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DISTRIBUTION OF CRIMINAL OFFENSES IN METROPOLITAN REGIONS*

STUART LOTTIER¹

The regional trend in the United States is largely the result of two developments: the historical background of sectional differences in resources, industry, tradition; and the recent impact of motor transport which has changed people's movement habits, helped create large metropolitan cities, and brought settlement closer to the cities. These general processes have combined to obliterate political boundaries and bring about a regional regularity which is only now maturing as the territorial basis of modern American civilization. The hypothesis of the present study is that crime, as an interrelated part of the general social life, is also regional, and that the delineation of regions of crime would have both theoretical and practical utility. An earlier article² demonstrated that criminal mobility has a regional pattern, that criminal movements to and from a city tend to decrease regularly with distance from the city. The present article proposes to determine whether criminal offenses are distributed regularly in metropolitan regions. A future article will analyze the distribution of offenses in the larger territorial units called sectional regions.

A metropolitan region is here defined as an area dominated by a central city and its boundaries are delineated by the distribution of one or more variables which change gradually from center to boundary where the trend in an opposite direction begins. An essential criterion of a region is thus its gradient character. The variables to be observed in the present article are criminal offenses, spatially fixed events, not mobile offenders. Crime gradients on the basis of the distribution of *offenders* in city areas have been worked out in detail by Shaw and McKay for juvenile delinquents

* This is the second of three contributions by the same author on this general subject. The first appeared in number four of the preceding volume at page 657 ff.

²Based on a doctoral dissertation, Department of Sociology, University of Michigan, June, 1936.

¹ Sociologist, Detroit Recorder's Court Psychopathic Clinic, Lowell S. Selling, M.D., Director.

² "Regions of Criminal Mobility: Introduction to a Detroit Study," this JOURNAL, preceding volume number four.

within numerous American cities.³ They conclude that there are wide variations between different neighborhoods and that delinquency rates are generally highest in the centers of cities and decrease with distance away from the centers; likewise rates are high near industrial and commercial subcenters within the cities and decrease with distance away from these subcenters. In Chicago, adult commitments to the county jail follow the same pattern.⁴ Other studies indicate that there is a gradient tendency in the distribution of offenses over areas that are larger than cities. Watts has shown that the per capita rate of convictions recorded for indictable offenses in Canada increases with population density.⁵ The presence of gradients follows from the fact that in metropolitan regions settlement is most dense in the dominant city center.⁶

Sutherland has established regional gradients for two offenses with Chicago as the center. He obtained burglary and robbery data from chain stores and banks. For 1931 and 1932 the proportion of stores which had been burglarized or robbed decreased steadily by 25 mile zones from 59.6 per cent in the city of Chicago to 29.8 per cent in the suburban area within 25 miles from the center of Chicago to 6.2 per cent in the zone 100-125 miles away from the city. "The banks in Chicago, East St. Louis, and Wichita are less frequently burglarized or robbed than banks outside those cities but within 25 miles of the center of the city, but the rate of burglaries and of robberies of banks decreases as distance from the city increases."⁷

The present article attempts to extend Sutherland's method of analysis to the distribution of eight offenses in the Detroit commutation area and the Detroit metropolitan region. The commutation area is roughly the city and its suburbs, the "built-up" area which often includes scores of political jurisdictions. It is almost

³ Clifford R. Shaw and Henry D. McKay, *Social Factors in Juvenile Delinquency*, Natl. Comm. on Law Observ. and Enforc., No. 13, Vol. 2, Washington, 1931, *passim*.

⁴ *Ibid.*, pp. 66 and 107.

⁵ "The Influence of Population Density on Crime," 26 *Jour. Am. Stat. Assoc.*, 1931, p. 18.

⁶ But it has not been shown that there is a complete positive correlation between criminal offense rates and the size of urban population aggregates. In the United States, *Uniform Crime Reports* (U. S. Department of Justice, Vol. 6, No. 4, Table 1) classifies the per capita rates of eight offenses by cities grouped according to size. In general, the larger cities have the higher rates for all offenses, but murder, burglary, larceny and auto-theft are highest in cities between 100,000 and 250,000 inhabitants and second or third highest in the group of larger cities. Apparently the crime dominance of cities is not entirely explainable in terms of demographic factors.

