Colonial conceptions and space in the evolution of a city: evidence from the city of Bloemfontein, 1846-1946

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Mainstream understanding of how the urban form of South African cities developed over the past century and a half is often traced back to the colonial town plan. Writers argue that the gridiron and axial arrangement were the most important ordering devices. For example, in Bloemfontein—one of the smaller colonial capitals in South Africa— it has been suggested that the axial arrangement became an important device to anchor "the generalist structure of the gridiron within the landscape to create a specific sense of place". Over the years, the intentional positioning of institutions contributed to a coherent legibility of the city structure in support of British, Dutch, and later apartheid government socio-political goals. During these eras, it was the colonial conceptions of space that influenced the morphological evolution of the city. This paper suggests that an alternative process guided the expansion of Bloemfontein. Drawing on the theory of natural movement, I suggest that Bloemfontein grew mainly as a result of its spatial configurational properties. Using longitudinal spatial mapping of the city from 1846 - 1946, empirical data from a Space Syntax analysis will be used to construct an argument for the primacy of space as a robust generator of development. The paper offers an alternative interpretation of the interaction between urban morphology and the process of place-making in a South African city.

Keywords: urban form; colonial cities in South Africa; conceptions of space; place-making; Space Syntax; empirical spatial data

Koloniale begrippe van ruimte in die evolusie van 'n stad: bewyslewering vanuit die stad van Bloemfontein, 1846-1946

Die ontwikkeling van die Suid-Afrikaanse stad oor die afgelope eeu en 'n half word verstaan vanuit die oogpunt van die generiese koloniale stadsplan. Skrywers het reeds die belangrikheid van die roosterpatroon en die aksiale planuitleg oortuigend beklemtoon. Bloemfontein, een van die kleiner koloniale hoofstede in Suid-Afrika, word beskryf in terme van hoe die assestelsel die stad anker, deur middle van ". . .the generalist structure of the gridiron within the landscape . . ." en hoe dit verder 'n sin van plek tot gevolg het. Oor die jare het die strategiese plasing van institutionele geboue 'n bydrae gelewer tot die samehang en leesbaarheid van die stadstruktuur, wat verder ook die Britse-, Nederlandse-, en later apartheidsosiaal-politieke doelwitte ondersteun het. Gedurende hierdie eras is die morfologiese evolusie van die stad sterk beïnvloed deur die koloniale begrip van ruimte. Hierdie artikel beskryf 'n alternatiewe proses wat aanleiding gegee het tot die uitbreiding van die stad, Bloemfontein. Deur gebruik te maak van die teorie van natuurlike beweging, stel ek voor dat die stedelike groei hoofsaaklik plaasvind het as gevolg van die eienskappe van ruimtelike ordening. Die argument is geformuleer in terme van ruimte as 'n primêre generator vir stedelike ontwikkeling deur gebruik te maak van historiese stadskaarte vanaf 1846 – 1946 wat geanaliseer is deur middel van "Space Syntax" tegnieke. Die argument in die artikel bied 'n alternatiewe blik op hoe ons die interaksie tussen stedelike morfologie en die maak van plek in terme van die Suid-Afrikaanse stad verstaan.

Sleutelwoorde: stedelike vorm; koloniale stede in Suid-Afrika; begrip van ruimte; maak van plek; Space Syntax; empiriese data

A large body of evidence traces the origins and growth of the colonial city in South Africa to various applications of colonial town planning principles. These principles are believed to shape the spatial reality of South African cities even today. For the Dutch and British colonial powers during the 19th century, the appropriation of space in the interior of Southern Africa was part of a much larger colonial enterprise that reached the far edges of the known world at the time (Betts and Ross 1985).

Theorists have written about the role of colonial town planning in allowing the colonists to imprint intentional power relations in space (Betts and Ross 1985; Floyd 1960; King 1976; Lynch 1981; Mabin 1992; Smith 1992). Others have also considered the spatialisation of power in the apartheid city beginning in the 1950s (Davis 1981; Robinson 1992). Kotzé (1994) suggests that the gridiron plan, with its axial arrangement of streets and the positioning of prominent buildings at the termination of these axes, resulted in a very particular socio-political civility.

Another significant contribution in this area of research was made by Kotzé & Du Preez (2011), who also investigated the development of the city of Bloemfontein[1]. Their research suggests that the colonial town plan served as an important spatial method for anchoring the city gridiron in the surrounding Free State natural landscape. Their analysis focuses especially on the formative years of the settlement. However, contrary to Chapman's (1984) position, it becomes much more difficult to describe settlement growth by means of colonial principles as the city expands beyond the colonial town core.

