3, but the weather along Stuart's route from June 25 until July 2 has never been investigated. Weather records are probably sparse—indeed, not every town along his route had a Dr. Jacobs to keep records—but such an examination might shed light on some aspects of the journey.

Recall that this study began with the goal of determining whether Dr. Carhart's proposed cavalry charge was feasible and not simply to refute it. These conclusions may be drawn from the analysis herein:

1. His proposed attack route seems unfeasible, especially for his estimated 6,000 mounted troopers. For starters, his distance is short by two miles and his duration off by at least 20 or 25 minutes.

2. “Bonaughton Road” is particularly unsuited for the route because it follows a steep gorge with no transverse route in or out. Once committed, one must continue to the Baltimore Pike.

3. The Baltimore Pike is especially unsuitable for a cavalry attack owing to the presence of Federal forces along it and several major impediments on that section of the road where a galloping cavalry charge is to occur. After all, it was the main Union supply route.

4. An attack from the Baltimore Pike to Cemetery Ridge and Culp’s Hill would be hampered by many fences and more Federal forces on either side.

This discussion has been theoretical, but based on careful analysis of available facts and reasonable computation based on them. A cavalry battle occurred east of Gettysburg and Jeb Stuart’s brigades were stopped by the Federals: this is the recorded history. Also, on that day, the ANV lost the battle in one of the war’s great infantry charges: this is also recorded. There are few new facts or smoking guns about this defeat. Extrapolation of the three separate actions that day (Culp’s Hill, Pickett’s Charge, and East Cavalry Battle) into a “unified” plan is simply another desperate attempt at salvaging Lee’s judgment from the calamity, to burnish his record. He was the commander, he developed a battle plan that failed, and he bears the responsibility. To borrow a phrase from R. S. Henry quoted by Lieutenant Colonel Mark Boatner: No amount of “literary carpentry”⁹⁷ can deflect from General Lee responsibility for the defeat. Offering a plan that cannot work does not help the situation, either.

POSTSCRIPT

Dr. Tom Carhart describes Stuart's cavalry as "galloping" up the Baltimore Pike to the attack area. Our modern world does not afford most persons the opportunity to see real horses gallop, unless they are familiar with rodeos or horse races. The text above offers breakdowns of horse speeds from the 1860s and today, but it is still difficult to picture.

A 1987 Australian feature film entitled *The Lighthorsemen* can help in this visualization. It is based on a true story from the World War I Palestine campaign of 1917, culminating in a cavalry charge by two Australian light cavalry regiments against the town of Beersheba in October 1917. Aside from its cinematic value—the cinematography is excellent—the clip of the charge shows cavalry progressing from walk to trot to canter to gallop. The gallop starts at 3:00 into the video, and this is the speed that Carhart proposes for Stuart's 6,000 troopers up the Baltimore Pike.

Link to the video: https://www.youtube.com/watch?v=_udGcKMhbtc

If the link does not work, search on 'Two Steps from Hell Victory Charge of the Australian Light Horse, Beersheba' or 'Charge of the Australian Light Horse, Beersheba'. Other videos will contain the charge.

After sending their original comments, Dr. Blauner and his wife sent information on a video showing United States Army cavalry training from 1917-1918. They noted that although it is not of the Civil War era and that the horses are shod and well fed, it offers examples of spacing, speed, terrain handling, and terrain impact. Search on 'Cavalry Training in the United States, 1917-1918'.⁹⁸

Link to the video: <https://www.youtube.com/watch?v=QxOggtbzMJo>

APPENDIX A. TOPOGRAPHICAL DEFINITIONS

This section covers the basics of topographic maps, which are important to understand the discussion of the roads in this paper.

Topographic Maps. Per the United States Geological Survey:

A map is a representation of the earth, or part of it. The distinctive characteristic of a topographic map is the use of contour lines to show the shape of the earth's surface.

USGS topographic maps also show many other kinds of geographic features, including roads, railroads, rivers, streams, lakes, buildings, built-up areas, boundaries, place or feature names, mountains, elevations, survey control points, vegetation types, and much more.⁹⁹

A contour line joins points of equal height. Contours make it possible to show the height and shape of mountains, depths of the ocean bottom, and steepness of slopes. Basically, contours are imaginary lines that join points of equal elevation on the surface of the land above or below a reference surface, usually mean sea level.

