An Analysis of Smoking and Tobacco Waste Patterns at Peck Hall, Middle Tennessee State University

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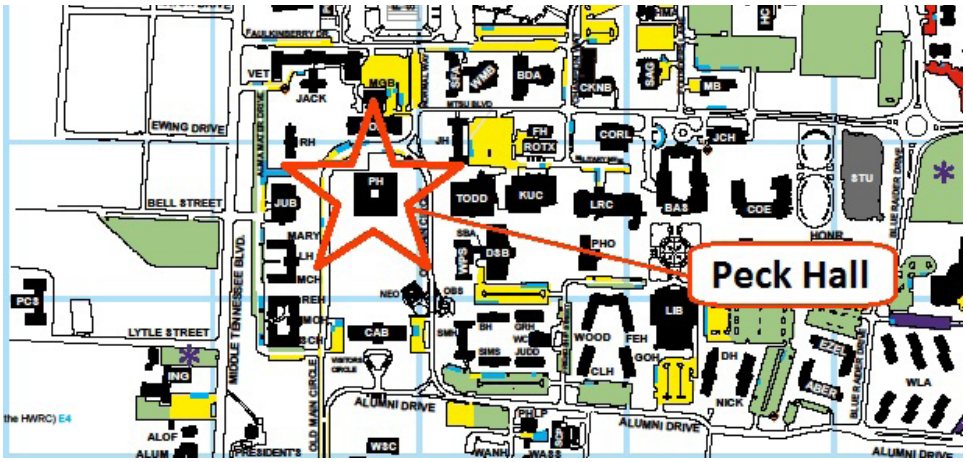
Abstract

This paper analyzes the accumulation of tobacco waste around the perimeter of Peck Hall. In spite of MTSU's tobacco ban, a number of students continue to use tobacco-related products on campus, especially along the southeast quadrant of the periphery of Peck Hall as a result of the placement of an unauthorized "butt bin." This site is also used as an area for student breaks between classes, with students engaging in a variety of activities at this site. Initial research suggests, while in place, the "butt bin" significantly reduced the amount of cigarette related waste in this area specifically (6 butts), and upon removal, a dramatic increase of cigarette butts were found in this same spot (75 butts), a week after. This increase stands in contrast to the more gradual accumulation of butts found around the rest of Peck Hall.

INTRODUCTION:

This paper discusses research conducted at Peck Hall on the campus of Middle Tennessee State University (MTSU), a building housing classrooms, faculty offices, and a small convenience store, and examines the usage patterns of the promenade and perimeter of this building with respect to smoking litter at the site. This research constitutes a garbology project, a means of archaeological inquiry developed by William Rathje, which posits the analysis of waste as an effective and insightful means of gaining an understanding of the human condition (Rathje and Murphy 1992). Garbology focuses upon human waste at both the household and landfill levels. This project deviates slightly, relying upon surface collection to examine waste patterns at the chosen site. By counting the individual pieces of smoking related litter at Peck Hall, we are able to discern how the MTSU community uses this location and how the community disposes of its waste at this site.

Figure. 1 Parking Map of Middle Tennessee State University campus, indicating the location of Peck Hall (http://www.mtsu.edu/parking/Map_2011-2012.pdf)



This research project sought to address a number of research questions:

1. How are smokers using the perimeter of Peck Hall?
2. Where is the greatest concentration of cigarette butts?
3. Why do smokers choose to congregate there?
4. What are the effects of the unauthorized smoking receptacle and its subsequent removal?
5. What social patterns can be observed around the perimeter of Peck Hall?

The primary question of focus was, "How are smokers using the perimeter of Peck Hall," but the other questions allowed us to also inquire about how the perimeter of Peck Hall is used by a variety of MTSU community members.

In the fall of 2011, MTSU banned the use of tobacco products, which became effective January 1, 2012 (Gordon 2011). The MTSU community has been enlisted to halt tobacco use while on campus property. MTSU's political body established a program through student health services to help smokers to quit. In spite of the official ban, however, enforcement has been limited, and individuals continue to smoke on campus. At the beginning of the Fall 2012 semester, an unauthorized "butt bin" appeared on the South East side of Peck Hall, a building located on the Western side of campus, housing numerous departments, including humanities and liberal arts. We decided to study this site in regard to said smoking receptacle, which was removed October 3, 2012. This did not stop smokers from continuing to congregate in this southeastern corner. By studying smoking patterns at Peck Hall, this project provides insight into the efficacy of the ban.

