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Article abstract

One reason that classical central place theory has relevance to past patterns and places is that it assumes that consumers make single purpose shopping trips with invariant frequency. An alternative theoretical model incorporating multi-purpose trips is offered, which yields an expected structure of markets and places. Findings are corroborated by the post-office markets of the eastern part of Grey County, Ontario, in the late-nineteenth century. The results suggest that the decline of small places in Ontario was well-established before the advent of the automobile.

Theory and Observation: A Perspective on Consumer Trip Behaviour and the Decline of the Ontario Hamlet

Darrell A. Norris

Résumé/Abstract

La théorie classique de la localité centrale s'applique aux comportements et aux localités d'autrefois, notamment pour la raison suivante: elle postule que les consommateurs font leurs achats d'une manière ponctuelle et à une fréquence qui ne varie guère. Mais l'auteur présente un autre modèle, théorique celui-là, comportant des déplacements à des fins multiples et définissant un réseau prévisible de marchés et de localités. Ses conclusions sont corroborées par l'étude des marchés résultant de la présence de bureaux de poste dans l'est du comté ontarien de Grey à la fin du XIX^e siècle. Les résultats portent à croire que les petites localités ontariennes avaient déjà amorcé leur déclin avant l'apparition de l'automobile.

One reason that classical central place theory has relevance to past patterns and places is that it assumes that consumers make single purpose shopping trips with invariant frequency. An alternative theoretical model incorporating multi-purpose trips is offered, which yields an expected structure of markets and places. Findings are corroborated by the post-office markets of the eastern part of Grey County, Ontario, in the late-nineteenth century. The results suggest that the decline of small places in Ontario was well-established before the advent of the automobile.

The market lattices derived by Christaller and, later, Lösch have encouraged many attempts to discover systematic elements of structure and spatial arrangement in real world patterns of central places.¹ Such attempts have yielded mixed results. Often, key central place precepts (for example, a hierarchy of places which accommodates criteria of size and spacing) have been merely imposed on the obstinate irregularity of reality, past and present.² It is not generally known that, although central place theory is concerned with the optimum spatial arrangement of consumer markets and firms, it does not, strictly speaking, explain the existence of places.³ It is well-known that certain assumptions intrinsic to the theory are not met under real world conditions. These assumptions include a spatially uniform distribution of income, transport costs which are a linear function of distance between any two points in space, consumers who are completely informed cost-minimizers, and firms which are indistinguishable in terms other than their location, the good sold, and its price.⁴ Because reality does not offer so perfect a laboratory, it is tempting to conclude that the square peg of classical theory merely lacks a suitable environment in which its essential soundness can be demonstrated.

There are, however, two implicit assumptions in the theory which further undermine its relevance to real world conditions. The first assumption is that consumers make shopping trips which are exclusively single purpose. The second is that consumers buy each good at some constant periodicity regardless of the amount purchased or the distance travelled. These two assumptions are necessary to

sustain two familiar features of the theory, which are minimum distance (i.e., cost) travel by consumers, and declining consumer demand for a good with increasing distance (i.e., cost) from a point at which it is sold. Without these two features, the hexagonal market lattice associated with a single good could not be deduced. Classical central place theory is not relevant to an environment in which consumers make multi-purpose trips, and vary their trip frequency depending on their accessibility to goods and services. Just as it is not relevant to the *raison d'être* of a modern shopping mall, classical theory is equally inappropriate to an understanding of the forces underlying nineteenth-century small-town main-street business districts. This paper offers a behaviourally more realistic basis for the existence of central places and the formation of their tributary markets. A theoretical framework is established, and its implications are assessed in the light of the structure of places and markets in part of Southern Ontario in the late-nineteenth century. Findings are compared with those of other scholars who have approached the question of central place evolution and decline in the late-nineteenth and early-twentieth century.

Since *circa* 1880, the settlement landscape of rural Southern Ontario has undergone a profound transformation. The landscape is a fractured mosaic of settlement, its missing pieces a host of hamlets and villages, its faded elements a legion of towns shorn of past commercial and institutional functions. Accounts of this transformation have leaned heavily on four explanatory factors: the rise of

modern industry and systems of distribution; the advent of the automobile; population redistribution; and the introduction of rural mail delivery.⁵ The largely early twentieth-century cast of this quartet of factors suggests that the stagnation, decline or demise of Ontario's hamlets and villages was, in consequence, also generally confined to the first three decades of this century. This paper offers a corrective lens to this view. It argues that the decline of small places in Ontario was a predictable and observable phenomenon in the closing decades of the nineteenth century, owing to the competitive advantage of towns as locales for multi-purpose tripping.

CONSUMER BEHAVIOUR AND BUSINESS LOCATION: A THEORETICAL FRAMEWORK

The following argument is treated more fully and in formal terms elsewhere.⁶ This paper adheres to a simplified outline of the theory. First, a theoretical measure of the benefit to the consumer of multi-purpose tripping is outlined. Second, the paper demonstrates how, in theory, the retail businessman should locate, given optimum trip behaviour by his potential customers. The expected norms of locational behaviour by businessmen explain the existence of central places with particular structural characteristics. The expected norms of trip behaviour by consumers yield markets which are related to the attraction of places as shopping destinations. The evolution of places and markets is shown to depend on the locational behaviour of firms entering the system.

