

English Economists' Descriptive Accounts of Location Theory*

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Introduction

The spatial aspects of economic theory have been developed through time in spatial price theory and location theory. This paper will concentrate on the interdisciplinary topic: location theory. Most of the major contributions to location theory have come from economists, engineers, and geographers. Location theory has at least four historical roots. If one uses the classification system of agricultural location, market area analysis, industrial location, and central places; then, one would point to Thünen, Launhardt, Weber, and Christaller, respectively. Johann Heinrich von Thünen published his isolated State in 1826.¹ Wilhelm Launhardt's Mathematische der Volkswirtschaftslehre was published in 1885.² Alfred Weber contributed his Theory of the Location of Industries in 1909.³ Walter Christaller's Central Places in Southern Germany was released in 1933.⁴ Most of the theoretical contributions found in modern location theory literature can be traced to these four men.⁵ After summarizing the major contributions of these recognized founders of the field, the detailed analyses of "English" economists will be provided. The presentation will be limited to the works of Petty, Smith, Marshall, and Hobson.

The Founders

No attempt will be made to be exhaustive in the coverage of the founders of location theory, but a brief sketch of the major features of their theories will be provided

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so that the theories can be compared to passages found in Petty, Smith, Marshall, and Hobson.

Thünen

Thünen's model was based on the "situation rents" of the various crops which could be grown around an isolated town. The transportation costs associated with moving a crop from the most distant site of production to the place of demand (the town) accounted for a rent accruing to those producers whose production of the same crop was closer to the town. The price for the crop in the town was set by the cost of production plus the transportation cost of the most distant production. Those producers nearer to the town than the most distant producers would enjoy the same market (town) price, but they would not spend as much on transportation costs. For any one crop, a rent gradient could be calculated which would show maximum rent at the town. The rent would decline as one moved away from the town to reflect the increased burden of transportation costs. More than one crop entered the model by allowing land to be allocated to the crop which would yield the maximum rent in any one location. As a final result, the isolated town would be surrounded by rings of agricultural activity.

Launhardt

Wilhelm Launhardt was a German engineer-economist who anticipated major developments in location theory. Alfred Weber discovered the locational/weight triangles developed earlier by Launhardt. Frank A. Fetter developed the market area analysis found earlier in Launhardt's work.⁶ The location/weight triangles will be discussed with Weber's works. Launhardt's market area analysis related spatially concentrated supply (a firm or industry) to spatially dispersed demand. The distances

Between production sites were to be formed on the basis of the distance of a day's journey, so that it would be possible to make a journey to and from the market from a point half-way between two market centers in one day. It is interesting that Christaller⁷ later mentioned the same measure as the basis of his time-distance measure of a region. Launhardt stated that the limits of the sale-area are determined by the price of commodities at the neighbouring market-centers or towns.⁸ If at market A, a commodity is sold at the price p , and transported at the transport cost rate f , then at the distance x from the market center the cost will be $p + fx$. If at the neighboring market B an equal volume of merchandise is sold at price p_1 and the transport cost rate if f_1 then at the distance y from the market center the cost will be $p_1 + f_1y$. The limits of both market-areas, or sales areas, is given by.⁹

$$p + fx = p_1 + f_1y.$$

The locus of these limits forms a closed curve about the place of the most expensive good.

Weber

Alfred Weber introduced many terms into the location theory vocabulary. Among these terms were ubiquitous, localized materials, pure materials, gross (weight-losing) materials, the locational figure (triangle), the weight figure (triangle), agglomerations, deglorierations, and isodapanes. His model allowed for three types of locations: (1) raw materials locations, (2) a production site for final goods, and (3) a consumption center. Weber viewed the location of the production site for final goods as being determined by the relative "weights" or pulls of three -Points. These points usually included two raw materials locations and one consumption center. Thus, Weber formed a "triangle" to solve what has become to be called the "classical three point problem." Once the production site has been determined, points of equal transportation costs from that point creates what Weber called an "isodapane." One reason for

moving from a location triangle determined least-cost-transportation-expenses production point to an isodapane might be due to savings in labor costs at that point. A "critical isodapane" is reached when the savings in labor costs are just off-set by the increased transportation expenses. Such a move would result in what Weber called "labor orientation." "Agglomeration" was another force in Weber's system to account for deviations from a least-cost-transportation-expense production point. Weber argued that agglomerations exist anytime the critical isodapanes of two or more locational triangles intersect. Within the zone of intersection of the critical isodapanes, production could be carried out with enough savings to justify each firm moving from least-cost-transportation-expenses points to a new point of agglomeration orientation."

