

## **Chapter 3**

# **Gerard Rushton, Central Place Theory and Me: The Influence of a Geographic Visionary on One of His Students**

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### **3.1 The Predoctoral Stage: My Experience as Gerard Rushton's Student and Research Assistant**

I was Dr. Gerard Rushton's first doctoral advisee at the University of Iowa, although he had advised several doctoral students at McMaster University and Michigan State University before his return to his doctoral alma mater. I was also lucky to take a class in intermediate economic geography from him as an undergraduate student at Iowa, and to see first-hand how he presented complex ideas in location theory, especially central place theory.

I nevertheless was uncertain about what aspect of central place theory I should pursue when I was trying to formulate a defensible dissertation proposal. After reading so much of the extant central place theory literature, I began to hypothesize that the underlying organizing principles of Walter Christaller and August Lösch were quite different. Perhaps real world central place systems were a hybrid amalgam of the hierarchical principle of Christaller [1] and the area-serving principle of Lösch [2]. But how was I going to test that hypothesis?

My breakthrough lay in the applied literature of rural sociology, especially the work of Edward Hassinger [3] at the

University of Wisconsin at Madison. He explored the use of Guttman scaling to delineate a hierarchy of central place functions in a manner different from that of Berry and Garrison's duplication ratio method [4]-[6]. I decided to expand on Hassinger's method in my doctoral research.

### **3.2 Rushton's Influence on My Doctoral Research**

I thought that Guttman scaling could not only be used to delimit hierarchical marginal goods in a central place system. I thought it also could be used to differentiate goods that did not conform to hierarchical principles of Walter Christaller [1] from those that conformed more to the area-serving principles discussed by August Lösch [2]. Another graduate student in the Department of Geography helped me to write computer code that would allow Guttman scaling to be applied to much larger matrices of places and their functional content than was then possible with available statistical programs [7] [8].

Rushton however posed a new research question that started me on a six-month intensive research effort. Namely, is the order of exit of goods out of a central place system the mirror image of the order of entry into that same commercial economy? What was needed to provide the answer were longitudinal data. So, my dissertation suddenly involved a lot of time spent in the Iowa State Historical Society's archive of old city directories and telephone directories. I recorded at two-year intervals for a decade the entries and exits of every store, and the goods they carried, in a seven-county area centered on Des Moines for about fifty places that ranged in size from tiny hamlets to Des Moines itself.

### **3.3 Integrating Classical Location Theory with Advances in Behavioral Geography**

The state of Iowa has always been the classic central place testing ground since the environment is relatively uniform, there are few barriers to movement, and the main *raison d'être* of most settlements is to provide a surrounding rural farm and non-farm population with goods and services [9] [10]. However, my attempt to model dynamic entrepreneurial response that would parallel and complement Rushton's contributions to an understanding of consumer spatial behavior was not as successful as either of us would have liked. I simply could not demonstrate that order of exit was the mirror image of order of entry based on threshold level of economic support.

Although I could not successfully integrate the interaction between consumer and entrepreneur, I obtained my doctoral degree [11] and published results of my preference structure delimitation of market areas in textbook chapters [12, 13]. The method I had used to identify hierarchical marginal goods appeared in an article that I jointly published [14].

### **3.4 An Extension and a New Collaboration: Central Place Principles in Archaeology**

I shifted away from central place theory research when I took a teaching position at the University of Tennessee in 1971. I was, however, pleased one day in 1973 when my department head brought to my attention an article that applied central place theory to Classic Era (approximately 600 AD to 900 AD) settlements in the Maya lowland of present-day Mexico, Guatemala, Belize and Honduras [15].

I was intrigued for two reasons, as (1) finally another discipline was borrowing location theory from geography rather than the other way around; and (2) the application appeared wrongheaded. The settlements supposedly conformed to the geometric principles of a hexagonal lattice in an extremely uneven environment with major hills, sink holes and other karst features. Even spacing of settlements in such an undulating environment, in my opinion, denied rather than supported central place principles, and indicated that other factors such as defensive or religious/ceremonial considerations were at work in settlement location.

Some of my archaeological applications of location modeling owe much to Dr. Karl Butzer, as he had amassed the best data available on Egyptian settlement patterns along the Nile and its tributaries during the time of the Ramessid pharaohs (1300-1100 BC). He had a graduate student, Ms. Barbara Kaufmann, working on analysis of these data for her Master's thesis. He had read some of my contributions to the archaeological literature with my new collaborator at the University of Tennessee, Dr. Richard ('Rick') L. Church [16] [17].

### **3.5 Central Place Theory: The Transition from Archaeological Applications to Location-Allocation Modeling**

Rick and I gladly helped Barbara with her Egyptian settlement research by suggesting she test the hypothesis that political control of the populace was very centralized under the Ramessid pharaohs. The pharaohs' administrative centers for governing their 23 political districts called nomes seemed to have been very efficiently located. To test a hypothesis of bureaucratic efficiency, a maximal covering solution was

developed that allocated the 128 unearthed settlements among the 22 nome capitals.

That efficient solution was then compared with (1) the solution actually used by the pharaohs; and (2) solutions in which 23 settlements are simply drawn at random 5,000 times from among the 128 choices in order to generate a frequency distribution of random solutions. The pharaohs' solution was much closer to the optimal one than to any measure of central tendency generated by the random selections [18] [19].

### **3.6 The Serendipity of Complementarity: Central Places Thirty Years On**

The most important influence in my life and on my more recent research has been my wife, Dr. Margaret M. Gripshover, who would describe herself as a cultural/historical geographer. One research effort that we undertook together was to examine the retail changes within the central places that I had examined for my dissertation thirty years earlier. I told her I actually had not visited them for my dissertation, relying instead on data derived from city directories and telephone directories. She was appalled, and insisted that we actually go to those same places in central Iowa and observe what had happened to their commercial structures.

Our examination was informed by the results of consumer spatial behavior findings we had completed as investigators on a grant funded by the US Environmental Protection Agency [20] [21]. Despite the rise of the big-box retailers, the urge to shop at locally owned stores for ethical and other reasons appears to be stronger than ever [22]. Sometimes labeled as neolocalism, this desire is manifest in such disparate ways as local food movements and resurgence

of farmers' markets and craft breweries, in conjunction with avoidance of corporate chain operations [23].

### **3.7 Conclusion: An Only Superficial Parting of the Ways**

Rushton's subsequent research from my perspective may have focused more on health geography and the application of GIS-based technologies for identifying disease clusters and the optimal locations of treatment clinics. My recent research, on the other hand, has focused more on aspects of American popular culture, especially rock music capitalizing on my undergraduate major and minor in the humanities (history major and minor in English literature) and my son's experience with the music industry as a musician in both unsuccessful and successful bands. I even invited my graphic artist daughter into some of my music research [24]. In the end, however, I always tried to emulate Rushton's practical dicta in my seemingly disparate research topics: 1) I read and consumed voraciously the bodies of literature pertaining to any new research subject or application area; 2) I sought an identifiable spatial perspective to all research questions; and 3) I always speculated about how the subject of attention might be produced, consumed or distributed in a more geographically efficient, equitable and/or sustainable manner.

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