Consumer Behaviour

Let us pre-suppose an Ontario farm household which has a set of needs which it must satisfy by making trips to obtain goods and services from business. What are these needs? If it is *circa* 1890, our farmer will undoubtedly wish to visit the post office to send and collect mail and, probably, pick up his weekly newspaper. The post office is often in or next to the general store, where the family obtains a variety of goods it cannot (or chooses not to) produce.⁷ Wear and tear on the horses, vehicles, and implements required to run the farm are occasions for visiting the blacksmith, wagon-maker, implement agent, harness-maker, and veterinarian. Repairs and improvements to the property require visits to the saw mill, the odd job for the carpenter, painter, plasterer or mason, the occasional item from the sash and door factory. Clothing needs are periodically satisfied by specialists (the shoemaker, tailor or milliner) or by store-bought factory-made goods. There is a host of other shopping needs which the household conceives and acts on: some are commonplace; others (a sewing machine, a watch, a piano) may be a lifetime purchase.

Our first insight, then, is that the household satisfies its needs for retail goods and services in a periodic and

complex fashion. Second, it is obvious that these needs are constrained by disposable household income and by the local availability of particular goods, both of which change with local agricultural development and increasing access to external markets. Third, it is clear that the cost of obtaining goods jointly reflects how often and how far the farmer travels to obtain them. Fourth, it is evident that the farmer has some control over the frequency with which he obtains certain goods; he can exercise this control by adjusting the quantity he buys on each trip. Fifth, the exact advantage of the goods being available at the same place is clearly the travel savings made whenever the two goods are bought during the same trip. Sixth, in the long run these travel savings are substantial when two or more goods or services are often patronized (for example the post office and general store) but negligible if a good or service is rarely needed (for example a confectioner or photographer). Seventh, the farmer who is not within easy reach of a full range of goods and services can adjust to the cost of travel not by buying less (a fundamental proposition of central place theory), but rather by buying less often, making larger purchases, and by combining purchases in multi-purpose trips.

The key problem in applying these insights to the analysis of consumer behaviour in the past lies in estimating the purchase frequencies associated with all goods and services. We can neither interview the dead, nor rely on the scattered and atypical testimony of diarists as evidence of trip and consumption habits. We can, however, estimate that the dispersal of businesses offering particular kinds of goods reflected in some way the frequency with which these goods were obtained. We define the relative dispersal of a business function as the number of places in which it is found, relative to the number of places occupied by the most common business function in an area. The relative dispersal of the "jth" business function is

$$F_j = \frac{I_j}{I.1} \quad (j = 1, 2, 3 \dots n) \quad (F_j \geq 1.0) \quad (1)$$

which can be measured for the incidence of every business function from the most ($I_j = 1$) to the least ($I_j = n$) common function. We assume that the relative purchase frequency associated with each good or service is approximated by F_j if the effect of distance is not considered. Because, however, we assume that customers buy less often as the trip distance required increases, actual purchase frequencies will be less than they would be if customers were located immediately next to the store. If we assume that the acceptable travel cost to obtain a good is identical for all customers regardless of the distance they travel, then relative purchase frequency declines with distance from the store according to the expression

$$\frac{F_j}{D_{ix}} \quad (2)$$

for increments of distance, D , between the customer, x , and the store location, i .

If the customer makes multi-purpose trips, a place containing several types of business is measurably attractive to him, for the travel cost of obtaining the whole range of goods available at the place is no greater than the cost of obtaining the good required most often. Formally, this attraction is equal to the sum of the relative purchase frequencies of the goods available at that place, defined as

$$W^{il} = \sum_{j=1}^n I_{ij}F_j \quad (3)$$

for a consumer located at place i , seeking the good l , given that place i does ($I_{ij}=1$) or does not ($I_{ij}=0$) contain elements of the set l through n business activities offering goods bought as often as or less often than l . For the potential customer, x , living at some distance, D_{ix} from place i , its attraction is

$$W_x^{il} = \frac{W^{il}}{D_{ix}} \quad (4)$$

which means that place attraction declines with increasing distance, and that if a customer chooses the most attractive destination among a set of alternatives, a distant place offering a variety of goods may be preferred to a nearby place furnishing a narrow range of goods. Thus the pattern of market areas associated with a particular business activity should in theory exhibit wide differences in market size depending on differences in the relative attraction of places (Figure 1). Moreover, market areas should expand or contract depending on the changing relative attraction of places (Figure 1). Indeed, it is entirely possible that a market area will contract to the point at which a business activity can no longer be supported by local demand. The measure of attraction described above has much in common with Reilly's law of retail gravitation in so far as market areas are thought to depend on the pulling power of places.⁸

Business Location

The business location decision can be summarized more briefly than the norms of consumer behaviour. First, it is always to a businessman's advantage to choose a location which offers goods required more frequently than the good he sells. By doing otherwise he would lose business to competitors at other locations offering the advantage of multi-purpose tripping. The only businessmen with a relatively free locational choice are those engaged in the most common business activity. In effect, these businesses create places. The less common the activity (that is to say the lower its associated purchase frequency), the less open is the locational choice available to businessmen engaged in that activity. In an environment governed by multi-purpose trip behaviour, every place should contain a complete array of business activities terminating in the least common activity which has chosen to locate there. The en-

try of a new business activity in a place is conditional upon the presence of all activities whose occurrence is more widespread.