Christaller

Walter Christaller was a geographer who placed major emphasis on the use of economic theory to solve geographical problems. His use of economics and his methodology were heavily influenced by his training under Alfred Weber. Christaller believed that a scientific investigation should begin with "pure deduction." Christaller also used Max Weber's concept of ideal types. He developed a market area theory very similar to Thünen's isolated town on a conceptual level, but they were exactly opposite in that Christaller's model had points of supply surrounded by spatially dispersed demand.

A central place model developed by Christaller used three principles of location which he called the market, traffic, and separation principles. The first two are economic. The last is socio-political. He felt that the market principle was the most important. The market principle utilized the concept of "central goods" to fulfill tertiary sector economic functions. Central places were determined based on functions performed, not on population counts. Those places with a large number of central functions (and therefore with a large number of central goods) were called central

places of a "high order." The higher the order the larger the "range of the central place's goods." The area included in this range was called the "complementary region." The ideal shape of a complementary region (market area) would be a circle. Christaller simply assumed that if the entire area under consideration is to be served then the only logical pattern for these regions is that of a hexagon. This was a major point of difference between Christaller and Lösch.¹⁰ In Lösch's model, one can deduce the hexagonal shape from given premises. Thus, Christaller's basic pattern of market areas was determined by the market principle (price as a function of distance from the market). He used the traffic principle to account for linear deviations found in the basic pattern. The separation principle was introduced in recognition of the fact that economics alone could not account for all of the details of actual locations.

English Economist's Development

Pre-classical, classical, and neoclassical economists may have not placed emphasis on location theory, but they did not completely ignore the subject. This review will be limited to the works of Petty, Smith, Marshall, and Hobson. Substantial amounts of descriptions and analyses can be found in the works of each of these writers. Other writers should be noted as having at least touched on the subjects related to this topic. Schumpeter recognized Cantillon, West, Ricardo, and Edgeworth. One part of Ricardo's work is of particular interest. It shows that even though Ricardo is known for his differential rent theory based on fertility, he also gave "situation" as a possible cause of rent.

If all land had the same properties, if it were unlimited in quantity, and uniform in quality, no charges could be made for its use, unless where it possessed peculiar advantages of situation. It is only, then, because land is not unlimited in quantity and uniform in quality, and because in the progress of population, land of an inferior quality, or less advantageously situated, is called into cultivation, that rent is ever paid for the use of it.¹²

John Stuart Mill also recognized that fertility and situation should be taken together to determine rent.¹³ While discussing ground rent, Mill gave the following account of urban rent:

The ground rent of a building, and the rent of a garden or park attached to it, will not be less than the rent which the same land would afford in agriculture; but may be greater than this to an indefinite amount; the surrounding surplus being either in consideration of beauty or of convenience, the convenience often consisting in superior facilities for pecuniary gain. Sites of remarkable beauty are generally limited in supply, and therefore, if in great demand, are at a scarcity value. Sites superior only in convenience are governed as to their value by the ordinary principles of rent by the amount at which people estimate the superior facilities of money-making in the crowded place.¹⁴

This writer is not arguing that these authors placed major emphasis on these topics. In most cases, they mentioned the subjects very few times, but the following four economists did devote considerable effort in developing their descriptive accounts of location. As elsewhere in this work, this writer will place emphasis on what the authors under consideration actually said about the subjects. Therefore, liberal references will be made to them and quotations will be cited.

Sir William Petty

Sir William Petty (1623-87) has been called "the founder of political economy."¹⁵ He is known for his development and use of statistics, the conceptual derivation of national income, an implicit use of the multiplier effect through public spending, and his famous statement that "labor is the father and active principle of wealth, as lands are the mother."¹⁶ Schumpeter noted that Petty should be credited with the "discovery of the rent of location."¹⁷ It is surprising that as early as 1938 Eric Roll gave the quotation

from Petty which contains locational rent, but he failed to note its similarity to Thünen's work. In fact, even in later editions of his book Roll gave Petty credit for developing the "general principle" of differential rent a hundred and fifty years before Ricardo.¹⁸ In an obvious rebuttal to this statement found in Roll, Schumpeter said that it might be easy to conclude that Petty's "discovery" of location rent as to "imply decreasing returns, and in the end, the whole of the Ricardian theory. Only this would be quite unhistorical."¹⁹ The fact that Petty's discovery was in the spirit of Thünen's theory can also be found in the geography literature. Chisholm stated that the idea of economic rent ". . . particularly von Thünen's version of it, had been briefly stated . . . by Sir William Petty."²⁰ Finally, one can look to the introductory essay to Petty's works to find evidence that Petty's writings were in the same mold as Thünen's. In addition, one can find the following statement by Charles H. Hull:

The notion of diminishing returns, forcing recourse to fields of inferior natural and indestructible powers in order to supply the market and thus giving rise to a differential rent, did not occur to him.²¹