This paper proposes an alternative understanding of how the colonial city developed. It is not suggested that the idea of city expansion based on colonial design principles should be called into question, but rather that colonial city development theory provides an incomplete account of this process. This paper utilizes a theory that supplements the common understanding of space-making. This alternative theory is able to explain some of the underlying spatial decision-making that led to the ideal city form in the colonial South African hinterland. It is proposed that our understanding of this process is incomplete without taking into account the generative force of the fundamental properties of physical space.

Investigating the development of the colonial plan: the case of Bloemfontein

It is therefore necessary to consider supplementary processes that shape colonial cities. One theory that is useful for understanding changes in urban form is the theory of configurational space (Hillier 1999; Hillier et al. 1993; Hillier 1996a, b; Hillier and Hanson 1984), which proposes that space is a fundamental generator of change in urban form. Using this theory, it is possible to examine how the physical properties of space played a significant role in facilitating the expansion of the colonial city. This spatial perspective thus makes it possible to reassemble a different narrative about how the city plan of Bloemfontein developed.

First, however, it is important to acknowledge the importance of the topography and natural landscape features (hills, streams) which became important reference points for the positioning of the first streets in colonial settlements (Chapman 1984; Kotze 1994; Kotze and Du Preez 2011). During the formative years of the settlements, spaces were experienced, recognised, and conceived in the context of the natural landscape. Connections to these landscape features were critical for the survival of these early settlers: access to and protection of scarce water sources and hills for prospect and defence.

It was only later that the political fantasy of creating a civil (colonial) society in contrast with the harsh reality of the surrounding wilderness resulted in a turn towards a system of architectural legibility. This was achieved by building new landmark buildings in alignment with the axis that had gained prominence in Bloemfontein. Over time, the dominant groups in town were able to realise more powerful socio-political aspirations by reinforcing already prominent spaces within the city with architectural landmarks. In this way, architecture enhanced the [spatial] legibility of the city.

Theorising space in the construction of meaningful place

To test these ideas, I employ the *theory of natural movement* developed originally by Bill Hillier at University College London (Hillier 1996a, b; Hillier and Hanson 1984). This theory suggests that the city grows, first and foremost, as a result of the spatial configuration of the city grid. A significant feature of Hillier's theory of space is that aspects of cultural and social life follow the imbedded logic of spatial relationships. What his theories may suggest in terms of the colonial city is that the dominant socio-political claim on public space will tend to occur in the more prominent spaces within the city. The idea that integrated spaces, or most highly traversed spaces in a system of spaces, are more likely to become the physical embodiments of colonial power in Bloemfontein. This idea is explored in this paper and supported by evidence from an analysis of Bloemfontein. The exploration is intended to be suggestive, although the single case study research design limits generalisability and the propositions remain hypothetical.

In syntactical terms, spaces are more important when they are more integrated into the overall (global) spatial pattern of the city. Highly integrated spaces are more likely to attract more human movement and therefore achieve prominence due to their centrality within a system of spaces. Multiple research studies have provided strong evidence supporting this connection between spatial configuration and movement (Hillier 1999; Hillier et al. 1993; Hillier 1996a). A highly integrated space can be easily reached from anywhere in the city by traversing the fewest number of other spaces en route. Using the concept of integration means that the significance of one space (a street) is viewed in relation to all other streets in a city, rather than as a space in isolation (Bafna 2003; Hillier 1996a).

The quality, prominence, and meaning of civic places are due to street design and architecture that reinforce the imbedded potential of space. Any single space is always in reference to the overall spatial pattern of the city; therefore, as the overall layout of the city changes, so does the potential for some places to become less prominent and other places to become more prominent. This process is critical in determining how colonial ideals become realised, strengthened, or erased over time.

Method of investigation

For this investigation, I employed space syntax analysis techniques. The syntactical map is a version of the city street pattern that shows city streets as straight lines, interconnected at every change in direction. The maps were drawn in AutoCAD and then imported into an open-source software program called Space Syntax 2D, produced and developed at the University of Michigan. This program calculates the *integration* of every city street in relation to all other streets. The streets in Bloemfontein were categorized according to their level of integration with the city grid: from highly integrated (thicker black lines) to streets with low integration (thinner gray lines). Finally, GIS (Geographic Information Systems) was used to calculate how the location and the completion dates of landmarks correspond to changes in the city plan over time.