Additionally, examining the litter present on the MTSU campus allows archaeology to contribute to the overall campus environment. Understanding why and where community members congregate and the garbage that they leave behind allows for a more targeted approach to campus beautification. Broadly, preeminent garbologist William Rathje has discussed the examination of garbage and the benefits of such studies. Rathje initially conceived garbology. This method was created as a means to understand human waste patterns as another element of the anthropological goal of interpreting human cultural behavior. The research of Rathje and his students was conducted by analyzing fresh garbage from landfills to determine whether or not assumptions about waste disposal were accurate. They overturned many presumed ideas concerning the consumption patterns of the American population. For example, although there is a notion that Styrofoam constitutes 25 to 40% of landfill volume, research done by Rathje's team proved that all polystyrene foam represents no more than 1% of total landfill volume. This work has brought to light new truths regarding American consumption and subsequent waste habits by creating a new methodological approach for modern archaeology. Applying this methodology to the Peck Hall perimeter provides insight into how specific usage patterns contribute to patterns of waste.

The methodology utilized for this project focuses on surface observation as opposed to collection of tobacco-related waste. Instead of counting individual observations in differentiated "piles" of waste, the volume of waste was analyzed. Then, the increase of waste over time was observed by comparing the increase of litter. A grid was formed through the use of mapping, constituting the basis of our methodological approach. Instead of using a typical archaeological grid, we chose to utilize architectural elements for two reasons. First, upon measuring the perimeter of Peck Hall it was established, that once divided in half, the preexisting structure was a prime number – unable to be divided into equal segments past this point. If the four larger quadrants were not divided any further, specific data in association to the location of smokers could not be understood. Second,

as a living population's waste was being observed, it was important to analyze behavior in relation to the architectural elements that organized, and influenced the actions of the "Peck Hall Culture."

SITE BACKGROUND:

Peck Hall, located on the western edge of campus, is a three-story modernist building. It is cube-shaped with a concrete and brick exterior, and its ground floor is an open breezeway. The ground floor is also surrounded by a promenade that many MTSU community members utilize as a break area. This is mostly likely due to the open yet sheltered nature of the exterior facilities at Peck Hall. The exterior ground floor contains a small convenience store, numerous bike racks, vending machines, and seven benches. The interior of the building houses such centers as the Confucius Institute, lab spaces, numerous classrooms, and offices for departments such as Political Science, Archaeology, and History. Our specific site was the exterior ground-floor promenade and the grassy perimeter extending roughly two meters around the building, including an extension to mulch patches and eroded areas.

Days chosen for observation and field study were Tuesday and Thursday from 1-2 PM, starting Tuesday, September 25 and lasting until Tuesday, October 23, excluding October 16 and 18 as they fell during MTSU's annual fall break. While we had an interest in observing the effects of a variety of weather patterns, the weather was mostly sunny, with temperatures ranging from the mid-60s to low 80 degrees Fahrenheit. Therefore, the weather was virtually uniformly conducive to individuals at MTSU for "break periods." As weather patterns such as rain or extreme cold were not observed, this negated our ability to analyze its effect on littering habits. In addition to observing the effect of weather, we felt this time period was sufficient. Although this project was limited as a class assignment, the relatively high number of fieldwork sessions allowed for a fairly longitudinal and systematic study.

Prior to beginning this fieldwork, it was expected that there would be less cigarette waste in the East to South East corner, yet more individuals smoking, as a result of the unauthorized smoking receptacle, or "butt bin" (Fig. 2). It was hypothesized that the cigarette waste present would consist of discarded cigarette butts, cigarette related packaging (cellophane, boxes, and foil inserts), and the occasional chewing tobacco-related products. We assumed that the "butt bin" would be removed at some point, allowing for data collection on the effect of the "butt bin" on cigarette-related litter. This would not have been possible without an extended period of observation. It was also thought that there would be less tobacco-related waste surrounding the rest of the exterior of Peck Hall.

Figure 2. Sample smoking receptacle, or "butt bin."

This is an area primarily used by students as a space for breaks between classes, though faculty and staff are at times present. Additionally, some students use this space for extended periods of time. Socialization, individual, and group study behaviors are examples of activities undertaken during this lengthier period of occupation. With this background knowledge, it was expected that the specific location of these individuals would correlate with waste observed.

