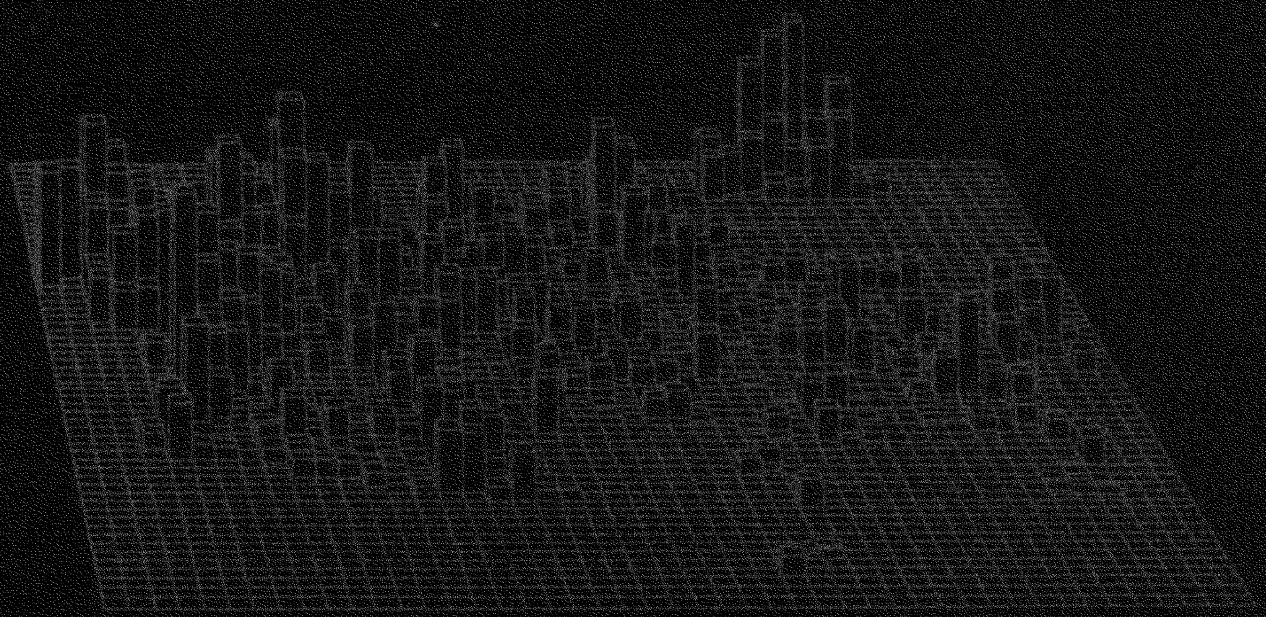
CRU

An examination of some area based policies

by Mahes Visvalingam



Series Editor: J.C. Dewdney
Census Research Unit
Department of Geography
University of Durham

Working paper 22

91(05)

The Census Research Unit, Department of Geography, University of Durham, is a small group of research workers investigating aspects of the theory and use of census data.

The diagram on the cover represents total population per 1 km grid square in the northern part of County Durham: the height of each column is proportional to the population in that square. The county is viewed from the west, Gateshead being at the extreme left margin, West Hartlepool at the far right, and Bishop Auckland at the centre-right. The original surface was calculated and drawn by computer.

UNIVERSITY OF DURHAM

DEPARTMENT OF GEOGRAPHY

CENSUS RESEARCH UNIT

WORKING PAPER No. 22

AUGUST 1983

AN EXAMINATION OF SOME AREA-BASED POLICIES

MAHES VISVALINGAM

ACKNOWLEDGEMENTS

Whilst accepting full responsibility for the views expressed in this paper, I am grateful to Professor J. I. Clarke and Mr. J.C. Dewdney for their helpful comments. I would also like to thank Keith Scurr of the Geography Department, University of Hull, for cartographic assistance; my husband for his support and encouragement; and the University of Hull for facilities made available for this unfunded research.

CONTENTS

LIST OF FIGURES AND MAPS

Source: the 1971 grid square population census data, provided by the Office of Population Censuses and Surveys

1. INTRODUCTION

Priority area policies rest on the proposition that there exist areas wherein individuals suffer from a collective deprivation which amounts to more than the sum of the individual disadvantages with which they have to contend. The concentration of extra resources and efforts, over and above those normally provided, into such areas would benefit the residents whilst avoiding expensive and contentious means testing and low take-up (Hatch and Sherrott, 1973).

Reservations concerning this spatial perspective in policies of positive discrimination include theoretical and empirical objections. This paper is primarily concerned with the latter.

The controversy surrounding this topic indicates quite clearly that the theoretical and ideological arguments embody personal beliefs and considered opinions as much as objective facts (see Herbert and Smith, 1979 for a wide range of views on a variety of social issues). Consequently, empirical observations have been sought as impartial justification for reaching a consensus with respect to policy initiatives.

What follows in Section 2 is a brief elaboration of a personal opinion to the effect that the structural criticisms of area-based policies are unconstructive and are detrimental to the deprived themselves. The view taken is that the emphasis on class conflict is a caricature of contemporary British society, that the prospects for a structural solution are remote and that the emergent technological era, unless regulated, is likely to worsen the existing disparities in opportunity structures.