The integration pattern of every city is different due to differences in the density of the street network patterns. Typical for South African cities, the streets in Bloemfontein have low integration values, as most street spaces are fairly segregated from the other street spaces in the city. The exceptions are the Bloemfontein Central Business District (CBD) and corridors leading into/out of the city from the CBD. The streets in the CBD are highly integrated and have become more integrated over time, though they account for only 12.5% (or $1/7^{th}$) of all the city streets (see Figure 1and Figure 2).

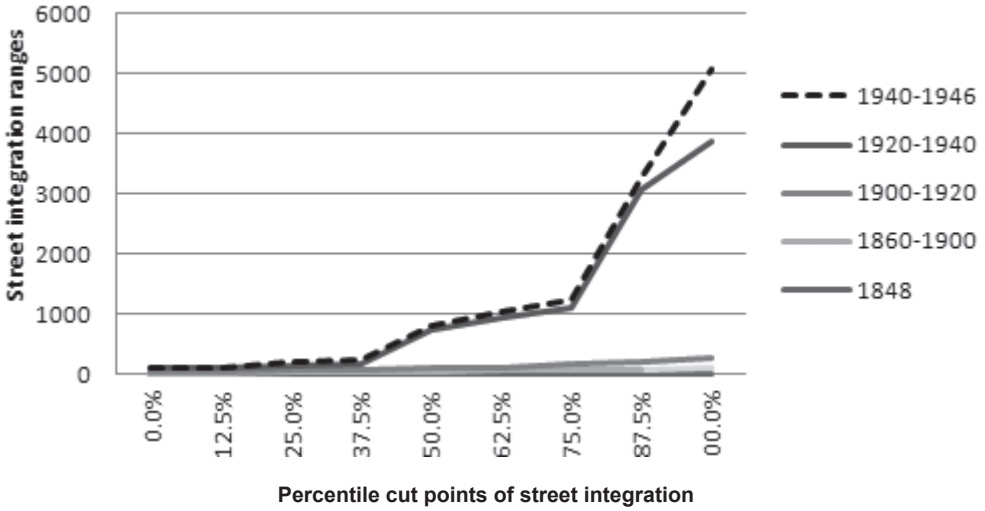

Figure 1
Street integration over time at percentile cut points

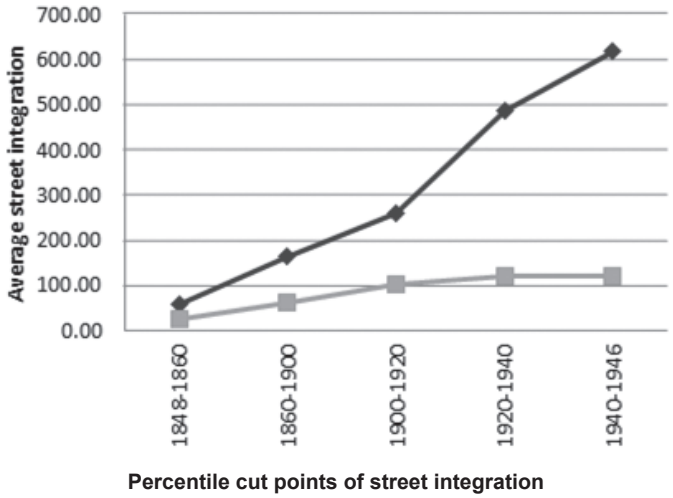

Figure 2
Comparison of the average street integration of streets in the top percentile cut points (12.5% of streets) with all the other streets in the city.

To focus the investigation, the study period from 1846 – 1946 was chosen in order to correspond with the detailed descriptions of the historical development of the city in Karel Schoeman's 1984 book "Bloemfontein: Die Ontstaan van 'n Stad 1846-1946". To date, Schoeman's book is the most comprehensive historical survey of the development of the city of Bloemfontein. The selection of date-specific maps covering different stages in the development of the city plan was dependent on the availability of historical documentation of the city plans. The historical maps that were chosen correspond to significant growth periods of the city grid. For the purpose of this study, viewing the Bloemfontein city plan in 20 year increments seemed to capture significant changes in the gridiron pattern and the building stock.