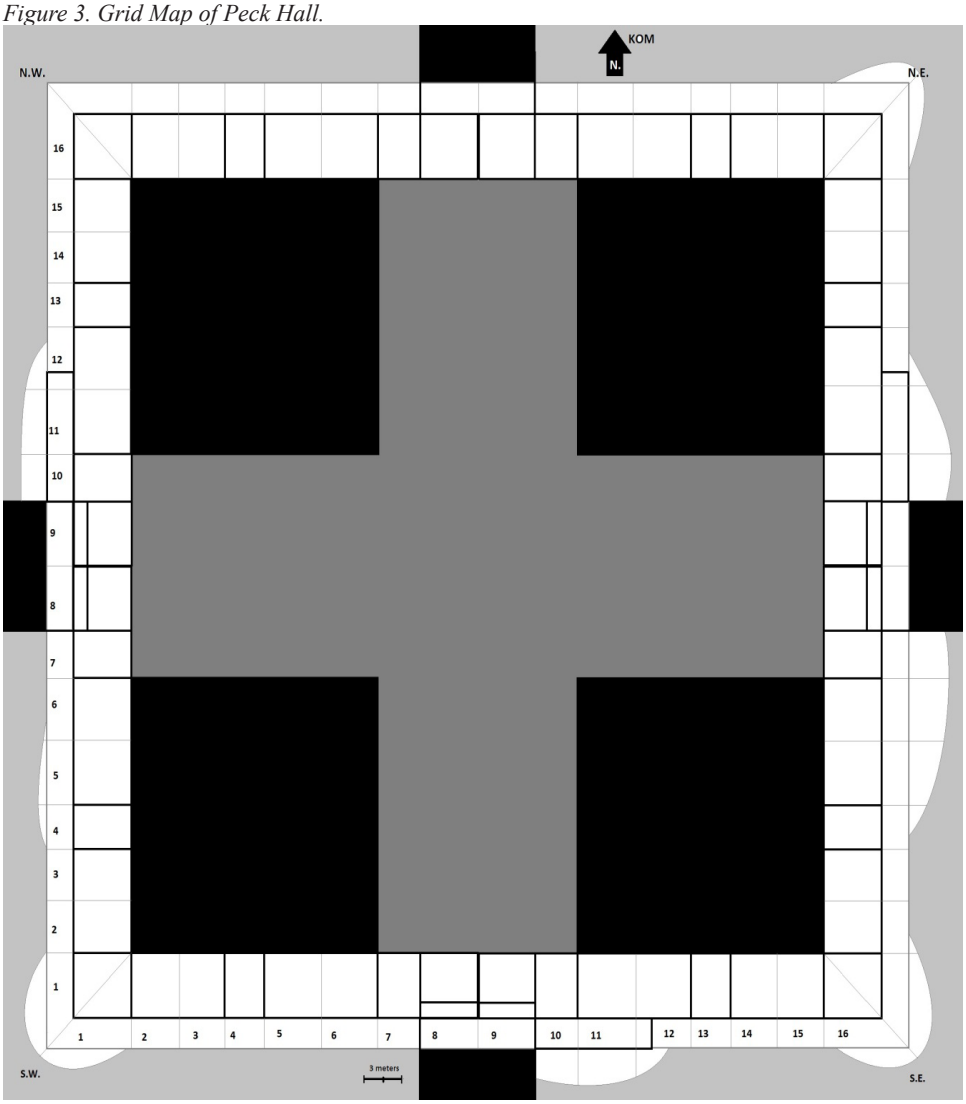
FIELD METHODS:

We began this project with a survey of the area, assessing both the waste present at the site and the appropriate method for laying out a grid on the area of interest. This initial survey of waste revealed high concentrations of cigarette butts and some tobacco packaging. These findings indicated the necessity of bulk counts covering a variety of waste types, including individual cigarette butts. It was also clear that the observation should focus upon a perimeter surrounding the building, rather than a more broad survey extending from the building to the road. We used this as our site primarily because the majority of individuals who utilize Peck Hall as a break area tend to remain close to the building rather than scattering about the grounds. It was necessary to decide between imposing a grid over the area and basing the grid upon the existing architectural features. Originally, we had attempted to establish a grid based on traditional archaeological methods. However, upon measuring the outer perimeter of Peck Hall, each side equaled 62.22 meters. This number, when divided in half, results in 31.11 meters – a prime number. Therefore, it could not be divided into an appropriate grid, consisting of equal increments. If we were to only collect quantified samples in these larger halves or quadrants, the resulting data would not have yielded the focused, patterned information necessitated by the research questions.