These opinions are not rigorously defended since philosophical arguments are inadequate devices for achieving consensus in what has become a contentious and emotive issue. They are nevertheless presented in this paper since they sketch the scene within which the empirical debate has been staged.

Some empirical arguments against area-based policies, mainly on the basis of data from the population census, are discussed in Section 3. With social theorising still in its infancy, it has been suggested that the choice of indicators has tended to define deprivation rather than the other way round (Edwards, 1975; Hakim, 1978; Knox, 1978; and Carley, 1981). Also, commonly used techniques, both simple and complex, for the identification of multiply deprived areas are inapt if we examine their underpinnings. Consequently, this paper questions the methods and thus the empirical evidence provided by critics of the concept of area-based policies.

2. THEORETICAL OBJECTIONS TO AREA-BASED POLICIES

Briefly, critics of area-based policies, such as Hamnett (1979), Eyles (1979) and MacLaran (1981) feel that such policies tackle the symptoms rather than the fundamental structural causes of deprivation. Smith (1979b, 265) considered "area-based policies still favoured by government as largely impotent in the face of the general forces of capitalist development to which the British economy responds, to a significant extent beyond government control" and that "it is increasingly within the framework of the historical-materialistic approach that an understanding of urban social problems will be found, though the remedies remain elusive".

The structural class conflict theory views urban problems as arising from the divisions necessary to maintain an economic system based upon private profit. "Poverty exists because it has so many positive functions for the affluent society" (H. Gans, 1973, 320, quoted by Hamnett, 1979) and "superficial (distributional) inequalities between areas obscure, in an area-based approach to reform, fundamental (allocational) class divisions" (R. Lee, 1976, 43, quoted by Hamnett, 1979).

Further, area-based policies "involve the drawing of boundaries, including some people and excluding other, perhaps similar individuals. Such policies may therefore encourage a certain parochialism among professionals and the public. They may also divide sections of the population who may achieve more if they were united" (Eyles, 1979, 240).

In this discussion the writer wishes to exclude specific area-based initiatives, both past and present, from the potential utility of such an approach. It is unrealistic to view the many explanations of urban problems, namely those based on class conflict, cultures of poverty, cycles of deprivation, institutional malfunctioning and maldistribution of resources and opportunities (Coventry CDP, 1975) as mutually exclusive. Lawless (1979) preferred to view them as concurrent processes operating in parallel. Johnston (1980) provided a clear and valuable summary of his interpretation of the nature of explanation in human geography, which has stimulated vigorous discussion. The various philosophical approaches, which foster different conceptions of the causes of deprivation, were seen as complementary by Johnston but as irreconcilable by Eyles and Lee(1982) and Silk(1982).

This controversy stems from Johnston's subscription to a belief in antecedent reality; to his proposition that "the purpose of research is to understand the phenomena in question, to explain their genesis" (Johnston, 1980, 403); to the implied suggestion that all phenomena, being manifestations of the ultimate reality, are valid pointers to that reality; and his vague conclusion that such explanation

can assist in the process of social change through education and emancipation and thereby avoid revolution.

Silk rightly questioned what he called the obsession with explanation through generalisation and echoed the view that the purpose of research in human geography is to change the world, not just interpret it. Explanation has value only if it provides guidance for action and this is only possible when "historical/dialectical specificity covers a sufficient period of time" (Johnston, 1980, 410). Conflicting theories, both utilitarian and realist, on the causes of poverty are of little practical value in meeting the challenge of the emerging technological revolution with its implications for transformations in social consciousness, social relations, underlying structures and other tangible manifestations.

A new phase of social reality is in the making, offering exciting opportunities for some and a nightmare for others. Being in its formative stages, it is malleable and accommodating and we have the challenge of casting its mould through socio-economic planning. Williamson and Byrne cautioned against the "structural trap of informed inactivity" (1979, 178) and stressed that policies require an understanding of the mechanisms generating and maintaining social inequities. As pointed out below, the new, so-called 'enabling' technologies (Alvey, 1982), offer some sinister possibilities.

It is unfortunate that ideological differences should confuse and leave impotent those committed to social innovation and social justice. The impact of area-based policies is weak compared with other divisive forces, which make a mockery of working class unity.

Structural revolution, promising a redistribution of power and resources, has little charismatic appeal in Britain. Cullen and Knox (1982) were perplexed - why is it that people do not rebel against a system of residential differentiation and economic organisation which disprivileges them? They suggested that urban managers and town planners have quite successfully used "space as a means of containing and defusing class conflict" (p 279). By focussing on consumption rather than control of production, planners have quite successfully fragmented a potentially solid proletarian consciousness by providing the environments within which affluent workers have "become more and more 'privatised', parochial and pre-occupied with home and life style" (p 279). Cullen and Knox observed that people from more established public housing projects were inclined to identify themselves with middle class settings rather than with lower-status areas, when acting out roles and aspirations within stereotyped settings and symbolic locations (p 283).