The production of colonial city space, 1846-1946

1846 – 1860

Captain H.D. Warden was ordered by the British Government in 1842 to look for a suitable site for a settlement in a central location from which the English could govern the Transgariep area (today called the Free State). He identified a site which was ". . . suitable in every respect,

and in a military point of view superior. . .” (Schoeman 1980:3) due to the hills that provided opportunities for surveillance of the area. Called “Bloem Fontein”, the site was located amongst the best farms in the area, had a sustained water source, and was situated within a mile from the high road to Winburg (Schoeman 1980).

Warden was eager to move his regiment to the area. By March 1846, Warden, his family, and his troops had already established themselves in the area. At first, Warden and his family temporarily moved into the house of farmer Brits. The troops and horses were positioned downstream from the fountain (“Fontein”), possibly to prevent contamination of the water source. Brits himself helped to extend a canal eastward to provide the camp with fresh water (Schoeman 1980).

The first street (later called St George’s Street) [4] extended eastward along the canal that connected Warden’s house [1] with the military camp. The street was nestled between the canal (“spruit”) to the north and a slight hill (“dolorietrant”) to the south (Schoeman 1980:3). The first few buildings in Bloemfontein were constructed along this dirt road. A fort named after Charles Drury [2] was erected on the hill above the fountain to protect this scarce resource. In 1849, the Fort was moved to its current location [3] guarding the southern entrance into the town (see Figure 3) (Schoeman 1980).

Within two years of Warden and his troops occupying the area, the town was already laid out by the surveyor Andrew Bain (see town plan in Figure 3). The town plan reinforced the connection between Warden’s house and the camp with another street parallel to St. George’s Street on the north of the spruit, connected with a few perpendicular streets crossing the canal. In addition to Fort Drury, a few other buildings were erected such as the First Parliament Building (“Raadsaal”) [5], the first Catholic Cathedral (1849) [6], the first Anglican Cathedral (1850) [7], a lodge, hotel, printing press, and general stores (Schoeman 1980).

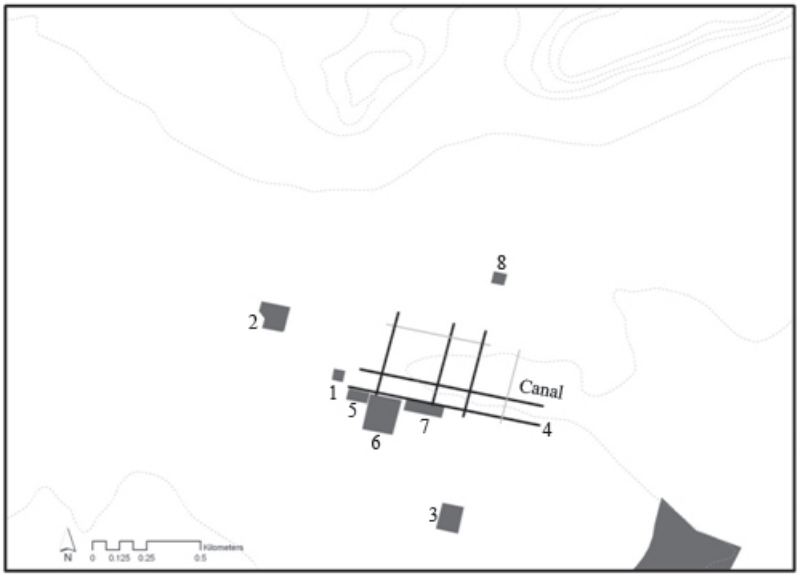

Figure 3
Bloemfontein, beginning years from 1846.

On the northern side of the canal, the British administration reserved a site on the flat plain for a Dutch Reformed Church to be built [8]. In 1852, a simple T-plan building was erected, with plenty of room around the church for the Boer families to leave their wagons when they came to town for the Sunday church service. By 1854, the Dutch Reformed church building, although

still incomplete at the time, became the most visible and imposing architectural structure in town. Dr. Fraser wrote in 1849 that: "*Bloemfontein is fast growing into a town, and will be a very pretty place*" (Schoeman 1980:12). Within two years of Bain's plan being laid out, people referred to it as a "*rapidly increasing English town*" (Schoeman 1980:12).