Per Natural Resources Canada:

Contour lines connect a series of points of equal elevation and are used to illustrate relief on a map. They show the height of ground above mean sea level (MSL) either in metres or feet, and can be drawn at any desired interval. For example, numerous contour lines that are close to one another indicate hilly or mountainous terrain; when further apart they indicate a gentler slope; and when far apart they indicate flat terrain.

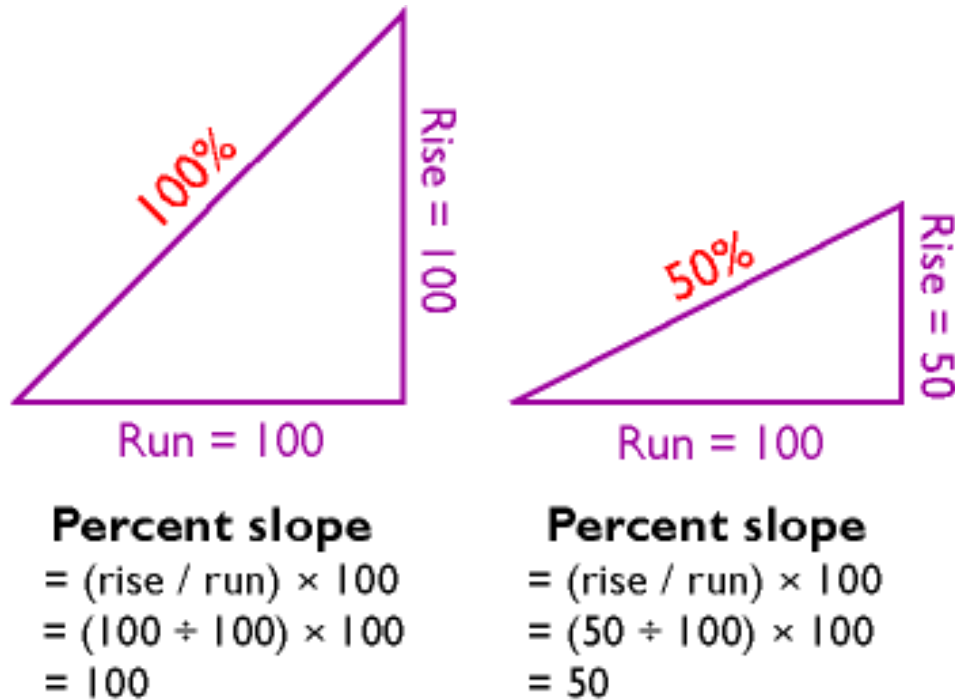
Use contour lines to determine elevations of mountains and flat areas. The closer together the lines are, the steeper the slope.

Contour elevation numbers indicate the direction of elevation by always reading (pointing) uphill.¹⁰⁰

The concept of grade (or slope or incline) requires introduction. Per the Geography Department of the Pennsylvania State University:

One way to express slope is as a percentage. To calculate percent slope, divide the difference between the elevations of two points by the distance between them, then

multiply the quotient by 100. The difference in elevation between points is called the rise. The distance between the points is called the run. Thus, percent slope equals $(\text{rise} / \text{run}) \times 100$.¹⁰¹



ACKNOWLEDGMENTS

The authors thank graciously those persons who assisted with this paper. The material in this paper took the authors way out of our comfort zone, requiring the assistance and review of subject experts to check our research and interpretations thereof.

Gettysburg National Military Park rangers John Heiser, Historian, Department of Visitors Services and Education, and Matt Atkinson offered us discourse, ideas, advice, and encouragement. For this paper, they suggested investigating terrain and horses, which in turn caused us eventually to seek input from an equine veterinarian. (See below.)

Andrea Wedo, M.S., a Geographic Information System analyst, produced the topographic maps and the slope analyses used in this paper, the first of many items beyond our ken. Roger J. Cuffey, Ph.D., Professor Emeritus in Paleontology, Department of Geosciences, Pennsylvania State University, who has supported our papers from the beginning, reviewed this paper for its geographic content and overall logic. Jon M. Nese, Ph.D., Associate Head for Undergraduate Programs, Department of Meteorology and Atmospheric Science, Pennsylvania State University, ensured that the meteorological interpretation herein was far more scientifically correct than the original version he read.