However, it could be argued that parochialism and complacency are the instinctive predisposition of the

majority of those who are no longer under stress. The post-war Labour movement in Britain, with its roots in the non-conformist Church and trade unionism, fired the imagination of the working class, channelled any latent revolutionary zeal towards a democratic process of social reform through Parliament and fostered a receptive environment within which any man or woman could achieve recognition and stardom in sport, music, Parliament and even academia. The working class in Britain no longer suffer the blatant subordination and injustices that their contemporaries in many Third World countries still endure. They enjoy the freedom of speech and other constitutional and statutory rights unheard of in many other countries. Since their present subordination is more subtle and discreet, they have assumed an illusory sense of freedom, respectability and enterprise.

The very achievements of the working class movement have, ironically, led to its demise. It achieved minimum levels of living for the destitute, prospects of social mobility for the able, preferential pay deals and a taste of power for organised workers in key industries and has unwittingly encouraged a progressive privatisation of workers and a greater reliance on self- and group-, rather than class-, based efforts. As their welfare and income levels, whether earned or unearned, have risen, workers have become compromised in more ways than they are aware of. The nominal invitation to participate more actively and freely within the capitalist economy has persuaded sections of subordinate social groups to accept a 'negotiated' version of 'dominant' values (Parkin, reported by Cullen and Knox, 1982, 283).

Thus the extreme stance of the militant structuralists strikes a note of discord even within the working class itself, since the Labour movement has wiped away many of the sources of extreme discontent. The withdrawal of support for the Labour Party in the recent Bermondsey by-election may be construed as a rejection of militant ideologies by large sections of the working class.

In contemporary Britain, the fissures within the Labour Party are but reflections of the moot point that working-class unity is fast becoming a legend of the past. The deprived are still largely of working-class origin but, thanks to the reforms of the post-war Labour movement, some well organised fractions within the working class are far from deprived. Despite ritualistic shows of solidarity, the spirit of the movement has deviated from a call for human rights and dignity towards more parochial and divisory self-interests, empire building and one-upmanship grounded in materialism. Thus changes in political consciousness and organisation, as advocated by the structuralists, are unlikely to eliminate deprivation. Moreover, whilst workers and managers see themselves in continual opposition, resulting in inflated costs of essential services and fuel, no one derives any substantial benefit or satisfaction from the public ownership of the means of production.

What about the poor in these games of social chess and snakes and ladders? The poor in many developed countries no longer form the majority as they do in many Third World countries and consequently lack political muscle. Although they are not the notable winners of the Labour movement they still enjoy consolation prizes through the welfare state, which they risk losing in a revolution; particularly since their rewards in the aftermath of a revolution remain obscure. Frustrations, general grouses and periodic outbursts of violent expressions remain but they await an informed, united and charismatic leadership to transform them into constructive political action, let alone revolution. In this context, the writer views the achievements of self-help organisations as very successful improvisations, to make the best of constrained circumstances, rather than as change-generating innovations.

What are the visions of the future? Dahrendorf(1982) envisaged a promising future for Britain based on technology and self-help. This is unduly optimistic since virtually all aspects of the computer industry have recorded a downward trend over the past two years (Urwick/Computing Survey, 1983). The grossly overrated claims for technology echo the past optimism regarding education, now seen as unjustifiable. For those in the right place (particularly London and the South) and at the right time (first on the scene, NOW), technology holds some promise just as education did in the 1960s. Every sphere of activity has its saturation levels. Moreover, left to private enterprise, technology would undoubtedly widen the gulf between the "two nations" in Britain - the North and the South (McEnery, 1981) - and between the haves and the have-nots.

The prospects are that the poor will become increasingly reliant upon the generosity of the state, particularly within this emerging technological era. As Latimer put it, "as the industrial era draws to a close the concept of work will probably die with it ... this means changing the way we see work and ridding ourselves once and for all of the 'work ethic'" (reported by Pearson, 1982).

Technological development has already reduced the demand for labour in manufacturing, through industrial robots and other automated processes. The prospect of reducing labour intake and thereby curbing labour power is already here even within the tertiary sector with word processors and systems for computer-aided design and manufacture. Even computer programmers may be made redundant in the not too-distant future by high-level software, which would be capable of generating programs directly from specifications. The Japanese project on fifth-generation computer hardware and on-going research in artificial intelligence aspire to endow machines with capabilities beyond human achievement. This is expected to reduce the need for human experts in a variety of applications, particularly where the expertise relies on reasoning capabilities based on an accumulated

knowledge base. Knowledge-based expert systems are already past their infancy in some application areas, such as the diagnosis of diseases in plants, animals and man.

In the short term, such technological thrusts can generate a flurry of activity involving experts and technologists in the construction and manipulation of these rule-based systems and in the development of 'natural' man-machine interfaces. In the long term, if this science-fiction enterprise proves successful, we may in our lifetime, witness an era of ultra-technology - when machines rather than a working-class service the needs of managers, decision-makers and the 'haves' in society.

In these times of rapid change, confusion and uncertainty, it would be more constructive to explore the potential of whatever help is available to the deprived, than to adopt adversary and entrenched ideological stances, particularly since the former does not preclude the formulation of alternative strategies. Institutional changes are necessary (Dahrendorf, 1982) but the means and sub-goals for reaching an egalitarian state are not obvious.