This rule of business location corresponds to what is termed order of entry in a Christaller network of central places. In Christaller, however, these complete and consecutive arrays of business activities are deduced from the market required to sustain the "highest order" good. Also, the resultant network of places is a hierarchy such that places of the same order offer exactly the same array of goods and services. In Christaller, the possibility of a size continuum from the smallest place to the largest is explicitly excluded. The Lösch network, on the other hand, incorporates a size continuum but violates the order of entry principle; all sorts of odd combinations of business activities are possible.⁹ What we would wish of Ontario businessmen in the late-nineteenth century is some concept of rational locational behaviour which yields places of all sizes while it retains the characteristic additive combinations of business activities (i.e., post office → general store → blacksmith → ...) which subtly distinguish the hamlet, village, and town.

A second feature of the business location decision is that it may be to the advantage of the prospective businessman to choose a location already occupied by a competitor. This is because of the dramatic differences in the size of tributary markets owing to multi-purpose tripping (Figure 1). A portion of a pre-existing market may exceed the whole of any alternative market the businessman could command. Two or more businesses of the same type in the same place was a common-place event in nineteenth-century Ontario, particularly among frequently encountered activities such as the general store or blacksmith. This phenomenon is normally explained in terms of the additional demand created by the resident population of the place itself, for classical central place theory precludes such duplication of business establishments. The surplus demand created by less than a couple of dozen households in an Ontario village was in most instances hopelessly inadequate to support the second or third general store, blacksmith, or other business enterprise. Some differentiation of market areas would, however, account for the phenomenon.

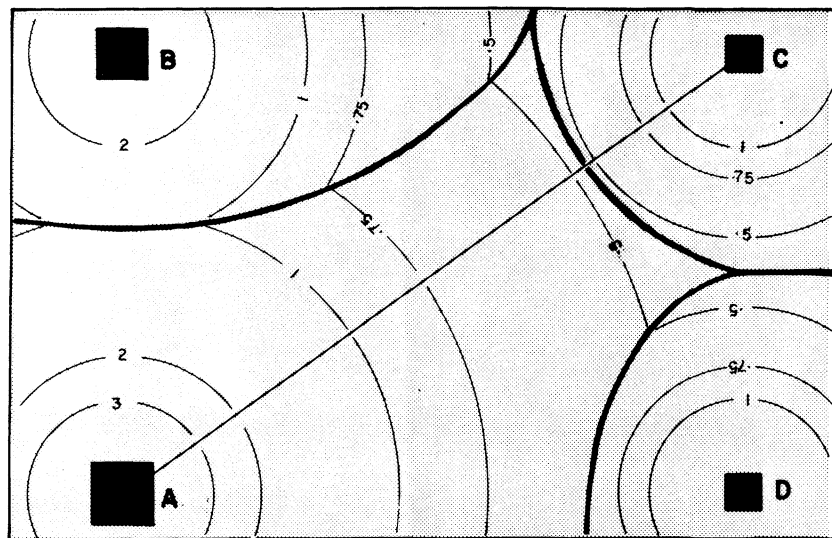
MARKETS AND PLACES IN EASTERN GREY, 1887 AND 1898

If the ideas outlined above correspond to the behaviour of late-nineteenth-century Ontario consumers and businessmen, we would expect to encounter wide variation in the size of consumermarkets, and should be able to associate this variation with the attraction of places. Also, changes in attraction should induce changes in tributary markets.