But the optimism was short lived. As early as the beginning 1850s, Britain became unwilling to incur further costs by having armed forces permanently settled in the area. This, combined with Warden's inability to secure the area from plunder and the Colonial-Basotho Wars, fueled the decision to withdraw their troops. The administrative responsibilities for the town were handed over to temporary Boer governance in 1854 and formalised in 1856 with J.J. Hoffmann as the first president of the new Republic. As a result, more and more Dutch residents were attracted to the area. Despite the speed at which the settlement developed in its first few years, during the 1850s it remained a rather small, modest place with houses distributed relatively far apart. Interestingly, the local newspaper called The Friend described the settlement as ". . . *a miserable collection of hovels*" (Schoeman 1980:21).

1860 – 1900

Bloemfontein remained a quiet town until the 1870 discovery of diamonds in the Free State. Despite great resistance from the Free State Republic, the British government acquired the diamond fields. Nonetheless, the town of Bloemfontein made a convincing case that the best transportation routes to the diamond fields were through Bloemfontein. As a result, greater numbers of English-speaking residents started to move to the town (Schoeman 1980).

These factors triggered the second growth period. Schoeman (1980) describes the town during the mid-1870s as concentrated around the Market Square on the northern side of the canal, while St Andrews Street developed westward in the direction of the former Fort Drury. With more people moving into the area, the important places in town became more intensely used. New public and private buildings began to fill in the town plan and defined more usable public space.

Figure 4
Bloemfontein plan from 1848-1860 and additional institutional development, 1860-1890.

The creation of public spaces and the higher complexity of street use also resulted in new opportunities for public place-making. The syntactical map of the town plan at that time shows Maitland Street as one of the most highly integrated streets, which reinforced its spatial prominence. It is not surprising that in the mid-1870s, the Municipality decided that the site at the western end of Maitland Street was the most appropriate to locate new Government Buildings [9]. As Schoeman writes, they described the prominence of this site and envisioned erecting a building whose tower would be in the centre of Maitland Street, framed by the buildings that connected the site to the market square. This important public space was conceived as a moment of civility in the landscape, a public place in its own right (Schoeman 1980:67-68). In the 1890s, Maitland Street was formally bookended by the erection of the Bloemfontein train station [10] at the east end of the axis. The train station acted like a new front door, feeding the town with an influx of new residents. The arrival of foreigners to the town and increasing population growth between 1870 and 1904 changed the character of the place to become the centre of Free State civility (Krige 1991).

The early decision to locate the Dutch Reformed church on the outskirts of town would eventually redirect the socio-political atmosphere of the town during the 1880s (Schoeman 1980:67). In the 1870s, an imposing building that became known as the Twin Tower Church replaced the old structure. In a town with primarily single story buildings, the church was a prominent landmark, overshadowing the other churches located in the protected area between the hills to the south of the city and the canal. For many years, the Dutch Reformed church was the first visual landmark that travelers from the south encountered upon their arrival (see Figure 5) (Schoeman 1980).

Figure 5
View north down Church Street towards the Twin Tower Church, 1892 (Schoeman 1980).

The residents of the English quarter on St George's Street tried to maintain a foothold in the socio-political scene of the town by building churches and schools along this axis (see Figure 7). After the Anglo-Boer War, the Anglican congregation built a new tower [11] designed by Herbert Baker at the end of Wes Burger Street to take advantage of this privileged location (compare Figure 4 and Figure 7). Wes Burger Street had been highly integrated since Bains' initial town plan, which may have been the reason behind this architectural gesture to reorient the socio-political legibility of the town back towards the south. However, the syntactical analysis suggests that this attempt came too late. From the 1880s onward, Wes Burger Street became less syntactically integrated. By 1906 the town plan had already changed, and the Anglican Church tower remained on the margins of the development in the Bloemfontein Central Business District. (See Figure 7) (Schoeman 1980).

Figure 6
Tower of the Anglican Church designed by Herbert Baker, 1906 (Schoeman 1980).

In contrast, the part of town north of the canal at first consisted primarily of private establishments, but gained institutional presence after the 1880s. Churches expanded their architectural presence in the town, and schools, hospitals, stores, banks, a City House, recreational facilities (Rambler's Club), the Bloemfontein Club, and further expansion of the town street pattern followed suit (Schoeman 1980).