⁷ *Principles of Criminology*, Chicago, 1934, p. 122.

identical to the "metropolitan district" which is defined by the census to include "in addition to the central city or cities, all adjacent and contiguous civil divisions having a density of not less than 150 inhabitants per square mile."⁸ The metropolitan region is a larger unit, roughly the wholesale area or trucking area surrounding a city. McGill⁹ delineated the Detroit metropolitan region on the basis of motor traffic to and from Detroit, circulation of Detroit newspapers, telephone toll calls, and other tests.

Sources of Data

The most reliable index to the kind and volume of crime committed is the number of offenses known to the police. The English and several European countries have collected these data on a nation-wide basis since the middle of the nineteenth century and have consequently developed them into reliable indexes. Efforts in the United States until recently have proved fruitless.

"Since the organization of the International Association of Chiefs of Police in 1894, there has been scarcely an annual convention at which discussion of criminal records and statistics has not found a prominent place. In 1927, the movement took definite form when Police Commissioner William P. Rutledge of Detroit proposed that the Association designate a Committee on Uniform Crime Records."¹⁰

The result of this Committee was the publication in 1929 of *Uniform Crime Reporting*¹¹ which serves as a manual of recording practice for police officers. The collection and publication of this information was delegated in 1929 to the United States Department of Justice. The reporting by police agencies to the Department of Justice was and is entirely voluntary.¹² The data used here to determine the regional distribution of criminal offenses are obtained from the published and unpublished records of that Department.

The crimes selected for analysis are included among the Part I classes of the Uniform Classification. "Part I classes are restricted to those offenses which generally become known to the police, and

⁸ U. S. Census, 1930, *Metropolitan Districts*, pp. 5, 6.

⁹ K. H. McGill, *Methods for Delineating the Boundary and Integration Zones of Metropolitan Regions*, Ann Arbor, 1935, unpublished MS.

¹⁰ Committee on Uniform Crime Records, I. A. C. P., *Uniform Crime Reporting*, New York, 1929, pp. 1, 2.

¹¹ *Op. cit.*

¹² "Under our federal system, the national government cannot compel local governments to report on their operations. It can, however, assume responsibility for conducting a voluntary undertaking." *Ibid.*, p. 12.

which therefore serve as the best index to the amount of crime committed."¹³ These offenses are defined as follows:

"1. Criminal Homicide: The homicide group is confined to murder and manslaughter. It does not include justifiable homicide, such as a legal execution, and excusable homicide, as in self-defense.

"2. Rape: Rape is perhaps the only offense in Part I Classes which is not regularly reported to the police, but the aggravated nature of the offense is so great that it may properly be included as a separate class.

"3. Robbery: This class should be confined to the taking or attempted taking, of property from the person of another through the use of threat or force or by putting in fear. Pocket picking, purse snatching, and the like, where there is no use or threat of force, belong to Class 6.

"4. Aggravated Assault: In this class enter all assaults with intent to kill or assaults and attempted assaults by any means or weapon likely to cause death, all cases of maiming, and the like. Simple assaults appear in Class 8 below.

"5. Burglary—Breaking or Entering: This class is composed of all offenses known as burglary, breaking and entering and housebreaking, as well as attempts. Offenses which do not possess the characteristic of breaking or entering, such as possession of burglars' tools, should not be included.

"6. Larceny—Theft: In this class are included all cases involving the stealing and carrying away of personal property with intention to deprive the owner of the value or benefit thereof. Fraud, embezzlement, and obtaining by false pretense are listed separately as a Part II Class. In some of the tables of known offenses, Larceny—Theft is divided into two sub-classes according to the value of property taken: (a) \$50 and over in Value, and (b) Under \$50 in Value.

"7. Auto Theft: This class includes all cases where a motor vehicle is stolen or driven away and abandoned, and should not include taking for temporary use where actually returned, illegal use by chauffeurs, and the like. Cars recovered within twenty-four hours should not be deducted from the total of cars reported stolen."¹⁴

The Detroit Commutation Area

Table 1, below, summarizes the numbers of Part I offenses for 34 of the 43 incorporated places in the Detroit commutation area described as the metropolitan district for 1932, 1933, and 1934. This information is unavailable for the nine remaining places because several are so small that they are policed only by the county sheriff and have no independent force, or if they do employ police officers their records are incomplete or otherwise unacceptable for

¹³ Committee on Uniform Crime Records, I. A. C. P., *A Guide for Preparing Annual Police Records*, Revised, 1935, p. 11.