With these factors in mind, the decision was made to base the grid upon the preexisting architectural features. This provided the added benefit of being analogous to

the ways in which the building was already used. For instance, we used the gridded pattern already present on the concrete promenade, breaking down these sections by the existence of columns. Users of this area also tend to sit or stand leaning against the columns, adding a level of predetermination to their choice of location. Additionally, concrete lines also bisect these columns; these factors culminated into a preexisting, logical grid for observation, with some modifications.

Figure 3. Grid Map of Peck Hall.



After measuring the architectural "grid" features, it was observed that some sections were substantially larger than other sections. In order to impose a uniform size for the grid quadrants, we divided these larger sections in half. In total, each side of Peck contained

sixteen similarly-sized units. These grid units were then extended approximately two meters into the surrounding grassy area, so that litter discarded from the promenade could be included in the analysis. With the addition of these units, we were left with a total of 32 grid units on each side, for a mass total of 128 grid units. No units were any larger than 4.6 meters.

As can be seen in Figure 4, the white areas represent the area of observation as divided into the units mentioned above. The black and gray areas are shown to gain a spatial understanding of the layout of Peck Hall. The black areas represent the outer walkways, and the four ground floor sections containing various classrooms, labs, offices and the stairways that lead to the building's upper levels. The gray areas represent Peck Hall's inner walkway, and the surrounding grass not used for this study. The white, oblong sections represent the areas extended to encompass the entirety of five mulch patches, one segment of extreme water erosion, and areas surrounding the two "access ramps" not enclosed by said mulch patches. These exceptions to the established grid were maintained in order to include in the analysis all areas affected by heavy littering. The mulch patches are located in the southeast, southwest, west, and east sides of the building. There was extreme water erosion in the northeast corner, in which cigarette butts and other litter were dragged farther from the building en masse. Finally, there were no mulch patches surrounding the access ramps on the south and west sides of the building. However, these ramps were used much like the promenade. Therefore, there was a tendency for litter accumulation surrounding the ramps' exterior.

As there was no penetration of the soil, the basic methodology would be considered surface archaeology. Surface observation and systematic counting were employed as opposed to surface collection. We first attempted to count and classify each type of trash individually. However, as this proved to be unnecessarily detailed, it was decided to undertake bulk counts in order to analyze volume fluctuations from week to week. We started at opposite corners of the site working towards one another, taking counts of individual cigarette waste in each individual unit of the grid. These counts were marked on printouts of Figure 4 to gain a spatial and visual understanding of waste distribution at the site. During these counts, exceptional waste was noted, including writing utensils, newspaper, paper waste related to class work, and the occasional non-toxic medical-related waste (i.e. unused Band-Aids, cold and sinus products). At the beginning of each observation period community members at the site were marked and counted on the map to gain an understanding of the volume of individuals that would be typically present during periods of observation. This count was not comprehensive due to the constant movement of individuals coming and going at the site. Aside from this error, the methods employed were basic and sound for the research questions that we sought to answer. However, with more time, the research could have been expanded to a larger surface area and included gathering of physical samples from the site.

Figure 4. Sample of Tobacco Waste – Newport Pack (weathered).

ANALYSIS OF THE SAMPLE:

Analysis of our data consisted of a bulk count and subsequent analysis of fluctuations within the data collected. This analysis method was employed in order to understand how litter varies around the perimeter of Peck Hall as a result of social dynamics at the site. As such there was a limited classification of the particular types of litter under observation. However, using Rathje's garbage project typology the data collected could be classified based upon the following categories (Rathje 2001: 22):

Table 1. Garbage Item Code List.

Type	Code
CIGARETTES (Butts)	123
CIGARETTES (Pack)	124
PIPE, CHEWING and LOOSE TOBACCO	127

Table 2 is an example of the raw data gathered on our first extensive day of observation (October 2, 2012). The data here comprises cigarette butt counts for both the inner promenade and outer grass units. These quantities are typical of counts gathered on subsequent observation days. Exceptions to this are grass units 2-4 on the east side facing Todd Hall, the units where the smoking receptacle could be found, where cigarette litter was found in higher concentration, after the removal of the smoking receptacle. This survey was completed a week prior to the removal of the butt bin. As is apparent, the grass by and large contained more bulk waste than the concrete promenade units. Higher concentrations can also be noted at the corner units as opposed to the interior units.