Whilst structural remedies remain elusive, pragmatic "minor palliatives" remain attractive, particularly since an area-based approach provides a framework within which various reformist activities could be co-ordinated at the local community level. Such an approach is based on the observation that people living in the least desirable areas or neighbourhoods of cities, wherever they happen to be at particular periods of history (see Hamnett, 1979, 256-7) suffer from a multiplicity of problems. The problems of "twilight zones" (Rex and Moore, 1967) and of the inner cities have been well documented. Kirby (1981, 177) also stressed that place poverty, resulting from poor social services, poor schooling and poor health care, can be eased by location-specific aid.

The Department of Industry's Information Technology Centres (ITEC) aim to instil awareness, experience and skills in the new technology into teenagers. The strategic geographic location of such centres, coupled with positive discriminatory policies, offer some scope for preparing deprived children, who have aptitude but who lack personal computers and more importantly a 'high-tech' ethos in the home, for technological careers.

Even Hamnett, despite his previous criticisms of the area-based approach (1979), was forced to conclude "although area-based policies are in themselves inadequate, particularly where de-industrialisation and recession are concerned, this is not to say they have no role to play" (1983, 13) when confronted with the already worsening disparities in welfare levels since 1971 as portrayed by indicators from the census.

It is readily accepted that not all the deprived live in multiply-deprived neighbourhoods and that "small areas will only constitute strategic points if intervention is seen as experimental and the lessons learnt from it applied much more widely" (Hatch and Sherrott, 1973, 237). Whilst the general implementation of positive discriminatory policies must satisfy issues of efficacy and equity, within experimental schemes efficacy must be given priority over equity. Budgetary constraints and the spreading of resources too thinly in an attempt to maintain some semblance of equity and impartiality are already seen as major factors contributing to the piecemeal nature and ineffectiveness of the present area-based experiments (Eyles, 1979). The same could be said of the ITEC experiments - of some 150 centres anticipated by the end of 1983, 91 have already been approved (Computer Weekly, 1983). It is equally relevant to question the interventionist wisdom of putting a micro in every school without any thought for the future of the human products, let alone immediate provisions for adequate teacher training and suitable software.

With the emphasis on technology underlying government policy, share-holders of micro-electronics industries enjoy a windfall and industry (equated willy-nilly with society) will have its pick of the best. The surplus would-be technologists will, without counter-intervention, become disillusioned and disposable commodities of the free-market economy like other skilled craftsmen and the highly qualified labour already joining the unskilled in the growing scrapheaps in the wastelands of capitalism. The ITEC and other Information Technology programmes must be continually reviewed and revised if technological change is to benefit mankind and not just an elite class.

The machinery of capitalism is already engineering the construction of a new phase of reality whilst we academic geographers ruminate and conflict over conjectures of historical reality and the 'isms' and 'wasms' in human geography. One aspect of this debate is relevant to the geography of welfare, namely the divergent views on the role of empiricism.

Structuralism and Marxism equate empiricism with positivism and behaviouralism and take a Biblical and Koranic view that iconic representations are false gods which belie the essence of underlying reality (Eyles and Lee, 1982, 118-119; Silk, 1982, 381). There is the implicit presumption that reason and language devoid of symbols can capture and communicate the nature of this reality. "Often this will mean postulating the existence of types of unobservable entities and processes that are unfamiliar to us: but it is only by doing this that we get beyond the 'mere appearances' of things..."(Eyles and Lee, 1982, 119). In the phenomenological approach "validation can come in the form of internal consistency and authenticity of the project" (p 117).

To Johnston, the manifest and unmanifest are all part of reality and he saw himself (man) as a maker of that reality of which he is a part (1982, 123). Thus as a Hindu worships god in any form, even as a lump of stone (the Linga), any object becomes a valid iconic pointer to reality. Owing to his socialisation as a geographer he chooses to understand, even if not explain, "geographic reality (much of which can be depicted in cartographic form)" (p 123).

Within the context of social indicator research (SIR), empiricism serves a different purpose. SIR is concerned in the first instance with providing vivid descriptions and representations of human despair and misery so as to sharpen social consciousness and invoke compassion and to exact a democratic mandate and resources necessary for redressing the unpalatable aspects of historically specific and man-made tangible reality. Empiricism is not so much a tool for explaining all-pervasive reality, but rather a subjective medium (like the arts) for communicating specific reality. Consequently, not all objects and representations are valid or relevant. Contrary to Johnston's supposition that the spatial variations in the human condition "can be measured on a generally acceptable metric, irrespective of how that metric is interpreted by the value system of the perceiver" (Johnston, 1980, 404), the following discussion of the empirical objections to area-based policies stresses the subjective nature of representation and interpretation of the raw data.

3. EMPIRICAL OBJECTIONS TO AREA-BASED POLICIES

"Not only does the application of positive discrimination assume a concentration of deprivations, it also assumes that such areas can be identified ... It has also been argued that identification presents theoretical and practical difficulties independent of whether or not deprivations are concentrated" (Hatch and Sherrott, 1973, 223).

Despite methodological difficulties, some writers suggest that there is sufficient empirical evidence to substantiate the view that area-based policies and the spatial perspective are misconstrued (Holtermann, 1975; Smith 1979a; Hamnett, 1979). The empirical criticisms of the area-based approach may be summarised as follows:

a) The degree of spatial concentration of individual aspects of deprivation is quite low;

b) There are other difficulties associated with the identification of priority areas;

c) The degree of spatial coincidence of different types of deprivation is even lower; and

d) It is an ecological fallacy to assume that the majority if not all individuals in sub-areas conform to the pattern of characteristics derived from aggregate data.