¹⁴ *Ibid.*, pp. 11, 12.

the present purposes. The 34 places for which the number of offenses are obtained represent 95.1 per cent of the total population of the district in 1930. The numbers of offenses occurring within the city of Detroit are recorded separately for the fifteen police precincts into which the city is divided. The metropolitan district is thus broken down into 48 areas for which the number of Part I Offenses are known for the three year period.¹⁵

The 48 areas are divided into seven zones according to distance from the Detroit city hall. The total of each offense occurring within each zone is divided by the population represented to determine the per capita rates. These data are plotted graphically in Figure 1. It is evident that five of the eight curves show definite gradient tendencies while the curves for larceny are only slightly gradient and burglary shows no gradient tendency whatever. Why do some offenses show the gradient distribution while others do not? This problem is reserved until the offense distribution within the metropolitan region is presented.

The Detroit Metropolitan Region

In order to determine whether or not there is a gradient pattern to the distribution of offenses in the Detroit metropolitan region, the numbers of Part 1 offenses are obtained for seventeen Michigan cities outside of the commutation area (metropolitan district) for 1932 and 1933. As is done for the commutation area, Table 2 tabulates these offenses in intervals according to distance from the Detroit city hall. The totals of each offense for each interval are divided by the population represented to get the rates per capita for each of the three groups of cities. Comparable rates are calculated for the total of 34 of the 43 incorporated places within the commutation area. These rates for the four unit aggregates are then plotted in zones by the average number of miles distant from Detroit. The results are shown graphically in Figure 2.¹⁶ It is evident that there is a definite gradient pattern in the distributions of four offenses: murder, rape, assault, and robbery. But there are only tendencies towards a gradient for burglary, auto theft, larceny, over \$50.00, and larceny under \$50.00.

¹⁵ Except rape which is calculated from 1934 data only.

¹⁶ The number of rape offenses reported by police in 33 incorporated places within the commutation area other than Detroit are excluded from the tabulation. The rape rate for the commutation area (metropolitan district) is based on Detroit offenses only.

TABLE 1—PART I OFFENSES KNOWN TO THE POLICE AND RATE PER 100,000 POPULATION FOR 44 POLICE JURISDICTIONS IN THE DETROIT METROPOLITAN DISTRICT[†] TABULATED IN ZONES BY MILES DISTANCE FROM THE DETROIT CITY HALL, 1932 THROUGH 1934, INCLUSIVE*

Zone and distance [†]	Aggregate Population	Murder	Rape [‡]	Robbery	Assault	Burglary	Larceny Over \$50	Larceny Under \$50	Auto Theft
I—0 to 2.9 mi.									
Total	319,800	127	267	1945	1410	3509	1053	26134	5508
Rate		39.7	83.4	608.1	440.9	1097.2	330.8	8169.1	1722.3
II—3 to 5.9 mi.									
Total	920,700	96	309	2524	638	6586	1474	30825	7058
Rate		10.4	33.5	274.8	69.2	715.4	160.0	3347.9	766.5
III—6 to 8.9 mi.									
Total	410,800	31	129	802	275	3233	425	9647	1811
Rate		7.5	31.4	195.2	66.9	787.0	103.4	2350.7	440.8
IV—9 to 11.9 mi.									
Total	204,600	7	36	334	25	1384	148	3846	670
Rate		3.4	17.6	114.3	12.2	661.3	72.3	1390.6	327.4
V—12 to 14.9 mi.									
Total	41,900	0	6	26	4	327	70	684	100
Rate		0	14.3	62.0	9.5	780.4	167.0	1608.5	238.6
VI—15 to 19.9 mi.									
Total	20,200	0	0	18	1	126	26	451	38
Rate		0	0	89.1	4.9	623.2	128.7	2232.6	188.1
VII—20 to 24.9 mi.									
Total	86,200	10	15	121	65	1130	229	1782	425
Rate		11.6	17.4	140.0	75.4	1310.4	268.1	2067.2	446.7

* Unpublished offense data obtained from the Federal Bureau of Investigation, Department of Justice; population data from United States Census, 1930, *Metropolitan Districts*, p. 73, and Volume I, *Population*, Table 2, p. 512.

† The following jurisdictions are included: Zone I, Detroit precincts 1, 2, 3, 13, 8; Zone II, precincts 7, 9, 6, 5, 4, 10, Hamtramck, Highland Park; Zone III, precincts 11, 15, 12, River Rouge, Grosse Pointe Park, Ecorse, Melvindale, Grosse Pointe Village, Dearborn; Zone IV, precinct 14, Grosse Pointe Farms, Ferndale, Lincoln Park, Allen Park, Centerline, East Detroit, Wyandotte, Pleasant Ridge, Oak Park; Zone V, Roseville, Royal Oak, Berkely, St. Claire Shores; Zone VI, Clawson, Trenton, Birmingham, Wayne; Zone VII, Mount Clemens, Plymouth, Pontiac, Rochester.