Table 2. Cigarette Butt Raw Data – October 2, 2012 – Grass Units.

	North		South	
Units	**Grass**	**Prom.**	**Grass**	**Prom.**
.5 Corner 1	15	0	58	4
2	17	2	37	40
3	11	1	30	3
4	10	1	22	1
5	24	7	32	15
6	21	1	29	2
7	24	1	32	1
Stairs/Walkway 8	1	0	0	0
Stairs/Walkway 9	0	0	0	0
10	32	0	0	0
11	35	5	3	5
12	26	3	58	10
13	20	2	20	5
14	32	3	39	3
15	25	16	0	4
.5 Corner 16	49	5	70	5

East		West	
Grass	**Prom.**	**Grass**	**Prom.**
31	3	36	5
6	7	36	0
22	3	29	1
26	5	16	3
51	12	7	3
47	3	29	6
26	2	29	2
1	0	0	1
0	0	0	0
1	2	1	7
0	2	0	0
21	5	39	1
9	1	13	8
17	2	17	5
2	2	21	1
68	3	53	1

Table 3 represents data collected a week after the removal of the "butt bin" in grass and promenade units contained to the eastern perimeter. When compared with Table 2 above, one can see the substantial increase of smoking waste in units 2-6, which may be attributed to the removal of the unauthorized smoking receptacle. Upon analysis of the surface collection data acquired after this date, these units decrease in the exponential accumulation of waste seen in Table 3. This does not mean that smoking waste does not increase. However, these units begin to follow a similar pattern seen in all other areas with a higher concentration of smoking litter. This brief massive increase could indicate a negative response to the "butt bins" removal by the Peck Hall smoking community.

Table 3. Cigarette Butt Raw Data – East Perimeter Units – October 9, 2012.

Units	Grass	Promenade
.5 Corner 1	56	13
2	75	14
3	62	7
4	68	19
5	62	3
6	111	5
7	65	2
Stairs/Walkway 8	0	1
Stairs/Walkway 9	4	0
10	31	2
11	7	3
12	41	4
13	16	1
14	18	0
15	23	0
.5 Corner 16	92	1

Table 4 is a quantified illustration of data gathered in these corner units. There was a specific focus in these areas because during previous cigarette waste counts, a marked increase in the corner units appeared as opposed to more central units. The "butt bin" had been removed at this point (October 3, 2012), which explains our shift in focus to the eastern perimeter where a significant amount of smoking was observed in Table 6. As can be seen, there is a dramatic increase in cigarette butt waste within the units observed in this location. To contrast this increase, we focused on units which had, in general, a higher occurrence of smoking traffic.

Table 4.Concentration of Corner Units – October 9, 2012.

	North		South		East		West	
Units	***Grass***	***Prom.***	***Grass***	***Prom.***	***Grass***	***Prom.***	***Grass***	***Prom.***
1	20	0	50	1	56	13	52	6
2	19	1	36	43	75	14	40	0
15	48	3	35	6	23	0	28	1
16	47	4	86	11	92	1	53	1

Table 5 lists the final count of cigarette data. This table displays a comparison of all units for the entirety of the site. It is clear that there is a substantial increase over time, when compared to previous charts, within the eastern perimeter units. However, units outside of this provenience also display significant accumulations, although we would not conclusively attribute these concentrations to human activity. Rather, these concentrations may be more indicative of natural factors such as wind and water depositions of waste. Units **s**outh 16, east 1, and east 4-7 are examples of the accumulations that occur within patches of mulch. Once again, we would not necessarily attribute these accumulations to human activity. Rather, the material characteristics of the mulch may result in litter becoming trapped in these areas as they are less likely affected by lawn maintenance (i.e. mowing), and possibly natural causes.

Table 5. Cigarette Butt Raw Data – October 23, 2012 – Grass and Promenade Units.