Let us consider each of these in turn.

3.1 The Concentration of Deprivation

The present author has suggested (Visvalingam, 1981b, 1983) that the first criticism may be premature, given that the primitives, namely the ratio indicators, do not operationalise the propositions of area-based policies as outlined by Holtermann (1975, 33-34). Holtermann's propositions suggest that target areas should exhibit a conjunction of the following forms of spatial concentration (Visvalingam, 1981b) :

i) the proportion of the area's population which is deprived,

ii) the proportion of the deprived in that area, and

iii) the proximity or density of deprived.

Ratio indicators, as well as absolute numbers, operationalise only one of these requirements. Ratios tend to produce more extreme values in small populations and near-average ones in large populations. Holtermann (p 35) observed that even the 'urban' enumeration districts (EDs) are variable with respect to both areal and population size and

herself expressed reservations concerning the use of ratio indicators. Thus the empirical evidence based upon ratios is suspect.

"Where resources are to be allocated, indicators must be normative along a continuum of good to bad, high to low and so on or conclusions about alternative allocations cannot be made" (Carley, 1981, 144). Visvalingam (1981b) pointed out that there are several alternative schemes for the ordering of populations on a good to bad scale. The signed chi-score measure was used to demonstrate that it is possible to accommodate all three statistical requirements of territorial indicators within one measure. However, it does include arbitrary elements: for example, it utilises the statistical theory that the standard error for proportions is a square root function of the sample size in producing a compromise measure between ratios and absolute numbers.

Visvalingam (1982) showed that in the worst five per cent of the one-kilometre grid squares in Humberside, using ratio-indicators, 19 per cent of the economically active males were unemployed in 1971. These squares, most of which have small populations, contain only ten per cent of all the unemployed males. In the worst five per cent of squares, using absolute numbers of unemployed males, only eight per cent are unemployed, although these squares include 59 per cent of all unemployed males. Using signed chi-score based on an average County expectation of 5.36 per cent, 11 per cent of the economically active were unemployed in the worst squares, which contained 47 per cent of all unemployed males. Thus ratio measures grossly underestimate the degree of spatial concentration of individual aspects of deprivation.

In evaluating measures of concentration, some attention must be given to the base population. The worst five per cent of squares in Humberside, using the signed chi-score measure, include 47 per cent of the unemployed and occur largely in the 'inner areas' of Hull and Grimsby, some Council estates, and in coastal, early retirement areas such as Bridlington. If we restrict our base to Hull and its immediate surrounds, the largely urban pattern of severe unemployment will appear more widespread. Moreover, if we confined the base to the 'inner areas' of Hull, we would conclude, as Smith (1979a) did, that unemployment was scattered. The final stages of priority delimitation and administration must eventually occur at a local level, based on completely different methods geared towards the identification of deprived individuals and households. The identification of priority areas must however be conducted within a suitable spatial framework, including a complete urban system at the very minimum (see Kirby, 1981, for discussions on a related theme).

3.2 The Identification of Deprivations

Carley (1981) felt that problems of delimitation exist: "Is it more efficient to direct limited resources to

the worst one per cent of EDs or spread them more thinly over the worst 15 per cent?" (p 146). It has already been argued elsewhere (Visvalingam and Dewdney, 1977) that quantile systems provide a useful scheme for comparative studies but are particularly inapt for problem-oriented studies. Proportional symbol maps, based on signed chi-score (Visvalingam, 1982) not only showed a much greater degree of spatial contiguity of worst cases than either ratios or absolute numbers, but also indicated that unemployment was a particularly serious problem in less than five per cent of the one-kilometre squares in Humberside. Moreover, proportional symbols highlight the tremendous variation in the spatial concentration of the deprived within different urban systems even within the limited area of Humberside. This suggests that the search for a consistent system of cut-offs may be academic and misplaced.

Census-based area profiles are seen only as a "first sieve" for identifying areas of multiple deprivation (Holtermann, 1975, 44). "It is important that citizens be involved in the neighbourhood assessment process wherever resource allocation is the intention, and that units being classed be kept small and checked carefully 'on the ground' for realism" (Carley, 1981, 146-7). This process is likely to whittle down the candidates for experimental schemes even further.

The identification of priority areas on individual measures of deprivation is beset with other problems. Hakim (1978, 8) differentiated between descriptive and diagnostic indicators. Descriptive indicators provide precise statistical enumerations, for example of those who are unemployed in different areas. Diagnostic indicators use the statistics on unemployment as proxy measures to identify the unemployed who are probably in need. Imber (1977, 31) illustrated the diagnostic use of statistics with "... it is not suggested that all those living in privately rented furnished accommodation need the help of the Social Services Department, but that in areas where there is a high proportion of such people there is likely to be a high need for the Personal Social Services".