Rather, Petty contended that the amount of rent per acre is determined by the density of the population. In other words, the rent of land is dependent on "situation" rather than fertility. Here is the quote from Petty's A Treatise of Taxes and Contributions (1662) which contains this idea:

For as great need of money heightens exchange so doth great need of corn raise the price of that likewise, and consequently of the rent of the land that bears corn, and lastly of the land itself; as for example, if the corn feedeth London, or an army, be brought forty miles thither, then the corn growing within a mile of London, or the quarters of such army, shall have added unto its natural price, so much as the charges of bringing it thirty-nine miles doth amount unto.²²

In an effort to break new ground in this area, this author read and reviewed the entire collection of Petty's works. Many passages were found that prove to be just as interesting as the preceding one. Later in the Treatise, Petty displayed a basic understanding of the fact that the price of an agricultural good near the center of population area would yield more rent than the same good farther from the center. Petty reasoned that the price of all such goods would be set by the price of those goods brought from the farthest distance.

For if the said five shires did already produce as much commodity, as by all endeavour was possible; then what is wanting must be brought from a far, and that which is near, advanced in price accordingly..... then will the rent be as much more advanced.....²³

Again, the similarity to Thünen's work is obvious.

Petty also recognized the importance of transportation costs and the "hazard" of carriage. In Political Arithmetick he analyzed the advantages of Great Britain as compared to France. Using a "parallelogram figure" to make the islands comparable to France, he reasoned that there was no point on the islands more than twelve miles from cheap transportation (i.e., the sea), whereas some points in France were over seventy miles from a port. Most important he concluded that:

Upon which grounds it is clear, that England can be supplied, with all gross and bulky commodities of foreign growth and manufacture, at far cheaper rates than France can be²⁴

Petty used the word "situation" to mean location. He felt that situation, trade, and public policy were the most important factors in determining the wealth and strength of a country. Improvements in shipping and water carriage could work with the other factors to improve a country's financial position.²⁵ Petty was an advocate of public works projects. Among his suggestions for such projects was the " . . . making

all highways so broad, firm, and even, as whereby the charge and tedium of traveling and carriages may be greatly lessened."²⁶ The major result of such projects besides "the pleasure and beauty of them" would be to make commodities "vendible" over a large area.²⁷ Such reasoning is fundamental to understanding what we call "market area analysis" today.

While discussing the sizes and purposes of "parishes," Petty made some remarks which apply to central place theory. First, in his book, Political Anatomy of Ireland (1691), he determined that a parish would contain "the number of people living within a market-days journey."²⁸

Second, one can find the following in his Treatise:

. . . the largest parishes I know, being not more capacious than three or five miles square, in which is no difficulty for the people meet once a week at some central place within that scope.²⁹

The last quote was found under the title "That five thousand Parishes are enough for England and Wales so as to give unto each but a thousand Parishioners, and so that none need go two miles to church." This seems to be a crude central place system. Such ideas can be found in Christaller's work.

In his book The City of London (1683), Petty presented a short analysis of what is known as "agglomerations" today.

But the gain which is made by manufacturers, will be greater, as the manufacture it self is greater and better. For in so vast a city manufacture will beget one another, and each manufacture will be divided into as many parts as possible³⁰

Petty gave an example of watch production. One man (or firm) would make the wheels. Another man would make the springs, etc. The final result would be a product "...cheaper than if the whole work be put upon any one man."³¹ He continued by giving the following statement:

. . . we also see that in towns, and in the streets of a great town, where all the inhabitants are almost of one trade, the commodity peculiar to those places is made better and cheaper than elsewhere. Moreover, when all sorts of manufacturers are made in one place . . . and shipped off in another, the carriage, postage, and traveling-charges will enhance the price of such manufacture²

A similar account of agglomerations would appear later in Weber's work.

All of these developments are in addition to those factors listed at the beginning of this essay which lead Marx, Brentano, Roll, and others to call Petty "the founder of political economy." It seems as if Petty might also be given credit for at least mentioning very important aspects of what has become known as location theory. His accounts are too vague and sketchy to call him the founder of location theory, but he deserves recognition beyond a mention of his location rent.