	North		South	
Units	***Grass***	***Prom.***	***Grass***	***Prom.***
.5 Corner 1	13	0	63	0
2	21	2	33	3
3	9	2	6	3
4	10	1	4	1
5	13	3	12	2
6	17	1	8	3
7	19	0	7	1
Stairs/Walkway 8	0	0	0	0
Stairs/Walkway 9	0	0	0	0
10	34	3	0	0
11	50	2	1	0
12	35	0	13	0
13	42	1	13	0
14	68	1	17	1
15	49	1	25	3
.5 Corner 16	60	4	90	3

East		West	
Grass	***Prom.***	***Grass***	***Prom.***
99	4	60	9
81	5	21	2
113	4	20	4
66	29	14	4
77	7	9	4
93	8	44	2
88	0	8	0
0	2	0	0
2	0	0	0
29	1	7	0
8	1	3	1
30	2	39	4
13	5	14	0
15	3	15	0
10	5	24	1
75	4	45	0

Though a longer observation period would yield a more comprehensive picture of smoking waste at the site, the data gathered during our course of study provides a strong introduction to the waste patterns at the Peck Hall site. The tables clearly illustrate

that cigarette waste continues to be an issue at the site, despite the smoking ban. However, individuals appear to be making some efforts to conceal their behavior or be more courteous, moving away from common walkways (Table 5) and refraining from disposing of butts on the building's promenade (Table 2). Table 3 indicates that the eastern perimeter has become a fairly popular place in which to engage in smoking activities, as can be seen when Table 3 is compared to Table 5, though this remains to be seen over a longer period of time. Additionally, a comparison of Tables 2 and 5 reveal that cigarette butt waste remains fairly constant over the observation period, except along the eastern perimeter. This could indicate that these patterns are fairly stable, though the implications of these data long-term will be discussed further below.

INTERPRETATION OF THE SAMPLE:

The Peck Hall site is a highly-modified environment composed of the large concrete building, minimal landscaping features, sidewalks and a lawn area. The ground immediately surrounding the building has been subject to fairly substantial erosion as a result of weathering and foot traffic. Fieldwork was conducted during the late summer/early fall and conditions at the site were uniformly sunny or partially cloudy and temperate. There was no rain or extreme temperatures during observation periods. This was conducive to high levels of traffic, with MTSU community members using the area for eating, smoking, studying, and socializing. It should be noted that the lawn surrounding Peck Hall is used for tailgating purposes, thus, the area of study is also affected by these events.

The building is occupied year-round, with a decrease in traffic during the months of the summer session. Student, faculty, and staff employ the outer promenade as a break area. Individuals have been observed eating, studying, smoking and socializing at the site. Individuals who are smoking and/or socializing primarily use the grassy perimeter. This area is subject to a high amount of foot traffic, and, as a result of the building's structure, much social interaction occurs along the promenade. For instance, smokers have primarily occupied the southeastern perimeter, since the placement and removal of the unauthorized smoking receptacle. Individuals at this location appeared to exhibit greater levels of socialization, as they communicated while smoking. In contrast, the western half of the north perimeter displays little to no habitation. The individuals observed here were often eating or studying in isolation, most likely as a result of the reduced noise level.

The high concentration of cigarette waste attests to the site's use as a break area. In fact, the disproportionate amount of cigarette-related waste could lead one to believe the area was a designated smoking area. Of course, the tobacco ban hints at the area as a site of rebellion. The previously mentioned western half of the northern perimeter, in its lack of significant waste, could suggest that the area was off-limits, but the lack of a ledge upon which to sit could also explain why individuals choose to congregate there less frequently.

The distribution of waste at the site provides clues about the stratification at work in this social area. The concentration of cigarette waste in some units as opposed to areas such as the northern perimeter, where very few cigarette butts were observed, coupled with

historical knowledge of the social stigmatization of tobacco use, could effectively illustrate the segregation of smokers from non-smokers, and inferences could be drawn about their respective beliefs about one another. Without historical knowledge of the area, it could be inferred that smoking was done by members of mainstream society, as evidenced by the heavy accumulation of tobacco-related waste. However, with historical knowledge of the tobacco ban, the presence of tobacco waste would illustrate the flouting of societal rules by a marginalized community.