Many indicators demonstrate an ambiguous relationship to the general concept of poverty and deprivation (Edwards, 1975; Knox, 1978; Smith, 1979a). For example, a "low economic activity rate ... can indicate the presence of students or the early retired, as well as unemployment or underemployment" (Carley, 1981, 144). Exceptionally high rates and numbers of unemployed males occur in census areas with male institutions such as borstals and prisons (Visvalingam 1982). Smith (1979a, 30) concluded "We are still a long way from being able to translate the life experience of people into the type of numerical data required by the positivist social science and by the managerial rationality approach to policy. For example, can we really claim that, on their own, such census variables as access to

basic amenities adequately measure housing quality, when this makes no distinction between a tower-block flat and a stock-broker belt mansion"? No, they do not.

The much maligned spatial perspective is based upon the concept that residence and neighbourhood, as indicated by ecological relationships rather than absolute address, provide important clues for separating the sheep from the goats. Tower-block flats and stockbroker-belt mansions may share some characteristics, but also differ in other respects which ground surveys, even if not census statistics, would detect. When the writer, who is of New Commonwealth origin, was residing as an unemployed lodger with a relatively large family in a red-brick terraced house in the 'inner areas' of Hull, this reflected the state of need of both lodger and hosts. The writer is still of New Commonwealth origin and is still counted amongst the unemployed, but her residence in an owner-occupied property in a relatively high-status area is a diagnostic indicator of her lack of need of the personal Social Services.

Smith (1979a, 29) suggested that "solutions might better be sought at both the more individual level of the actual people experiencing deprivation and the broader features of economic and social structure, than in policies of positive discrimination and in spending on a local area basis." The ultimate focus of area-based policies is target groups, consisting of individuals, rather than the area itself. The above example illustrates the difficulties inherent in the identification, without means testing, of individuals in need and demonstrates the intuitive basis for including a spatial perspecitve. The non-selective payment of compensatory benefits, to the unemployed for instance, is by no means socially equitable and is unlikely to effect any change in the material circumstances of the deprived as it is spread too thinly. It is also difficult to instil common standards of judgement in ground staff, with inevitable variations in their value systems, experience and commitment. The population census still provides the only spatially comprehensive data set which has been collected on a consistent basis, and it would be short-sighted to ignore this source of information.

3.3 The Coincidence of Deprivations

Hamnetts's (1979, 252-3) review of multiple deprivation reflects some variation in the conceptualisation of the problem. The basic concept is one of interlocking series of cycles of deprivation. Unemployment and low income result in poor standards of accommodation and overcrowding, which together induce psychological strain and ill health. These retard a child's performance at school, whilst a host of cultural and political factors result in inferior educational opportunities for these children compared with those on offer to privileged groups. With poor educational qualifications, the children themselves become liable to

unemployment and poorly paid jobs (Edwards, 1975). Hakim (1982) reviewed the far-reaching social consequences of unemployment.

Post-war reforms in Britain offered several exits from this network through programmes of subsidised public housing and education, the National Health Service, compensatory social benefits, etc. In addition, favourable labour laws and collective bargaining enabled manual workers to earn as much, if not more, than white-collar workers. Consequently, we have a complex scenario within which some sectors of the working class have acquired social mobility whilst others have exacted favourable material status. Yet other sections of the working class have been transferred from the inner city slums to outer council estates without a concomitant change in other circumstances. Others continue to live in 'inner areas', some of which have been modernised whilst the character of some other areas have been transformed by the influx of immigrant populations. To these historical variations we can add regional, intra-regional and local variations in the impact of fluctuations in the national economy and the differential policies of fractions within the hierarchically organised governmental and service-delivery systems.

Thus, in Britain, it is unrealistic to view multiple deprivation as a uni-dimensional phenomenon, exhibiting a collinear relationship between the different forms of deprivation. "It is more realistic to think of deprivation as multi- rather than uni-dimensional and of deprived areas as being of different kinds containing different combinations of deprivations" (Hatch and Sherrott, 1973, 236-7). Holtermann's (1975) study substantiates the concept of different forms of deprivation and her evidence "suggests that the pattern of spatial association between different kinds of deprivation may vary significantly from place to place, being the outcome of a complex combination of many forces, some of which can operate anywhere while some are specific to particular places" (p 42). Webber's (1975) classification of residential neighbourhoods again suggests that the indicators of overcrowding, sharing of amenities and lack of amenities have very different distributions.

It is against this background that we must evaluate the suggestion that different problems do not coincide in a spatial sense at a local level. Smith (1979a) provided evidence using three different methods, namely correlations, composite indices of deprivation and an analysis of the degree of overlap between worst cases, all based on ratio indicators.

Correlations, like many other statistical techniques based on the General Linear Model (GLM), are primarily geared towards the mathematical abstraction of generalisations concerning the population at large. Correlations are sensitive to outliers and, as pointed out by Kirby (1981), to

the range of values in the sample. Smith's coefficients are difficult to interpret since his sample was unrepresentative of the population and was drawn largely from the bad end of welfare distributions (compare the averages provided by Smith (1979a) for Tower Hamlets with those for Greater London and England and Wales). Moreover, bivariate distributions of social data, particularly when expressed in signed chi-score form, appear to violate the assumptions of the GLM (Visvalingam, 1981a).