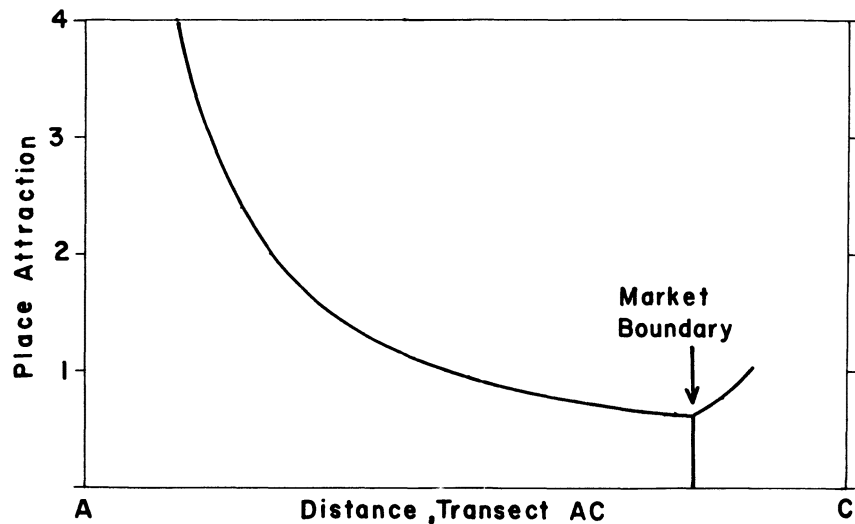
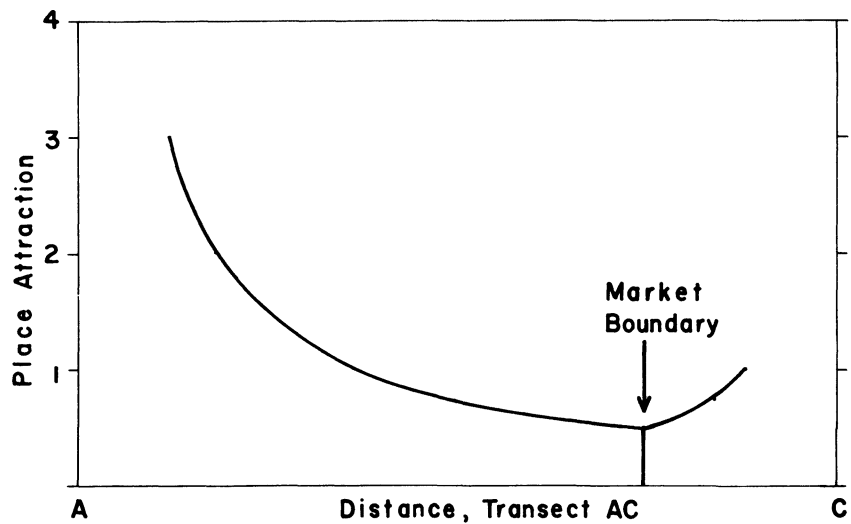
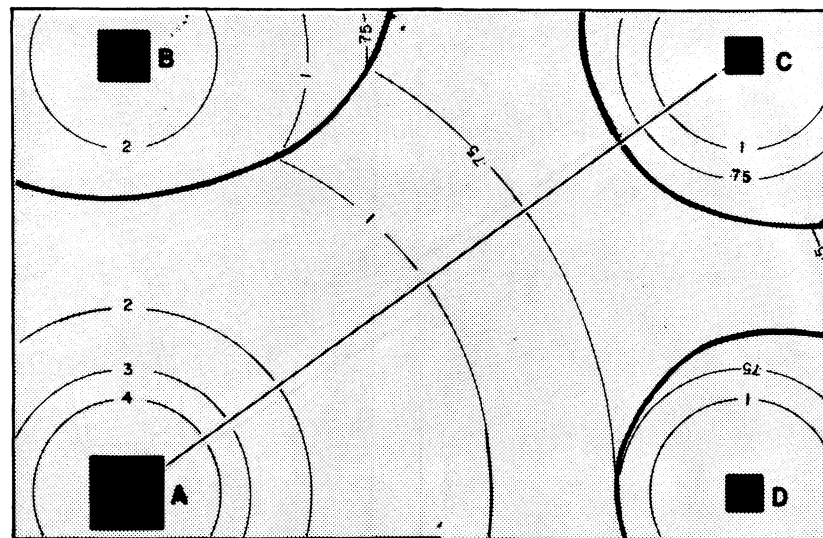
Extensive and complete information on Canadian nine-

FIGURE 1. MARKET DIVISION AND PLACE ATTRACTION: PATTERN AND CHANGE.

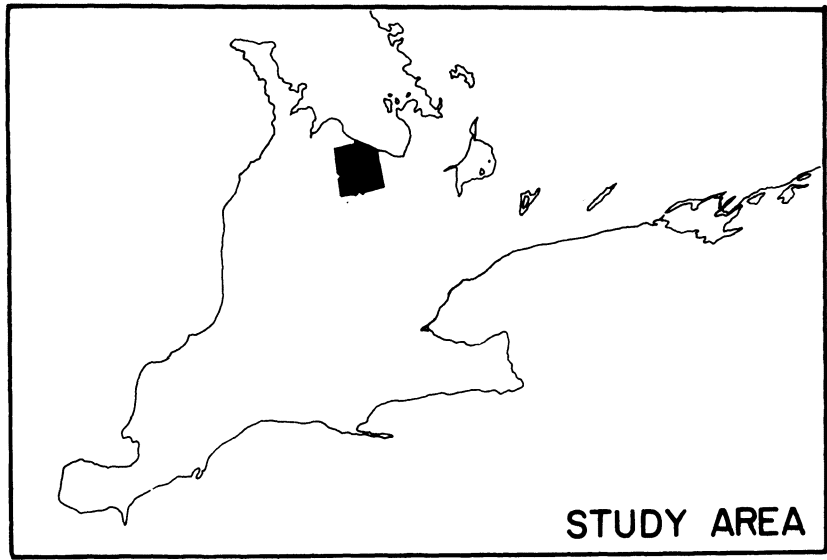
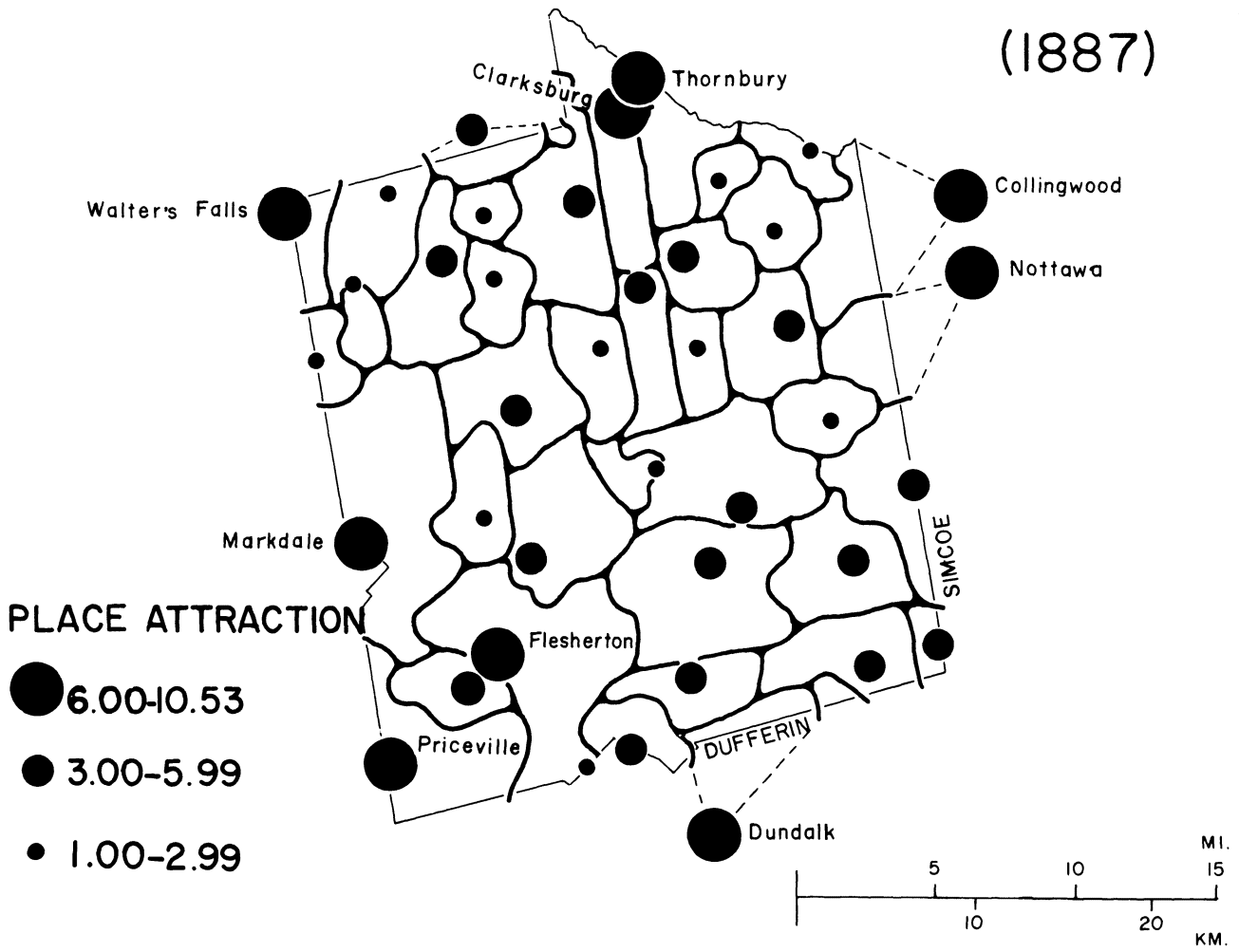
I. Markets delimited by points of equal attraction