The material evidence present is complicated with respect to indicators of wealth at the site. The high concentration of cigarette butts and such waste as the discarded pack of Newport cigarettes (pictured in Figure 6), suggests that tobacco was a common good available to the general populace. However, with historical knowledge of the inflated price of tobacco products, coupled with excavation revealing the area as an educational institution, would suggest that tobacco items were valued over food items (found in smaller concentrations than cigarette waste), and that such inflation, perhaps with the intention of reducing this behavior, did not affect individuals' smoking habits. Analysis of the types of cigarette and food waste present at the site could indicate the levels of wealth and stratification at the site. Additionally, the accumulation of such waste would also suggest that users of this site were not actively involved in the maintenance of their environment. While most of the artifacts deposited at this site would provide few clues about the racial or ethnic composition of the area, miscellaneous items found, such as an adhesive bandage from Japan, could potentially hint at the area having a multicultural occupation. The distribution and types of artifacts can provide clues about the ideologies of this society. The segregation of smokers and non-smokers illustrates the attitude of the society toward this behavior. The evidence that this behavior continued, even when marginalized and banned, suggests a rebellion against dominant societal rules and beliefs, communicating some level of social turmoil. The accumulation of discarded waste at the site provides clues about the society's relationship to their environment, specifically indicating a neglectful approach.

CONCLUSION AND RECOMMENDATIONS:

The perimeter of Peck Hall is a contested and complicated site. In regard to the primary research question ("How are smokers using the perimeter of Peck Hall?"), the data would suggest that smokers are heavily utilizing this area, with these activities being concentrated largely in units east 1-7 with a marked increase over time. This increase could be attributed to the removal of the unauthorized smoking receptacle. There is a gradual increase in all other units, especially in the units with high smoking traffic, but it does not compare to the substantial increase of cigarette waste observed on October 9 and 23 in these units. However, during our first extensive cigarette butt count, the area surrounding the butt bin did not have the greatest concentration. Initially, it was the northeastern corner that had the most substantial cigarette butt waste. This led us to believe that the "butt bin" was having a positive effect in reducing the amount of litter caused by smokers in the area. However, the removal of the smoking receptacle shortly after initial observation leaves us

unprepared to draw conclusions about the impact of said smoking receptacle. Left in place over time, the "butt bin" would have most likely have resulted in a decrease of cigarette related waste throughout the units specified. However, this would not be a feasible solution due to the tobacco ban. Additionally, the presence of a "butt bin" in one localized area has no effect regarding the cigarette waste surrounding the rest of the perimeter of Peck Hall.

Regarding the second research question ("Why do smokers choose to congregate around Peck Hall?"), prior to the Tobacco Ban, individuals at Peck Hall utilized this area as a place to take a smoke break in between classes. With the 2011 tobacco ban, smoking behavior was said to have decreased at the site, though enforcement of the ban has been inconsistent. The researchers have no evidence whether tobacco use decreased, or subsequently increased as a result of rebellious behavior. Yet, with the introduction of an unauthorized smoking receptacle in the southeastern corner, smokers began to congregate in this area primarily. However, upon analysis of the data, it was realized that there was also a heavy concentration of smoking traffic in the northeastern and southwestern corners. This came as a surprise. However, it was understood that the tree coverage at these corners might provide the illusion of privacy, resulting in the more consistent use of these areas for smoking. The southeastern corner also has similar tree coverage, possibly explaining the continued use of this area by smokers after the removal of the butt bin. Alternatively, the placement of the unauthorized smoking receptacle could have been seen as an endorsement of the area as a "designated smoking section" by the smoking population of Peck Hall in spite of the ban, resulting in continued use of the area after the removal of said smoking receptacle.

To further research the site, it would be beneficial to collect and analyze samples from the site. This could provide additional information about the nature of waste at this location, such as what brands are more commonly smoked. The level of decomposition of samples could also indicate how long waste remains at the site. These types of questions could provide more pointed information about social stratification at this site. Surface archaeology could be conducted in conjunction with trash pulls located within the interior breezeway of Peck Hall. Such comparative data would allow for an understanding of what is being thrown away, as opposed to what is being disposed of on the ground.

While tailgating occurs at this site, little material evidence exists to indicate this activity. Thus, material culture at this site suggests weekday use (Monday through Friday), but gives little indication of weekend activities in the observed area (Saturday and Sunday). This is an incomplete picture as tailgating activities are undertaken by a more inclusive segment of the MTSU population. Thus, seeing only weekday litter gives a limited picture of the entirety of "Peck Hall Culture." The tailgating population could be seen as a temporary migrant community in its influence of Peck Hall. The effect of these activities upon the site is limited. Additionally, waste at this site gives little indication of faculty use. However, pulling the interior trash cans could hint at differences in faculty and staff use of the site. Given that there are faculty offices within the interior floods of Peck Hall, there would most likely be a more visible separation of use found within the data left at the site.

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