‡ 1934 offenses multiplied by 3.

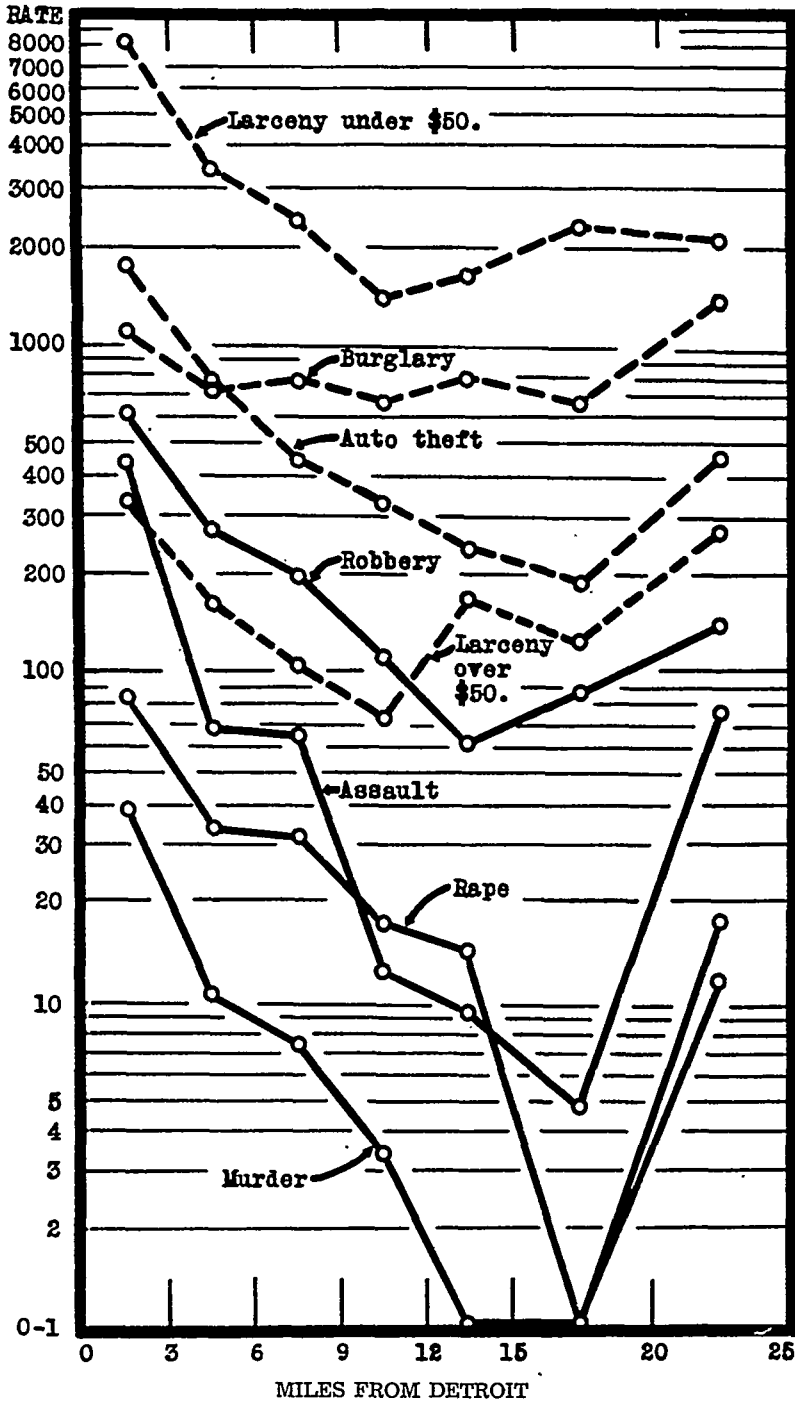


FIGURE 1. Rates per 100,000 Population of Eight Offenses Known to the Police for Detroit Police Precincts and Incorporated Places in the Detroit Metropolitan District, 1932-1934, Except Rape which is Calculated upon the Basis of 1934 Only,