Adam Smith

Adam Smith (1723-90) is usually considered to be the founder of classical political economy. Smith devoted much space in his Wealth of Nations³³ to the problems of "situation," i.e., location. Schumpeter has given him credit for developing a theory of rent based on location.³⁴ But, it is surprising that writers of location theory literature who mentioned Smith have failed to cite one part of the Wealth of Nations dealing with this subject. They have generally cited another portion of his book by giving the following quote:

The corn which grows within a mile of the town, sells there for the same price with that which comes from twenty miles distance. But the price of the latter must generally, not only pay the expense of raising and bringing it to market, but afford too the ordinary profits of agriculture to the farmer. The proprietors and cultivators of the country, therefore, which lies in the neighbourhood of the town, over and above the ordinary profits of agriculture, gain, in the price of what they sell, the whole value of the carriage of the like produce

that is brought from more distant parts, and they save, besides, the whole value of the carriage in the price of what they buy. Compare the cultivation of the lands in the neighbourhood of any considerable town, with that of those which lie at some distance from it, and you will easily satisfy yourself how much the country is benefited by the commerce of the town.³⁵

This passage is in clear anticipation of Thünen. It makes one wonder about Thünen's use of Smith, since Thünen devoted a chapter in his book to a critique of Smith's theory of rent without mentioning Smith's theory of location rent.³⁶

In the Wealth of Nations, Chapter XI, "Of the Rent of Land," Part I, "Of the Produce of Land which always affords Rent," one can find an explicit statement of Smith's location rent:

The rent of land not only varies with its fertility, whatever be its produce, but with its situation, whatever be its fertility. Land in the neighbourhood of a town gives a greater rent than land equally fertile in a distant part of the country. Though it may cost no more labour to cultivate the one than the other, it must always cost more to bring the produce of the distant land to market.³⁷

Smith gave explicit examples of the "situation" rent. In the following quote, he also indicated that (depending on the bulk and the value of the product) transportation costs are important.

The value of a coal-mine to the proprietor frequently depends as much upon its situation as upon its fertility. That of a metallic mine depends more upon its fertility, and less upon its situation. The coarse, and still more the precious metals, when separated from the ore, are so valuable that they can generally bear the expense of a very long land, and of the most distant sea carriage.³⁸

One of the most interesting quotes found in Smith is one which indicates that Thünen may have been influenced more by Smith than he admitted. While discussing

the effect of improved transportation on production, Smith gave the following important statement:

Good roads, canals, and navigable rivers, by diminishing the expense of carriage put the remote parts of the country more nearly upon a level with those in the neighbourhood of the town. They are upon that account the greatest of all improvements. They encourage the cultivation of the remote, which must always be the most extensive circle of the country. They are advantageous to the town, by breaking down the monopoly of the country in its neighbourhood. They are advantageous even to that part of the country. Though they introduce some rival commodities into the old market, they open many new markets to its produce.³⁹

The phrase "the most extensive circle of the country" could have inspired Thünen's circles. Smith discounted attempts to claim that improved transportation would lead to lower rents at central sites. Some people had feared that the extension of turnpike roads from London to the surrounding countryside would enable competitors to sell grass and corn cheaper in the London market than themselves. If such were the case, there would be a reduction in the rents collected in London. But, Smith concluded that such fears were not confirmed by the facts in the case. In retrospect, their rents had risen after such improvements were made.

In addition, Smith felt that cities existed because of their special relationship to the countryside. The country produced a "surplus" beyond what was necessary to feed the cultivators. In exchange, the city would provide the country with manufactured goods.⁴⁰ He also felt that having a central location could affect the development of a city.

The cities of Italy seem to have been the first in Europe which were raised by commerce to any considerable degree of opulence. Italy lay in the centre of what was at that time the improved and civilized part of the world.⁴¹

In summary, Smith made an explicit statement of location rent. One can find extensive examples and applications of this theory in his book. He felt that transportation costs and a good transportation system were both important factors in location. Smith explained that the existence of cities depended on a surplus produced in the countryside.

Alfred Marshall

Alfred Marshall (1842-1924) is usually considered to be the first of the neoclassical economists. It is amazing how much work dealing with location theory and spatial economics can be found in his Principles of Economics.⁴² This fact might make one wonder why most writers have agreed with the conclusion that the classical and neoclassical economic systems were wonderland(s) of no dimensions."⁴³ We have already seen that the preclassical (Petty) and classical (Smith) systems were not as void of this analysis as is usually indicated. But as far as general emphasis in their writings is concerned, this writer would have to agree with the consensus, i.e., that the classical and neoclassical economic systems tended (in the most part) to ignore space. The reasons for both of these apparent lapses can be found in Marshall. As far as the classical system was concerned, Marshall relied on a relativistic argument to explain why producers surplus (economic rent) type analysis found in the writings of English economists tended to ignore the influence of location. He felt that England was so small that goods could be delivered almost anywhere in the country at "no inordinate expenses"

For this reason English economists have ascribed to fertility the first rank among the causes which determine the value of agricultural land; and have treated situation as of secondary importance.⁴⁴

According to Marshall these economists were guilty of committing one of two errors. They did not take the trouble to state explicitly that (1) when comparing two pieces of land they must be located in the same neighborhood (to get the results that they did), or that (2) separate allowance must be made for differences in the expense of marketing. Economists in "new countries" (and this author would argue "larger countries") did not make these mistakes. In such countries the richest land might lie uncultivated, because it did not have good access to markets.