Ms. Christine Irvine, Registered Nurse, barrel racer, and owner of two horses, provided us with a list of elements on the health and welfare of horses to guide our initial inquiry into this area. Our list of elements in the horse section follows this list closely. Peter Blauner, VMD, and his wife, Mary, responded graciously and comprehensively to an Email from us out of the blue requesting a review of our paper to ensure that our coverage of equine care and physical limitations was correct. Dr. Blauner is an equine veterinarian in Harleysville, Pennsylvania, and is American Farrier Association Certified. He and his wife Mary own four horses and offered insights into horses and horse care far beyond our ability to find on the Internet.

Steve Hedgpath, former newspaper writer, editor, and long-term supporter, reviewed it for content, style, and grammatical correctness. Joseph Shakely, M.A., Associate Professor of English Literature at Bucks County Community College, reviewed the penultimate version.

It is simplistic to write that without the cooperation of each person above that this would be a lesser paper, but it is true, and we hope that our final version validates their

time and input. Errors in the posted version remain the responsibility of the authors.

February 2020

REFERENCES

Much of the historical information in this paper is of a general nature and can be found in most works on the subject; therefore, no footnotes are provided for these data. However, they do appear for quotes and for the more obscure items herein.

⁸⁷ The eBay version of this photo was chosen because it was the clearest from a search on Google. Another version may be found at <https://www.gettysburgdaily.com/140-places-every-guide-should-know-part-20-gettysburg-lbg-fred-hawthorne/> . It may also be found at the Library of Congress website, <https://www.loc.gov/item/2014646003/> , search on ‘Gettysburg Baltimore Pike and Emmitsburg Road photo’ .

⁸⁸ Longacre, *op. cit.*, p. 224.

⁸⁹ Meisel, , *op. cit.*, p. 24.

⁹⁰ Gettysburg Battlefield and Hospitals Map, Adams County, Pennsylvania, 1872. I. W. Field & Company, accessed November 29, 2019, <http://www.historicmapworks.com/Map/US/14433/Gettysburg+Battlefield+and+Hospital+Map/Adams+County+1872/Pennsylvania/> .

⁹¹ Teague, Charles, “The U.S. Marshal at Gettysburg”, pp. 66-70 (PDF pp. 1-5), http://npshistory.com/series/symposia/gettysburg_seminars/13/essay4.pdf , from “Gettysburg: The End of the Campaign and Battle’s Aftermath,” Gettysburg Seminar at the National Military Park, 2010, accessed November 29, 2019, http://npshistory.com/series/symposia/gettysburg_seminars/13/index.htm , search on ‘Provost Marshal Gettysburg’ .

⁹² Teague, pp. 77 (PDF pp. 12), quoting from David S. Sparks, ed., *Inside Lincoln’s Army: The Diary of General Marsena Rudolph Patrick, Provost Marshal General, Army of the Potomac* (New York: Thomas Yoseloff, 1864),p. 211.

⁹³ Teague, pp. 77-78 (PDF pp. 12-13).

⁹⁴ Craighill, p. 70.

⁹⁵ Tucker, *op. cit.*, p. 3.

⁹⁶ Wittenberg, *op. cit.*, Locations 2856-3887.

⁹⁷ Boatner, Mark Mayo, *The Civil War Dictionary*, New York: David McKay, 1959, p. 329.

⁹⁸ Blauner, Peter, and Blauner, Mary, personal correspondence, Email, November 11, 2019.

⁹⁹ “What is a Topographic Map?”, U.S. Geological Survey website, accessed November 29, 2019, <https://www.usgs.gov/faqs/what-a-topographic-map> , search on ‘What is a Topographic Map U.S. Geological Survey’ .

¹⁰⁰ “Topographic Maps: The Basics,” Natural Resources Canada website, p. 2, accessed November 29, 2019, https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/earthsciences/pdf/topo101/pdf/mapping_basics_e.pdf , search on ‘Topographic Map Basics’ .

¹⁰¹ “Slope,” The Nature of Geographic Information, Department of Geography website, Penn State University, accessed November 29, 2019, https://www.education.psu.edu/natureofgeoinfo/c7_p10.html , search on Slope Geology Penn State’ .