TABLE 2—PART I OFFENSES KNOWN TO THE POLICE AND RATE PER 100,000 POPULATION, FOR THE DETROIT METROPOLITAN DISTRICT AND SEVENTEEN MICHIGAN CITIES OF OVER 10,000 INHABITANTS TABULATED IN ZONES BY MILES HIGHWAY DISTANCE FROM DETROIT, 1932 AND 1933*

Zone and Average distance†	Aggregate Population	Murder	Rape	Robbery	Assault	Burglary	Larceny Over \$50	Larceny Under \$50	Auto Theft
I—10 Miles									
Total	2,009,687	200	483†	4,325	1,537	11,134	2,392	51,207	10,918
Rate		9.9	30.7	215.3	76.5	554.3	119.0	2549.5	543.5
II—51 Miles									
Total	311,301	18	76	269	239	2,070	463	5,478	1,005
Rate		5.8	24.4	86.4	76.7	664.9	148.7	1759.7	322.8
III—110 Miles									
Total	487,914	24	66	383	142	3,681	592	10,372	2,591
Rate		4.9	13.5	78.4	29.0	754.3	121.3	2125.4	530.8
IV—199 Miles									
Total	95,035	3	12	48	19	390	46	590	254
Rate		3.1	12.6	50.5	20.0	410.5	48.4	631.0	267.3

* Unpublished offense data obtained from the Federal Bureau of Investigation, Department of Justice; population data from United States Census, 1930, *Metropolitan Districts*, p. 73, and Volume I, *Population*, Table 2, p. 512.

† The following places are included: Zone I, 33 incorporated places within the Detroit Metropolitan District representing 95.4 per cent of the population; Zone II, Monroe, Ypsilanti, Ann Arbor, Port Huron, Flint, Adrian, Jackson; Zone III, Lansing, Owosso, Saginaw, Bay City, Battle Creek, Kalamazoo, Grand Rapids; Zone IV, Holland, Niles, Benton Harbor, Muskegon, Traverse City.

‡ Detroit only.