New opportunities now existed for the occupation of highly trafficked areas on the southern axis of Hoffmann Square (St Andrews Street) and the area around Charles and Henry Streets (see Figure 7). These opportunities were capitalized on through the institutionalization of the northern part of the city over the next few years. Public buildings and spaces such as Baumann Square [12] and Warden Square (1881) [13], the Fourth Raadsaal (1893) [14], the Executor's Office [15], City Hall (1883) [16], Rambler's Club (1898) [17], and the Oranje Hospital (1883) ([18] in Figure 8), followed the east-west and north-south spike in street integration. The City Library (1905) [13a] was also later completed on the eastern side of Warden Square. The integration map of 1880 to 1900 indicates that the highly integrated cross streets that formed a spatial central place of the town had shifted north-westwards from where the town centre had been a half century earlier. A larger Presidential residence was completed in 1885 on the site where Brits' (later Wardens') original house was located (see Figure 3[1]). This significant building would later play an important role in the establishment of President Brand Street as a major public space in the town (Schoeman 1980).

Figure 7
Bloemfontein, 1880-1900.

1900 – 1920

After the Anglo-Boer War, most of the building projects occurred on the northern side of the canal. The integration plan was concentrated by the addition of Peet and Selborne Avenues running along the edges of the newly channeled Bloem Spruit (see Figure 9). The city core was further intensified by the expansion of the city grid in all major directions, a decision made during the Anglo Boer War and implemented immediately thereafter. This expansion became effective in locating larger land uses such as Grey College [19] and the University of the Orange Free State [20] in 1906, and a military camp at Tempe [21] used by the British during the Anglo-Boer War (see Figure 9).

18. Oranje Hospital
19. Grey College
20. University of the Orange Free State
21. Tempe Military Camp

Figure 8
Bloemfontein, 1900-1920 (larger scale).

The town plan from before the Anglo-Boer War shows St Andrews Street as one of the few highly integrated streets in the town (Figure 7). It is therefore not surprising that this axis became particularly important in the westward expansion of the city towards Grey College and the University of the Free State. Interestingly, although St Andrews Street was critical in this expansion, its spatial prominence diminished slightly as a result.

With the Fourth Parliament building to the north and the President's residence to the south on President Brand Street, a new connection across the channel was established by building a bridge in 1906 (see Figure 9). This opened up another axis of opportunity for institutionalization that came to life with the formation of the Union of South Africa in 1910. The city of Bloemfontein was formally selected as the judicial capital of South Africa, a decision that was aligned with the completion of the High Court in 1909 [22] and the Appeals Court in 1910 [23]. The National Museum (1911) [24] was appropriately conceived around these highly integrated streets but in close proximity to the city squares rather than being located on President Brand Street. This then strengthened the judicial prominence of President Brand Street (Schoeman 1980).

22.High Court.
23. Appeals Court.
24. The National Museum

Figure 9
Bloemfontein, 1900-1920.

25. Fire Station.
26. City Hall.
27. Trinity Methodist Church.

Figure 10
Bloemfontein, 1920-1946.

1920 – 1940

This area of town was further intensified after the 1920s with the addition of the Fire Station (1933) [25], City Hall (1936) [26], and Trinity Methodist Church (1929) [27] (Figure 10). Schoeman writes that visitors during the 1930s remarked that "[i]t is very doubtful indeed whether there is a single city in South Africa that has more fine and impressive buildings than President Brand Street" (Schoeman 1980:255) (see Figure 11).

Figure 11
Looking north on President Brand Street, 1930 (Schoeman 1980).

1920 – 1946

The outward expansion of Bloemfontein after the 1940s stemmed from the need for more residential areas and consequently intensified the spatial integration of the central city street grid. The diagram below show the ratios of public buildings located on the most integrated streets compared to public buildings on the rest of the streets in the city over different points in time.

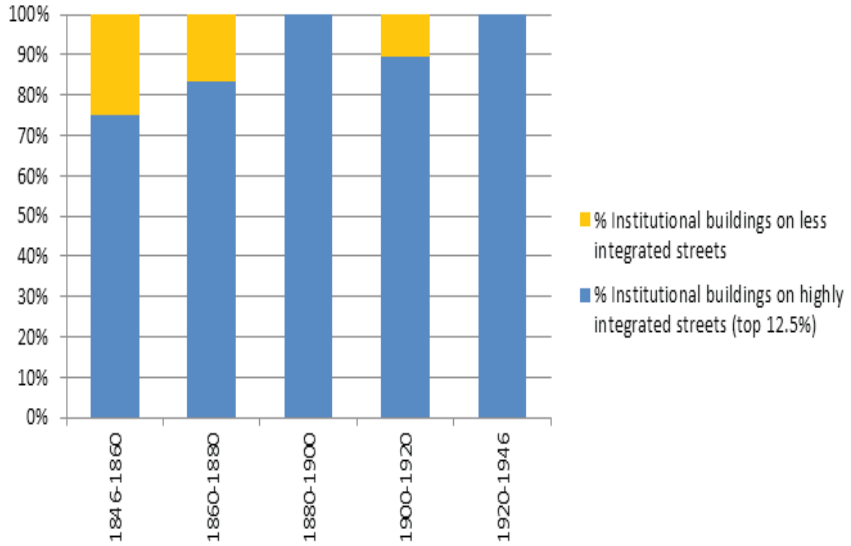

Figure 12
Institutional buildings, public use buildings, and integration of streets over time.