II. Centre A gains business activities and extends its market.



MAP 2. POST OFFICE MARKETS AND PLACES, EASTERN GREY. (1887)



SOURCE: Farmers' and Business Directory for the Counties of Grey, Ontario and Simcoe, 1887 (Ingersoll)

teenth-century consumer markets is limited to the catchment area of post offices.¹⁰ In the era before the introduction of rural mail delivery in 1908, each Ontario household selected a post office at which it collected its mail. This postal address was recorded in municipal assessment rolls and made its way thence to most county directories¹¹ and to some county atlases.¹² Both these published sources can be used to reconstruct the limits of post office markets (Maps 1 and 2). The *Halton County Atlas* illustrates two features of these markets: they were reasonably well-defined, and they were definitely not proximate. In Southern Trafalgar, some farmers were definitely travelling further than absolutely necessary to collect their mail: note the territorial reach of Oakville, the largest centre in the township (Map 1). County directories permit a measure of both the territory and consumer demand contained by each post office market. Demand can be estimated as the number of resident taxpayers who had selected that post office, essentially a measure of the number of its tributary households. By mapping county directory evidence, the limits of each market can usually be defined to an accuracy of farm parcels of up to 81 hectares (200 acres). A distinct pattern of market areas over a wide area can be reconstructed (Map 2).¹³ The market boundaries shown lie within four townships of Grey County: Euphrasia, Collingwood, Osprey and Artemesia. These four townships were served by 40 post offices in 1887, all but two of which were at places containing additional businesses. A few isolated mills aside, there were no other documented business locations in this area.

Markets and Place Attraction

As in Halton County, post office markets in Eastern Grey County differed markedly in territorial extent (Map 2). It is also clear from the map that the most attractive places serving Eastern Grey, those with the greatest variety of business activities,¹⁴ commanded the largest tributary markets. This association is confirmed by a linear regression model of the form

$$M_{il} = a + b w^{il} \quad (5)$$

in which M_{il} is the number of households patronizing the post office at place i , and W^{il} is the attraction of place i from definition (3) above. The best-fit regression equation for 36 places¹⁵ serving Eastern Grey in 1887 is

$$M_{il_c} = -6.16 + 25.19 W^{il} \quad (6)$$

with a coefficient of determination, R^2 , of .6492, which indicates a strong dependence of market size on place attraction.¹⁶

Market Change and Place Evolution

The pattern of markets shown in Map 2 had gradually

evolved since the beginnings of settlement in Eastern Grey in the 1840s.¹⁷ The earliest post office villages were the largest towns serving the area four decades later. Their post office markets could, therefore, be regarded as the outcome of the initial advantage which typically accrues to the first dominant centres serving a region.¹⁸ In terms of the theory outlined above, this initial advantage favours large centres during the most rapid developmental phase of a pattern of places, as new business activities must choose from those few centres with a complete range of business activities.