In their view land on the margin of cultivation, was land far from markets; and, especially, land far from railways that lead to good markets: and the producer's surplus presented itself to them as the excess value of the produce from well situated land over that which equal labour, capital (and skill), would get on the worst situated land; allowance being of course made for differences of fertility, if necessary....⁴⁵

While discussing market supply and demand relationships, Marshall also gave a set of priorities which were adopted by neoclassical and later writers. He felt that markets vary with regard to the period of time which is allowed to let the forces of supply and demand to come into equilibrium. In addition, he argued that the area of influence of these forces also varies. But he concluded that ". . . this element of Time requires more careful attention just now than does that of Space."⁴⁶ Unfortunately for the development of location theory and spatial economics, the economics profession paid more heed (at least implicitly) to Marshall's former theme (i.e., the emphasis on "time" rather than "space"). Ironically, Marshall's Principles seems to have contained much emphasis on "space." Let us now look at some specific examples of this emphasis.

One of the major developments in Marshall's Principles in his internal-external economies analysis. One overlooked point concerning this analysis is that Marshall believed that the situation of a business nearly always plays a great part in determining the extent to which it can avail itself of external economies" ⁴⁷ Marshall used the word "situation" to mean location. A "situation value" was derived from the growth of population, from improved transportation, and from improved communication with existing markets. He reasoned that two producers with otherwise equal facilities except that "one has a more convenient situation than the other" would not have even competition. The one with the best location could buy and sell at "less cost of carriage" and thus gain the advantage. Marshall felt that these advantages of "situation" and other factors (e.g., nearness to a labor market) could be translated into money values. When this translation was accomplished, the money value of the advantages of situation of one business over another could be calculated. That monetary measurement of a business' special situation values was called a "special situation rent" which contributed to "site value."⁴⁸

Marshall devoted an entire chapter in book IV of his Principles to the subject of industrial location.⁴⁹ He laid special emphasis to "physical conditions" in accounting for the localization of industries. These factors included climate, soil, mines, and easy access by land and water. Such localization would allow for " . . . division of labour in the mechanical arts and in the task of business management."⁵⁰ Marshall also listed "patronage of a court" as another chief cause of localization. A court would have many "rich folks" who would (1) make the demand for goods of a "specially high quality," (2) attract skilled workmen, and (3) educate those attracted on the spot. Other advantages of localized industries included the growth of hereditary skills, the growth of subsidiary trades, the use of highly specialized machinery, and a local market for special skills. When an industry had finally chosen a locality for itself, Marshall felt that it was very likely to stay there for a long time. In addition to the above factors listed in the last few

sentences, he believed that social forces would cooperate with economic forces to help make industries relatively immobile. Friendships would form, and children would learn the mysteries of trade unconsciously."⁵¹ Sometimes the localization of an industry would make an extensive demand for a particular kind of labor to the exclusion of all other types of labor. This could result in the unemployment of women and children unless "industries of a supplementary character" appear in the neighborhood to take up the surplus. Such would be the case in isolated rural company towns. Finally, Marshall accounted for the agglomeration of shops which deal in "expensive and choice objects." This gathering was explained by the consumer's need to do comparison shopping for these items.

Friedrich noted in the preface to Alfred Weber's Theory of the Location of Industries that Alfred Marshall gave a certain recognition of Weber's point of view concerning transportation costs.⁵² Marshall argued that the "dominant economic fact" of his time was the development of the transportation industries.

Probably more than three-fourths of the whole benefit she (England) has derived from the progress of manufactures during the nineteenth century has been through its indirect influences in lowering the cost of transport of men and goods, of water and light, of electricity and news: for the dominant economic fact of our own age is the development not of the manufacturing, but of the transport industries.⁵³

Marshall argued that every cheapening of the means of communication and transportation between distant places would alter the pattern of localized industries. The lowering of tariffs or of freight charges on the transport of goods would tend to make each locality buy more from distant places.⁵⁴

Marshall's discussion of market areas contains some of his best work in location theory and spatial economics. He brought f.o.b. pricing into his analysis. If a market were large, then the producers must have allowed for the expenses of delivery of goods to the purchasers. Each purchaser would have " . . . to

pay in addition to the market price a special charge on account of delivery."⁵⁵ The size of a market area would be a function of the amount of bulk.