More importantly, the degree of linear association between welfare variables in the population at large does not in itself prove the presence/absence of a coincidence of deprivations in a few localities. Correlation analyses are blunt and irrelevant to studies concerned with the unique and with exceptions in the extremities of property distributions and appear to be more appropriate for policies concerned with the population at large.

Smith also reported the scattered distribution of 'worst' areas on composite indicators, derived through the aggregation of standard scores for eight variables. Elgie (1979) made the important point that standardisation to zero mean and unit variance suppresses critical information on the variation in attributes. Moreover, an aggregative model is only suitable for ordering areas on any individual dimension of need; for example for locating vulnerable (perhaps lone and of low SEG) pensioners living in accommodation with poor amenities. Overcrowding and lack of a car may be irrelevant. Knox (1978) considered aggregative models as inappropriate yardsticks for exploring the multidimensional nature of deprivation. Hatch and Sherrott (1973, 237) stated that they were blunt and arbitrary and that they do not point to appropriate remedies.

Further, despite the caution of Hakim (1978), Knox (1978) and others, Smith included a hotch-potch of indicators to represent a "wide range of conditions". Two of the eight variables, namely population aged 0-14 and population of pensionable age are mutually exclusive categories of the same base population with some measure of negative correlation owing to the closure effect (Chayes, 1971). In the absence of sound a priori reasoning, an aggregative model appears unsuitable when a negative association is expected between pensioners and children (Webber, 1978, 276; Visvalingam, 1981a) and between pensioners and New Commonwealth born (NC born); in 1971 aged NC born were a minority within a minority group (Blackmore, 1983).

Smith, like Holtermann (1975), also examined the extent of overlap between different welfare indicators and both their conclusions are repeatedly used by the critics of area-based policies (Hamnett, 1979). The technique used is similar to the Cartet Count method of Cattell and Coulter (1966) and analogous schemes have been adopted by Morgan (1976), Robson (1979, 77), C.R.U./O.P.C.S. (1980) and

Shepherd et al (1982) for producing composite classes. Class boundaries parallel to the Cartesian axes are used for partitioning the multidimensional space into cartets or hypercubes and the number of data points in each cartet is counted. The overlap method expects the 'worst' cases on each dimension to coincide within the same extreme hypercube. Some of the technical limitations of this approach have been discussed elsewhere (Visvalingam, 1981a). The main objections here are as follows. First, rectilinear boundaries parallel to the axes are unnatural even in bivariate distributions for they tend to segment natural clusters and underestimate the degree of coincidence of different problems. If two variables are closely related it is more appropriate to employ boundaries which are orthogonal to the trend of their bivariate relationship. Rectilinear divides are only valid when there is a perfect positive relationship - since here they define a cut-off point on a line rather than describe a dividing line on a plane.

Second, quantile systems for locating extremes can also segment natural groups and are not robust. They do not facilitate comparative studies since the cut-off values can vary with the sample. They also place equal importance on extremities in each dimension. For example, only 0.84 per cent of households in Hull and its immediate surrounds were severely overcrowded (living at densities over 1.5 persons per room (ppr)) in 1971 compared with 1.5 per cent in England and Wales. Moreover, whilst Smith recorded rates of 53.7 and 32.1 per cent in EDs in the Tower Hamlets, within the Hull urban system the highest rate was less than 3.5 per cent in the worst kilometre square. Overcrowding in the worst 10 per cent of grid squares only exceeded 2.05 per cent - this compares with a 10 per cent cut-off value of 6.2 per cent for EDs in urban GB (Holtermann, 1975, 45). In general, overcrowding is becoming a residual problem for several reasons Robson (1979). On the other hand, nearly a quarter of all households in Hull lacked exclusive use of all amenities and over 50 per cent of households in the worst ten one-kilometre squares were so deprived. This compares with a cut-off value of 56.8 per cent for EDs in urban GB (Holtermann, 1975).

Holtermann (1975, 40) stated "the procedure used here of taking common percentile points on each indicator amounts to treating the levels of individual deprivations found at equal percentile points as being equivalent in welfare terms". Holtermann recognised that this does not consider the relative importance of different aspects of deprivation to the individuals concerned - the lack of a car poses a qualitatively different problem from the lack of employment or old age. There is also a further numeric problem. The overlap procedure based on percentile cutoffs also implies that the level of area deprivation (i.e. concentration of deprived households) at equal percentile points is equivalent in welfare terms. This is clearly contentious - in the Hull context, this amounts to saying that the ten worst kilometre squares with between 2.05 and 3.5 per cent of households in

overcrowded conditions are as 'bad' as the ten worst squares with between 50 and 92 per cent of households lacking exclusive use of basic amenities.

In addition, the mere counting of 'overlaps' in extreme hypercubes misses out other information. Even a bivariate scatterplot of ratio representations of overcrowding against lack of amenities (Figure 1) facilitates a different perspective on the issue of the coincidence of deprivations in Hull. Figure 2 is a scatterplot of the signed chi-score representations of the same two variables. In Maps 1 and 2 the distribution of these deprivations is shown by symbols which are proportional to the signed chi-score values.