Market change is also influenced by the strength of consumer inertia as a factor in trip behaviour. In the case of the post office, consumer inertia is potentially a strong factor, because any change in address risks inconvenience and confusion. Consumer inertia should benefit those places established earliest, for these stand to gain most from the effect of cumulative customer habit.

Finally, the structure of markets and places must, in practice, be influenced by imperfections of knowledge and behaviour among consumers and businessmen. For example, imperfect locational behaviour and attrition by death or retirement among businessmen are reflected in departures from complete business arrays. An incomplete array diminishes the attraction of a place as a focus of multi-purpose tripping, because customers must make special trips elsewhere to obtain the missing good(s) or service(s).

The strength of these additional factors is estimated by a multiple regression model of the form

$$M_{il} = a + b w^{il} + 62A^i + 63C^{il} \quad (7)$$

in which A^i is the age in years of the post office,¹⁹ and C^{il} is the degree to which the business array of place i matches a complete array conforming to the order of entry principle.²⁰ Applied to Eastern Grey in 1887 and 1898,²¹ the model yields the following best-fit equations. All variables included are significant at the 99.9 confidence level (by an F test). Values of β indicate the relative contribution of the coefficient on each independent variable in explaining the variance in the dependent variable, market size

$$(1887) \quad M_{il_c} = -211.16 + 24.88w^{il} + 1.96A^i + 1.88C^{il} \quad (8)$$

$$(R^2 = .8140) \\ \beta \quad b1 = .68, b2 = .28, b3 = .22$$

$$(1898) \quad M_{il_c} = -37.74 + 38.86W^{il} + 1.19A^i \quad (9)$$

$$(R^2 = .8919) \\ \beta \quad b1 = .83, b2 = .18$$

The above results suggest that initial advantage and consumer inertia (both an expected function of the age of pla-

ces) were indeed a contributory factor in the structure of markets. The relative strength of this factor declined, however, in the decade preceding 1898. Differences in array completeness were, as expected, associated with market allegiance in 1887, but were not a significant explanatory factor by 1898. The role of place attraction, however, strengthened, as did the predictive strength of the best-fit model. Three types of change had occurred between 1887 and 1898: seven new post office hamlets had been created to serve areas with poor access to existing centres; markets had expanded or contracted to conform to the relative attraction of the places serving them; places had grown or declined depending on the sustaining power of their tributary market. Together, these changes yielded a pattern of places and markets which corresponded very closely to the theoretical norm.

The Decline of Small Places: The Case of the Blacksmith

The Eastern Grey evidence suggests that three factors contributed to the decline of small Ontario places in the quarter century preceding the First World War. The first was the generally depressed economic climate in the early 1890s – businesses were prone to failure. The second factor was that even when business conditions improved, new establishments preferred safe locations, that is places where business arrays were complete or nearly so. Villages and hamlets suffered in consequence: blacksmiths were apt to avoid places lacking a general store; other businesses would not enter if no blacksmith was present; and so on. In the towns serving Eastern Grey, because there were usually two or more enterprises in each of the most common business activities, a full range of goods and services was maintained despite sporadic business failures. The towns consequently retained their attraction. The third factor was that the contraction or expansion of tributary markets meant that some places ceased to be suitable locations for new businesses, whereas other places added to their complement of business concerns. Blacksmiths are a case in point.

In 1887 there were 54 blacksmiths serving Eastern Grey. They occupied 29 of 36 places. Eleven years later 48 blacksmiths occupied 27 of 47 available locations. Although the number of post offices reached its historical maximum around the turn of the century, these new places typically failed to attract storekeepers or craftsmen. In 1887 there were only 2 isolated post offices in the study area; by 1910 there were 14. Why were these places passed over in favour of larger centres, despite their accessibility to consumers?

Assume that in 1898 the pattern of post office markets is fixed, and that Eastern Grey can sustain 48 blacksmiths, who take turns in choosing a place of business. Assume further that each blacksmith picks the largest

market share available when it is his turn to choose. He can either share a market with one or more blacksmiths who have made an earlier choice, or he can choose a new location in one of the vacant post office hamlets. At any time during the sequence a post office market lacking a blacksmith patronizes the most attractive location which has already been selected. It turns out that our last blacksmith in 1898 can obtain a market of 94 households, a figure equalled or exceeded by only 22 of 47 post office markets in the study area. In contrast, 26 of 36 available markets would, under these conditions, have been a suitable location for a blacksmith in 1887. It appears that, until the 1880s, there was considerable incentive for business to disperse to obtain maximum profits; thereafter it made increasing sense to concentrate, and share the large markets dominated by towns, which were securing and extending their hold on the surrounding countryside.

OTHER PERSPECTIVES

The authors who have addressed the problem of central place development in late-nineteenth-century Ontario have not employed information concerning market structure.²² Thus the dependence of market size on place attraction has escaped attention. Marshall, whose research embraced Grey and Bruce Counties, could find no clear evidence of hierarchical structure in their central places in 1896.²⁶ Dahms, who has focused on the area surrounding Guelph, has accounted for the contraction of Guelph's central place system almost exclusively in terms of twentieth-century change.²⁴ Spelt's account of urban competition in late-nineteenth-century Central Ontario rests heavily on the development of the railway and on the competitive edge of large-scale manufacturing after 1880.²⁵

The primary role of the post office and its tributary market appears to have been confined to the period between *circa* 1850 and the First World War.²⁶ Richtik has used postal income evidence to document the changing status of early centres in Western Canada, where it appears that the structure of places in the 1880s and 1890s may have resembled the conditions described above.²⁷ Before the Depression, it is possible to trace the decline and demise of small places throughout Canada with reference to postal income data.²⁸ As yet, however, this has not been attempted.