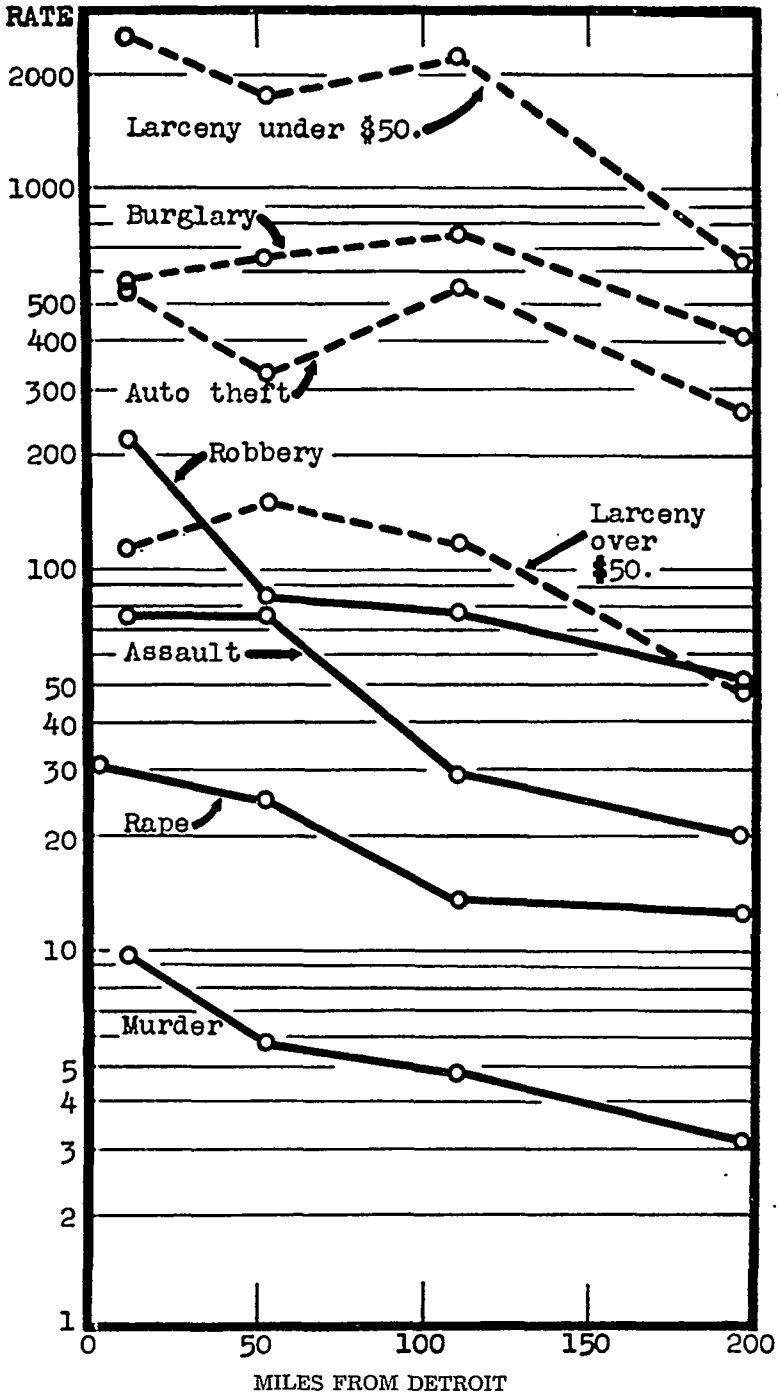


FIGURE 2. Rate per 100,000 Population of Eight Offenses Known to the Police, for the Detroit Metropolitan District and Seventeen Michigan Cities of Over 10,000 Inhabitants, 1932 and 1933, Plotted in Zones by Miles Highway Distance from Detroit.

The rates of both burglary and larceny over \$50.00 rise between the commutation area and the second zone, burglary continuing to rise until the third zone. Larceny under \$50.00 and auto theft decrease between the commutation area and the second zone but both rates rise between the second and third zones.

Assuming that there may be a gradient for these latter four offenses but that the technique employed does not make it apparent, then some factor may be common to them which is not present in any of the four offenses showing gradient patterns. It is apparent that each of the gradient offenses involves persons, whereas the non-gradient offenses involve property: houses, stores, factories to be burglarized, automobiles to be stolen, and all other kinds of property against which the offense of larceny might be committed. The items of property are probably variables which would have to be taken into account in making the rates for these offenses comparable for different places.

The feasibility of calculating larceny rates on a comparable basis is eliminated at once inasmuch as the types of property represented are too complex to be enumerated. Auto theft rates could be calculated on the basis of the number of automobile registrations, but registrations are available only for counties and are not tabulated for cities and other incorporated places. Burglary rates might be calculated on the basis of the numbers of dwellings which are recorded by the census. But the census definition of dwellings includes both single family and multiple family dwellings¹⁷ and proportions of these undoubtedly vary between the cities in the metropolitan region. Furthermore, the number of stores and other buildings is not recorded by the census and if burglary rates were calculated upon the basis of the number of dwellings, the assumption would have to be made that these were related in a constant proportion to the number of places which might be burglarized, because burglaries of business places and residence places are not distinguished in the reports of offenses known to the police.

The Gradient of Chain Store Burglaries

To determine if there is a gradient pattern in the distribution of

¹⁷ "A dwelling, for census purposes, is a place in which one or more persons regularly sleep. It need not be a house in the usual sense of the word. A boat, a tent, or a room in a factory or office building, although occupied by only one person, is also counted as a dwelling; while, on the other hand, an entire apartment house, although containing many families, constitutes but one dwelling." U. S. Census, 1930, Vol. 6, *Families*, p. 10.