Commodities for which there is a very wide market must also be such as will bear a long carriage: they must be somewhat durable, and their value must be considerable in proportion to their bulk. A thing which is so bulky that its price is necessarily raised very much when it is sold far away from the place in which it is produced, must as a rule have a narrow market.⁵⁶

The most important discussion of market areas is found elsewhere in the text. Marshall gave us a footnote on the subject of the shape of the boundary between market areas at least fifteen years before it was repeated by Frank Fetter.

If we suppose that two mineral springs A and B supplying exactly the same water are capable of being worked each to an unlimited extent at a constant money cost of production, this cost being, say two pence a bottle at A whatever the amount produced by it, and two pence half-penny at B, then those places to which the cost of carriage per bottle from B is a half-penny less than from A, will be the neutral zone for their competition. (If the cost of carriage be proportional to the distance, the neutral zone is a hyperbola of which A and B are foci). A can undersell B for all places on A's side of it, and vice versa; and each of them will be able to derive a monopoly rent from the sale of its produce within its own area. This is a type of a great many fanciful, but not uninteresting, problems which readily suggest themselves. Compare von Thünen's brilliant researches in Der Isolierte Staat.⁵⁷

Of course, Thünen did not have a market area analysis comparable to Marshall's, but this passage reinforces the argument that Marshall was influenced by Thünen. In addition, it shows a level of sophistication in market area analysis developed independently of Launhardt and preceding Fetter.

Marshall was also concerned with the migration of industries and people. He was much ahead of his time by observing that individuals may seek communities which have a proper taxes-expenditures package. This idea was developed later by Charles

Tiebout.⁵⁸ While discussing the tax rates paid by consumers of local services, Marshall stated:

The occupier generally regards the rates which are collected from him as forming a single aggregate with his rent; but he makes his reckoning also for the amenities of life which are secured by remunerative local expenditures of rates; that is he tends, other things equal to select districts in which the aggregate of rents and onerous rates is low⁵⁹

The potential mover would be hindered by personal and business ties at his present location. He should also take into consideration the "expenses and trouble of moving." As far as industries are concerned, Marshall anticipated the fact that someday business firms might start to abandon the central city for locations in the suburbs. He blamed high "ground rents" for this migration from central sites.

. . . the value which the central sites of a large town have for trading purposes, enables them to command much higher ground-rents than the situations are worth for factories, even when account is taken of this combination of advantages: and there is a similar competition for dwelling space between the employees of the trading houses and the factory workers. The result is that factories now congregate in the outskirts of large towns and in manufacturing districts in their neighbourhood rather than in the towns themselves.⁶⁰

In another place in his text, Marshall explained the same type of movement by the fact that as a city grows there is competition for land which increases the price of land. From a microeconomic standpoint, this increased rent is an increase in the "expenses of production" to an individual firm. The firm might "move to another town or into the country" if

. . . the saving in the cost of land that he will make by moving into the country, together with other advantages of the change, will more than counterbalance its disadvantages. In a discussion as to whether it was worth while to do so, the rental value of the site of his factory would be reckoned among the expenses of production of his cloth, and rightly.⁶¹

In summary, one might wonder what else could be expected of Marshall. He seems to have had a deep understanding of the basic problems of location theory and spatial economics. He also explained why the subjects had been ignored by most English writers before him, and his analysis of time helps explain why most economists after him have failed to emphasize space. In Marshall's own work external economies were affected by location. He devoted an entire chapter to the subject of the localization of industries and his writings emphasize the importance of transportation costs. Furthermore market area analysis can also be found in his text and he had a general concern for and interest in the migration of people and industries. In conclusion, Marshall should be recognized for his many contributions and discussions of locational-spatial problems.

John A. Hobson

John A. Hobson (1858-1940) is best known for his anti-Marshallian positions and his theory of underconsumption.⁶² He had a long list of books including The Evolution of Modern Capitalism.⁶³ This book contains Hobson's discussions on location theory and spatial economics. He recognized that both time and space should be used to measure a market area's size.

Modern methods of production have also brought about a great expansion in the time-area of the market. Competition covers a wider range of time as well as space.⁶⁴

He believed that a market area varied with the nature of the product being considered. The chief qualities which would determine the market area included (1) the extent of demand, (2) portability, and (3) durability.

Hobson argued that the same laws and limitation that applied to the ". . . degree of specialization of countries" also applied ". . . smaller districts, towns, and streets."⁶⁵ Industries producing valuable or durable goods would be subject to a "wide demand," and they would be locally specialized. Those industries producing bulky or perishable

goods would have a "narrow demand," and they would be unspecialized (and ubiquitous). The specialization function of a town could be augmented by the location of a large industry. Such industries would require a grouping around them of (a) secondary or auxiliary trades (coordinate trades), (b) dependent or derivative trades, and (c) "parasitic" industries. Within the town the industries related to the "carrying trades" would cluster to provide transport for the firms. Once the central business district becomes recognized as a trade center it is "...increasingly important to each new competitor to settle there" to take advantage of "trade centralization."⁶⁶ Hobson recognized the fact that "effective competition in retail" (trade) sometimes would require centralization and sometimes dispersion, but he placed emphasis on centralization.