Three observations are important (see Figure 12). First, more than 70% of the public buildings (which include institutional buildings) have always been located on streets that are the most integrated in the city (top 12.5%). Second, over time more buildings were constructed on the

streets that were the most highly integrated, increasing the overall ratio of public buildings on integrated streets. Third, once the city reached optimal occupation with all the prominent sites being occupied, i.e. the time right after the Anglo-Boer War (1880-1900), the need for further city expansion was prompted. After street expansion, the integration of the overall (global) street system changed, and new sites became available on integrated streets (1900-1920), only to become occupied again over time (1920-1946) (Figure 12).

This also means that prominent buildings located on formerly highly integrated streets that experienced diminished prominence due to prior town expansions became reintegrated into the town plan as a consequence of this outward growth. This secured the lasting significance of government and secular institutions in the city core (refer to Figure 12 and compare the most integrated streets in Figure 10 with the most integrated streets in Figure 13).

An interesting observation from the 1940s map is that Zastron Street [28] and Nelson Mandela Avenue [29] (formerly called Voortrekker Street) have already become prominent streets in the overall city plan (see Figure 13). These corridors would later become the main thoroughfares of Bloemfontein and sparked the significant commercial expansion of the CBD in a westerly direction. The space, with its significance dating back to the 1940s, have since grown into the main commercial area that one sees today, which includes two indoor shopping malls, two outdoor strip malls, hotels and guest houses, the main entrance of the University of the Free State, large businesses, regional headquarters of several banks, law firms, fast food restaurants, petrol garages, and various other uses.

28. Zastron Street.
29. Nelson Mandela Avenue.

Figure 13
Bloemfontein, 1920-1946.

Conclusion

This project investigates how the objectively measured spatial characteristics of the colonial city plan facilitated the socio-political decision-making process of the city of Bloemfontein between 1846 and 1946. This period was characterised by successive colonial development phases (Floyd 1960) and is described in-depth in the book by Karel Schoeman. The findings suggest that spatial characteristics are enmeshed with the political decision-making process. The colonists sensitively responded to their surrounding spatial landscape and developed their settlements with architectural features that bolstered their power by constantly reinforcing the city's coherence and legibility.

It is generally thought that the colonial linkages and historical architectural pieces that make Bloemfontein legible are the result of carefully calculated principles of colonial town design. However, this paper argues for an alternative interpretation of this process. Drawing on the theory of natural movement, it suggests that the fundamental spatial logic of the most basic town layouts exposes citizens to future opportunities for place-making which they use to construct successive development phases of the town plan. It is suggested that the theory of natural movement provides a possible avenue for understanding why certain morphological changes occur over the lifespan of a colonial settlement. The implications of understanding why morphological changes occur and how acts of place-making become enmeshed with settlement-development are far reaching. It provides us with a way of knowing why effective places exist, and affords insight into how to maintain the vibrancy of places, and where to anticipate opportunity for future places.

Another aspect of this paper explores how the spatial characteristics of the town plan facilitated the construction and shifting of prominent urban places through British and Dutch socio-political decision-making processes. The study traces the evolution of the city in terms of how different sectors of the city have enjoyed less or more investment and reinvestment over time. It is through the habitual experience of the environment that residents start to realize the potential prominence of sites. However, it is those in power that are able to realize the potential of space through architectural means that support their goals. Ordinary citizens, on the other hand, become subjected to these physical expressions of ideology communicated through the experience place. Finally, this paper also provides urban designers and planners with quantitative-historical evidence of how spatial processes can affect socio-political decision-making and the development of towns and cities. The analysis suggests that spatial processes play a significant role in how systematic inequities develop over time, highlighting the importance of space when considering equitable future restructuring and city growth.

Notes

1 This research built on the analysis of Robertson by Chapman, R. (1984)

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