The transition which occurred in Eastern Grey during the 1890s may well have happened earlier in other parts of Southern Ontario. Grey was settled late by Southern Ontario standards, and most of the county fell short of the commercial agriculture practised elsewhere in Ontario by the early 1880s. Crafts and small-scale mills remained characteristic of places in Eastern Grey, whereas in the Guelph area in 1891 the saw or grist mill and the carriage or wagon-maker were fading elements of central place structure, owing to external competition and the increas-

TABLE I

Common Business Activities, Inferred Purchase Frequencies and Attraction of Places:
Guelph Area, 1891; Eastern Grey County, 1887.

GUELPH AREA				EASTERN GREY			
RANK ACTIVITY	PLACES FOUND	PURCHASE FREQUENCY	ATTRACTION AS P.O. CHOICE	ACTIVITY	PLACES FOUND	PURCHASE FREQUENCY	ATTRACTION AS P.O. CHOICE
(j)	($\sum I_{ij}$)	(F_j)	(F_j cum.)	(j)	($\sum I_{ij}$)	(F_j)	(F_j cum.)
1 Post Office	58	1.00	1.00	Post Office	40	1.00	1.00
2 Gen. Store	42	.71	1.71	Gen. Store ¹	32	.80	1.80
3 Blacksmith	41	.69	2.40	Blacksmith	29	.73	2.53
4 Hotel	28	.47	2.87	Saw mill	23	.58	3.11
5 Shoemaker	26	.44	3.31	Hotel	21	.52	3.63
6 Saw mill	17	.29	3.60	Carriage-maker ²	19	.48	4.11
7 Butcher	15	.25	3.85	Shoemaker	18	.45	4.56
8 Grist mill	14	.24	4.09	Grist mill	16	.40	4.96
9 Grocer	14	.24	4.33	Implements ³	13	.33	5.29
10 Harness-maker	13	.22	4.55	Harness-maker	10	.25	5.54

NOTES: 1. including grocers: terms often used interchangeably in directories
2. including wagon-makers
3. including both agents and craftsmen

SOURCES: F.A. Dahms, "The Changing Functions of Villages and Hamlets in Wellington County, 1881-1971," *Urban History Review*, Vol. 8, No. 3 (February 1980), p.11; and D.A. Norris, "Business Location and Consumer Behaviour, 1882-1910, Eastern Grey County, Ontario," Ph.D. Thesis (McMaster University, 1976), pp.56-75.

ing scale of individual enterprises (Table I). Comparative studies of the structure of markets and places elsewhere in nineteenth-century Canada are needed to evaluate the results presented in this paper.

SUMMARY

Classical central place theory is an insufficient paradigm of real world past patterns of consumer behaviour and business location. A theoretical framework based on multi-purpose tripping accommodates several features of real world markets and places which are at odds with classical theory. These include differences in the size of markets offering the same good or service, a size continuum of places which nonetheless follows the order of entry principle, and the duplication of enterprises offering the same good in one place. Whereas classical central place lattices are static, the framework presented above illuminates the growth and decline of places and markets as a continuous consequence of the business location decision and resultant shifts in consumer travel behaviour. The his-

torical evidence suggests that the trend underlying this continuous change was the entrenchment of Ontario towns as shopping destinations and a corresponding decline of hamlets and villages in the late-nineteenth century. Other writers have disregarded the structure of markets, thereby overlooking a key factor in the decline of small places. The broad shift of rural allegiance from small places to towns has other implications which are beyond the scope of this paper. It probably affected, perhaps reflected, the evolution of social networks within rural settings. We know little about the morphology of this social landscape, but a fine-grained, inward-looking cellular mesh based on worship, association, acquaintance, kinship and marriage could hardly have escaped the effects of quite dramatic shifts in rural travel patterns and of the weakening of rural places. In short, during the generation preceding the First World War, rural dwellers in Eastern Grey refashioned their urban landscape by extending the limits of their regular spatial contacts. The automobile was not a prerequisite for this transformation.