Hobson also listed three major determinants of industrial location independent of his market area analysis and specialization analysis. These factors included climate, geographical and geological features, and "national character."⁶⁷ Under the category of "national character," he included race characteristics, food supply, density of population, and any other factor which would help determine the "efficiency of labour." Hobson gave special emphasis to the influence of transportation to the problem of location.

The space area of competition has been immensely widened, especially for the more durable classes of goods. It is machinery of transport--the transport of goods and news--that is chiefly responsible for this expansion. Cheaper, quicker, safer, and more calculable journeys have shrunk space for competing purposes. Improved means of rapid and reliable information about methods of production, markets, changes in price and trade have practically annihilated the element of distance.⁶⁸

In summary, one can find four major areas of analysis in Hobson's text which apply to location theory and/or spatial economics. These subjects include market areas, specialization, determinants of location, and transportation. His contributions are interesting, but they are not profound.

Conclusions

Petty, Smith, Marshal and Hobson did not give major emphasis to problems of location in their writings, but the extent of their discussions on the subject go beyond what one might expect. All four realized that space could make a difference in basic economic reasoning. Locational rent can be found in Marshall and Hobson.

Some form of market area analysis can be found in Marshall and Hobson. Transporttation cost or transportation system improvements were important to all four writers. In conclusion, this author feels that these discussions are too important to ignore.

FOOTNOTES

¹Johann Heinrich von Thünen, Isolated State trans. by Carla M. Wartenberg, edited by Peter Hall (New York: Pergamon Press, 1966 (1826)).

²Wilhelm Launhardt, Mathematische der Volkswirtschaftslehre (Leipzig: G. Teubner, 1885).

³Alfred Weber, Theory of the Location of Industries trans. by Carl J. Fredrich (Chicago, Ill.: University of Chicago Press, 1929 (1909)).

⁴Walter Christaller, Central Places in Southern Germany trans. by Carlisle W. Baskin (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1966 (1933)).

⁵Although Blaug mentioned Lösch and not Christaller, one can see the German dominance in this field by referring to Mark Blaug, "The German Hegemony of Location Theory: A Puzzle in the History of Economic Thought," History of Political Economy 11 (Spring 1979): 21-29. But, it should be noted that the Germans do not have a complete monopoly in the origins of the history of location theory. The works of Charles Ellet, Emile Cheysson, Dionysius Lardner, and Clement Colson have been documented in several places, see Robert F. Hebert, "A Note on the Historical Development of the Economic Law of Market Areas," Quarterly Journal of Economics 86 (Nov. 1972): 563-571; Robert F. Hebert, "The Theory of Input Selection and Supply Areas in 1887: Emile Cheysson," History of Political Economy 6 (1974): 109-113; W. P. Culbertson, Jr. and Robert B. Ekelund, Jr., "John A. Hobson and the Theory of Discriminating Monopoly," History of Political Economy 9 (Summer 1977): 282, ftn. 26; Robert B. Ekelund, Jr. and Robert F. Hebert, "French Engineers, Welfare Economics, and Public Finance in the Nineteenth Century," History of Political Economy 10 (Winter 1978): 638, ftn. 3; Mark Blaug, "The German Hegemony. . ." op. cit., 22, ftn. 4; and Melvin Cross and Robert B. Ekelund, Jr., "A. T. Hadley on Monopoly Theory and Railway Regulation: An American Contribution to Economic Analysis and Policy," History of Political Economy 12 (Summer 1980): 216-17, ftn. 3. Finally completeness of the treatment would call for a notice of Predöhl, Palander and Ohlin. Some of their works included A. Predöhl, "Das Standortproblem in der Wirtschaftstheorie," Weltwirtschaftliches Archiv, XXI (1925): 294-321; Tord Palander, Beitrage zur: Standortstheorie, (Uppsala, Sweden: Almquish och Wiksells (1935)); and Bertil Ohlin, Interregional and International Trade, (Cambridge, Mass.: Harvard University Press (1935)). Of course, this list is not exhaustive.

⁶Frank A. Fetter, "The Economic Law of Market Areas," Quarterly Journal of Economics 38 (May 1924): 520-9.

⁷Christaller, Central Places, p. 118, n. 5, and pp. 119-20.