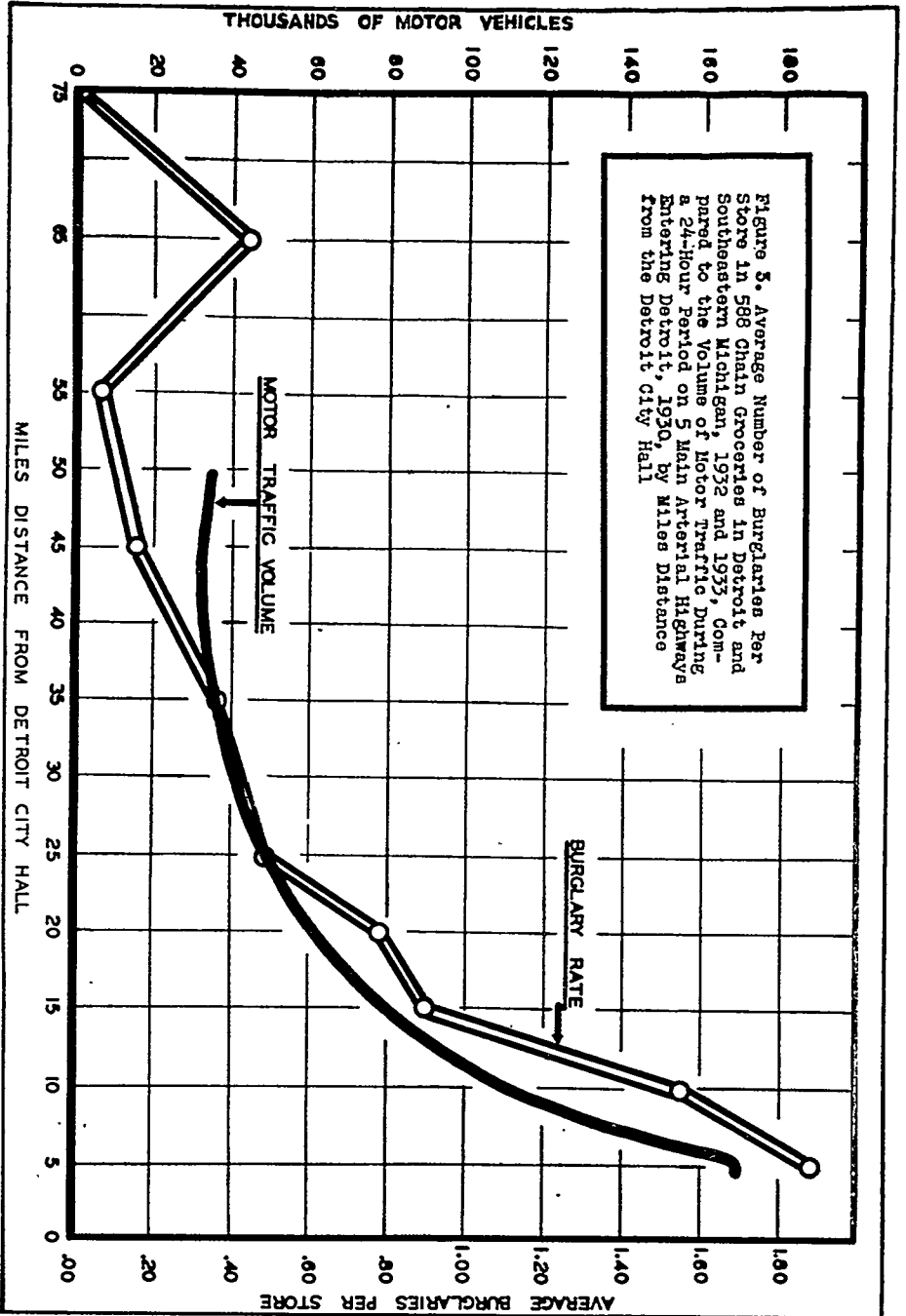
burglaries, and also as a general check upon the validity of gradients based upon offenses reported by the police, records of store burglaries were obtained from a large chain of retail groceries. This chain operates approximately 600 stores in Detroit and southeastern Michigan. The locations of the stores are spotted on a map and also the number of times each had been burglarized during 1932 and 1933. Circles are drawn upon the map at five mile intervals centering about the Detroit city hall. The number of burglaries between successive circles are totalled and divided by the number of stores in the respective zones to get the average number of burglaries per store per zone. These data appear in Table 3. A gradient for burglaries is constructed by plotting the average number of burglaries by miles distance from the Detroit city hall. The result appears in Figure 3.¹⁸ This figure represents an "ideal" gradient, showing that burglaries of chain grocery stores are most frequent in the center of the city, lower in the thinly populated areas, and higher in the satellite cities between the 55 and 75-mile circles. The burglary gradient is superimposed upon Waldon's gradient of traffic volume¹⁹ to which it is remarkably similar.

TABLE 3—AVERAGE NUMBER OF BURGLARIES IN 588 CHAIN GROCERY STORES IN DETROIT AND SOUTHEASTERN MICHIGAN, BY 5-MILE INTERVALS FROM THE DETROIT CITY HALL, JANUARY 1ST, 1932 TO DECEMBER 31ST, 1933

Distance From Detroit (Miles)	Number of Stores	Number of Burglaries	Average Burglaries Per Store
0 - 5	281	524	1.87
5 - 10	161	249	1.55
10 - 15	31	28	.90
15 - 20	9	7	.77
20 - 25	27	13	.48
25 - 35	11	4	.36
35 - 45	20	3	.15
45 - 55	14	1	.07
55 - 65	32	14	.44
65 - 75	2	0	.00
Total	588	843	1.43

¹⁸ Robbery data were obtained from the same grocery stores, and also both burglary and robbery data from the records of a chain of drug stores and a chain of gasoline filling stations. But in all three of these series the numbers of offenses were too few to establish continuous gradients. The data in Table 1 are tabulated by 10-mile intervals between the 35 and 75-mile circles because of the relatively few stores and burglaries beyond the 35-mile circle.