NOTES

1. W. Christaller, *Die zentralen Orte in Sueddeutschland* (Jena: Fischer, 1933), translated by C.W. Baskin as *Central Places in Southern Germany* (Englewood Cliffs, N.J.: Prentice-Hall Inc., 1966); A. Lösch, *Die räumliche Ordnung der Wirtschaft...* (Jena: Fischer, 1943), translated by W.H. Woglom as *The Economics of Location* (New Haven: Yale University Press, 1954). The most spirited attack on classical central place theory has been mounted by James E. Vance, *The Merchant's World: The Geography of Wholesaling* (Englewood Cliffs, N.J.: Prentice Hall Inc., 1970).
2. See, for example, J.U. Marshall, *The Location of Service Towns* (Toronto: University of Toronto Press, Department of Geography, Research Publications No. 3, 1969).
3. M.J. Webber, *Impact of Uncertainty on Location* (Cambridge: M.I.T. Press, 1972), p.27.
4. *Ibid.*, p.23.
5. J. Spelt, *Urban Development in South-Central Ontario* (Toronto: McClelland and Stewart, 1972), p. 182.
6. Darrell A. Norris, "Business Location and Consumer Behaviour, 1882-1910, Eastern Grey County, Ontario." Ph.D. Thesis (McMaster University, 1976), pp.56-75.
7. The transition from household manufacture of necessities to almost total consumer dependence on store goods is as yet not well understood. See: R.M. Tryon, *Household Manufacturers in the United States* (Chicago: University of Chicago, 1917); Brian S. Osborne, "Trading on a Frontier: The Function of Peddlers, Markets and Fairs in Nineteenth-Century Ontario," in D.H. Akenson, ed., *Canadian Papers in Rural History*, Volume II (Gananoque, Ontario: Langdale Press, 1980), pp.59-81; Leonard W. Brinkman, "Home Manufactures as an Indication of an Emerging Subculture, 1840-1870," *West Georgia College Studies in the Social Sciences*, Vol. 12 (June, 1973), pp.50-58.
8. W.J. Reilly, *The Law of Retail Gravitation* (New York, 1931).
9. T.L. Bell, S.B. Lieber, and G. Rushton, "Clustering of Services in Central Places," *Annals, The Association of American Geographers*, Vol. 64 (1974), pp.214-25.
10. However, the Ontario Agricultural Commission of 1881 reported on townships' access to markets for agricultural produce. These markets, too, were larger around larger places.
11. Ontario county directories published in the 1860s did not as a rule include postal addresses. After 1880 the practice was universal. The Ontario Archives holds an extensive microfilmed collection of these directories.
12. Betty May, *County Atlases of Canada: A Descriptive Catalogue* (Ottawa: Public Archives of Canada, National Map Collection, 1970). County atlases in which postal addresses were mapped include those for Halton, Haldimand, and Elgin (1877), Middlesex (1878), Perth, Norfolk, Muskoka, and Parry Sound (1879).
13. *Farmers' and Business Directory for the Counties of Grey, Ontario, and Simcoe, 1887* (Ingersoll, Ontario: Union Publishing Co., 1887).
14. Because only the largest centres (e.g. Collingwood) possessed some activities, these activities scored very low incidence values ($\times .025$ for a 40 place set), and contributed relatively little to the overall attraction value. Thus, attraction, as measured here, is very different from Davies' centrality index, which assigns high scores to rare functions. See W.K.D. Davies "Centrality and the Central Place Hierarchy," *Urban Studies*, Vol. 4 (1967), pp.61-76.
15. One post office, Proton Station, had just opened in 1887 and had no attributed market. Three other centres served parts of Dufferin County, for which no market data were available.
16. Readers might question the use of regression models in this context on the grounds that markets and place attraction are *interdependent*. From the theory outlined in the first part of this paper, however, it is arguable that market change *depends on* the locational behaviour of incoming businessmen. Market size can therefore be legitimately viewed as a dependent variable.
17. J. Lynch, "Report on the State of Agriculture etc., in the County of Grey, 1853," *Journal and Transactions of the Board of Agriculture of Upper Canada*, Vol. I (1856), pp.364-78; E.L. Marsh, *A History of the County of Grey* (Owen Sound: Fleming Publishing Co., 1931).
18. Edward J. Ullman, "Regional Development and the Geography of Concentration," *Papers and Proceedings, The Regional Science Association*, Vol. 4 (1957), pp.179-98).
19. Obtained from F. Campbell, "Canada Post Offices 1755-1895," unpublished paper (1958), corroborated by the Annual Report of

- the Postmaster General in the *Sessional Papers* of the Parliament of Canada.
20. Norris, "Business Location and Consumer Behaviour," pp. 89-90.
 21. *Farmers' and Business Directory for the Counties of Bruce, Grey and Simcoe, with Ashfield, Wawanosh West and Melancthon Townships* (Toronto: Morrey, 1898).
 22. J. U. Marshall, "Central Places in the Queen's Bush," M.A. Thesis (Minnesota, 1965); F. A. Dahms: "Some Quantitative Approaches to the Study of Central Places in the Guelph Area, 1851-1970," *Urban History Review*, No. 2-75 (October 1975), pp. 9-30; and, by the same author, "The Changing Functions of Villages and Hamlets in Wellington County, 1881-1971," *Urban History Review*, Vol. 8, No. 3 (February 1980), pp. 3-19.
 23. Marshall, "Central Places in the Queen's Bush," p. 132.
 24. Dahms, "Central Places in the Guelph Area," pp. 19-20.
 25. Spelt, *Urban Development in South Central Ontario*, pp. 177-90.
 26. C. Schott, *Landnahme und Kolonization in Canada am Beispiel Sudontarios* (Kiel: Schmidt and Klaunig, 1936) was among the first to recognize the transition from grist mill to post office as the principal nucleus of settlement after the mid-nineteenth century.
 27. J. Richtik, "Manitoba Service Centres in the Early Settlement Period," *Journal of the Minnesota Academy of Sciences*, Vol. 34 (1967), pp. 17-21.
 28. Published in the *Canada Sessional Papers*. Post office income, however, is not a perfect surrogate of the local market served, because greater *intensity* of external communication is characteristic of the larger centres in a region.