⁸Wilhelm Launhardt, The Principles of Railway Location trans. by A. Bewley (Madras: Lawrence Asylum Press, 1900-02), Part I, p. 9. Also see, James V. Pinto, "Launhardt and Location Theory: Rediscovery of a Neglected Book," Journal of Regional Science 17: 1 (1977) 17-29.

⁹Launhardt, "The Principles of Railway Location," p. 10.

¹⁰See August Lösch, The Economics of Location trans. by W. H. Waglom (New Haven: Yale University Press, 1954 (1944)).

¹¹Joseph A. Schumpeter, History of Economic Analysis (New York: Oxford University Press, 1954), p. 1246.

¹²David Ricardo, Principles of Political Economy and Taxation (Baltimore: Penguin Books, 1971 (1817)), pp. 93-94.

¹³John Stuart Mill, Principles of Political Economy (New York: August M. Kelly, 1969 (1848)), p. 474.

¹⁴Ibid., pp. 475-6.

¹⁵Eric Roll, A History of Economic Thought, 3rd ed. (Englewood Cliffs, N.J.: Prentice-Hall, 1953), p. 106.

¹⁶Sir William Petty, The Economic Writings of Sir William Petty ed. Charles H. Hull (London: Cambridge University Press, 1899), vol. 1, p. 68.

¹⁷Schumpeter, History, p. 214, n. 7.

¹⁸Roll, A History of Economic Thought, p. 106.

¹⁹Schumpeter, History, p. 214, n. 7.

²⁰Michael Chisholm, Rural Settlement and Land Use: An Essay in Location (Chicago, Ill.: Aldine Publishing Co., 1970 (1962)), p. 21. It should be noted that even though Chisholm thought Petty's discovery was "independent" of Ricardo's, Chisholm gave Roll's incorrect interpretation as a reference.

²¹Petty, The Economic Writings, p. LXXIII.

²²Ibid., pp. 48-9.

²³Ibid., p. 52.

²⁴Ibid., p. 293.

²⁵Ibid., pp. 249-67.

²⁶Ibid., p. 29.

²⁷Ibid., p. 31.

²⁸Ibid., pp. 180-1.

²⁹Ibid., p. 24. Emphasis added.

³⁰Ibid., p. 473.

³¹Ibid.

³²Ibid.

³³Adam Smith, The Wealth of Nations (New York: Modern Library, 1937 (1776)).

³⁴Schumpeter, History, p. 264.

³⁵Smith, Wealth of Nations, pp. 356-7.

³⁶Thünen, Isolated State, pp. 18-22.

³⁷Smith, Wealth of Nations, p. 147. The first and second editions read, "The rent of land varies with its fertility, whatever be its produce, and with its situation, whatever be its fertility."

³⁸Ibid., p. 167, also see pp. 164-5.

³⁹Ibid., p. 147. Emphasis added by this author.

⁴⁰Ibid., p. 357.

⁴¹Ibid., p. 380.

⁴²Alfred Marshall, Principles of Economics, 7th ed. (London: Macmillan and Co., 1916 (1890)).

⁴³Walter Isard, "The General Theory of Location and the Space-Economy," Quarterly Journal of Economics LXIII (1949): 477.

⁴⁴Marshall, Principles of Economics, p. 633, n. 1.

⁴⁵Ibid.

⁴⁶Ibid., p. 330.

⁴⁷Ibid., p. 441.

⁴⁸Ibid.

⁴⁹Ibid., Chapter X, "Industrial Organization, Continued. The Concentration of Specialized Industries in Particular Localities," pp. 267-77.

⁵⁰Ibid., p. 271.

⁵¹Ibid.

⁵²Weber, Location of Industries, p. XXXI.

⁵³Marshall, Principles of Economics, pp. 674-5. Parenthetical information added.

⁵⁴Ibid., pp. 273-6 and P. 325.

⁵⁵Ibid., p. 325.

⁵⁶Ibid., P. 326.

⁵⁷Marshall, Principles of Economics, p. 442, n. 1.

⁵⁸Charles M. Tiebout, "A Pure Theory of Local Expenditures," Journal of Political Economy LXIV (October -1956): 416-24.

⁵⁹Marshall, Principles of Economics, P. 795.

⁶⁰Ibid., pp. 272-3.

⁶¹Ibid., p. 449.

⁶²Schumpeter, History, pp. 832-3, footnote 5.

⁶³John A. Hobson, The Evolution of Modern Capitalism (New York: Charles Scribner's Sons, 1894).

⁶⁴Hobson, Evolution of Modern Capitalism, p. 99.

⁶⁵Ibid., p. 110.

⁶⁶Ibid., p. 114.

⁶⁷Ibid., pp. 108-9.

⁶⁸Ibid., p. 99.

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