¹⁹ *Metropolitan Highways*, Address before the American Association of State Highway Officials at their Sixteenth Annual Convention, Pittsburgh, 1930, p. 11. Reproduced in R. D. McKenzie, *The Metropolitan Community*, New York, 1933, p. 87.



It is apparent from this that some such variable as the number and kind of dwellings is operating in the per capita distribution of burglaries both in the commutation area and in the metropolitan region. The per capita series both show constant rises, whereas the burglary-per-store series shows a gradient decline, as noted. Coupling this with the decrease in the per capita distribution of burglaries between the 110 and 199-mile zones, it seems safe to construe that the distribution of burglaries in the metropolitan region tends towards a gradient pattern.

Conclusion

The gradient is an essential and quantitative criterion to determine whether a distribution is regional. Four offenses have a gradient distribution within both the commutation area and the metropolitan region. These offenses are murder, aggravated assault, rape, and robbery. The offenses not distributed according to a gradient are those involving units of property which act as variables in per capita series. These offenses are burglary, larceny, and auto theft, although the latter offense together with larceny-under-\$50.00 offenses both tend towards a regional pattern. Burglaries show a gradient throughout the commutation area and into the metropolitan region when calculated upon the basis of store burglaries per store rather than total burglaries per capita. From this fact it is inferred that a gradient would be characteristic also of the distributions of larceny and auto thefts if comparable rates could be calculated for these offenses. Thus, not only does criminal mobility have a regional pattern, as demonstrated in the article cited above, but a gradient regularity also characterizes the distribution of Part I offenses in both the commutation area (metropolitan district) and the metropolitan region.²⁰ The crime region is thus an objective reality.

It is important to relate this conclusion to the fact well estab-

²⁰ No attempt is made to demonstrate any antecedent-consequent relation between these two kinds of facts. They are both regarded as related to the problem of regional crime. It is recognized that if two classes of data present similar gradient patterns it does not necessarily follow that they are etiologically related. Nevertheless, if a crime region may be delineated upon the basis of both then the degree to which the two delineations coincide is a measure of the degree to which the crime region is an objective reality. The general assumption in constructing such gradients is that both the mobile and the spatially fixed aspects of criminal phenomena are related to the conditioning factors which are concentrated in the given center and decrease with distance away from the center. The analysis of these conditioning factors is, of course, a separate undertaking.

lished elsewhere that the large predominance of criminal offenses are committed in response to economic or sustenance conditions. This means that the criminal is not to be regarded as isolated from the division of labor of the general community but rather as one who participates in the same general culture and makes a living in the general economy as does the non-criminal. Both utilize the same means of transportation and communication; both are drawn to the city for its specialized and various occupational and recreational services; both exploit the city's resources and the resources of the smaller places centering about the city.

Metropolitan centers are the headquarters from which economic and commercial organizations integrate the surrounding region and likewise they are the headquarters for criminals. Not that criminal groups approximate the autonomous organizations of business. They are much more modest in their proportions. It is rather that the metropolitan center affords equal advantages to both alike: technical information, the latest news, markets for services and wares, lawyers, physicians, theaters, cabarets, a centralization of railroads, motor-buses, steamship lines, air routes, highways. Particularly to the criminal's advantage, the metropolis affords anonymity.

Having no intended reference to crime or criminals but more suggestive of these than the above remarks is Gras' metaphorical description of the metropolitan community:

"I can think of no better analogy than the web of the common spider. This efficient builder establishes first his radial lines running out in all directions from the center. Then the concentric fasteners are put in. At last the spider, posted at the center, is ready to do business. He is about equally distant from all parts. He can go in any direction. For the amount of silk spun he gets the largest possible income."²¹

The metropolitan region is a construction of the economic division of labor adjusted to motor transportation. It is "the most effective utilization of resources, human and material, yet known to society."²² And no less than the rest of the population, the criminal is automatically incorporated into the metropolitan economy.

²¹ "The Metropolitan Community," in E. W. Burgess, Ed., *The Urban Community*, Chicago, 1926, pp. 183-191.

²² *Ibid.*