Households lacking amenities were concentrated in the older 'inner' areas of Hull with an excess of privately rented, especially unfurnished, accommodation (the classification of tenure types is based on the method described by Visvalingam, 1981). Since over 75 per cent of households in the worst five (under 5 per cent of) squares lacked amenities, the problem was endemic and not confined to privately rented accommodation, which formed 61 per cent of all households in these squares. These worst five squares contained 15,443 households, which formed 5.58 per cent of all households in Humberside and 13.33 per cent of the households in the Hull sub-area. The 11,501 households which lacked exclusive use of all amenities in these five squares formed 21 per cent of all households so deprived in Humberside and over 40 per cent of households lacking exclusive use of all amenities in Hull.

There was also a tendency for these worst squares to exhibit an excess, relative to expectation, of the residual overcrowded families. Over two per cent of the households in these five squares were overcrowded, but they formed only 25 per cent of all overcrowded households in the Hull sub-area. However, this does not detract from the fact that four of these five squares also fall within the worst five overcrowded squares (Figure 1). Figures 1 and 2 foster somewhat different interpretations. The ratio distribution (Figure 1) suggests that overcrowding is more serious in council estates than in the inner areas of Hull. However, ratios based on discrete counts are unreliable for ranking areas with respect to residual problems. For example, the highest ratio of 14 per cent (1 in 7 households in square 5040 4340) was ignored in the ratio plots since a change in the family circumstances or housing conditions of this one household could result in zero per cent overcrowding. The next highest ratio of 3.12 per cent in a kilometre square (5130,4330) in Longhill refers to only two out of 64 households. In contrast, the highest signed chi-score value refers to 58 in 2255 households (i.e. 1.03 per cent) in Greenwood (5060,4320). The signed chi-score distribution (Figure 2) suggests that, in the worst cases, many more areas and households are so deprived within the privately rented sector compared with the public-housing sector in Hull.

The lack of a perfect statistical relationship between the lack of amenities and overcrowding is irrelevant, particularly in view of the ambivalent nature of social data. Both percentage households lacking exclusive use of all amenities and percentage households living at densities over 1.5 ppr are blunt measures. The first does not discriminate households lacking one amenity from those lacking all three, i.e. hot water, a fixed bath and an inside WC. The second again covers a wide range of conditions over 1.5 ppr and does not distinguish overcrowding due to large families from severe overcrowding in small inadequate housing units. These indicators are used in this paper to illustrate methodological concerns since they have been widely used as welfare indicators.

The scatterplots indicate that whilst the level of overcrowding was high in squares which were markedly lacking in amenities, it was also high in some other squares with high standards of amenities. Map 2 indicates that this second type of area with a concentration of overcrowded families occurred in some outer council estates. This map and Figure 2 indicate that not all squares with a concentration of council housing suffered from this problem in 1971; the significance and/or implications of this are outside the scope of this paper. Since less than 3.2 per cent of the households were over-crowded even in this worst area, it would be prudent to question whether this form of deprivation merits an area-based solution in Hull. If the answer is no, we need to reconsider the inclusion of this theme in area classifications.

Explicit investigations would be necessary to ascertain whether the concentration of 'residual' overcrowded families was diagnostic of much higher levels of concentration of other problems, such as unemployment and low income. This paper is not concerned with providing a portrait of deprivation in Hull in 1971 (see Davidson and Francis, 1973). However, the signed chi-score distributions of male unemployment and no-car households (Maps 3 and 4) are included. The general impression is that the 'inner' areas were characterised by relatively high measures of overcrowding, coinciding with a widespread lack of amenities, and that the council estates with high levels of overcrowding also had a marked excess of male unemployment and no-car households. These latter problems were also in excess, to a much lower extent, in some other council estates, notably in Longhill and the then newly developed Bransholme estate.

The outstanding impression is still one of a numerical concentration of deprived and a coincidence of deprivations within the least desirable inner areas in 1971. The lack of a car poses a qualitatively different problem in the outer council estates (Knox, 1978). These deprivations appear to be concentrated in four areas of the city - in St. Andrew's dock (2 kilometre squares), in the Spring Bank end of Botanic

Ward and Beverley Road, in Sculcoates and in Drypool (see Table 1).

Within the outer ring of council estates (Map 1), the standard of amenity provision was very high but other forms of deprivation repeatedly occurred in the same problem estates, especially in Greenwood Ward in North Hull and in Marfleet and Greatfield in East Hull.

The evidence in Hull suggests a spatial coincidence of deprivations in 1971. This may not be the case elsewhere but it is difficult to evaluate the situation in Tower Hamlets from Smith's recorded observations. The data provided for Spitalfields and Shadwell confirmed the spatial coincidence of problems in these localities at least. The low figures for male unemployment in Spitalfields must be interpreted with caution since this is just a proxy measure for the income node in the network of deprivation. The low figures for male unemployment may thus conceal part-time and underemployment and/or low incomes, and indicate the persistence of deprivations despite the availability of and the willingness to work!!

3.4 Ecological and Individual Deprivations

The evidence for a spatial coincidence of deprivations leads us to the fourth empirical reservation concerning area-based policies, namely that it is a fallacy to assume that the majority, if not all, individuals in sub-areas conform to the pattern of characteristics derived from aggregate data. The assessment of the coincidence of deprivations at the individual/household level is undoubtedly best checked on the ground (see Section 3.2 above).

The mere possibility of ecological fallacy does not invalidate an area-based approach, although it would be foolhardy to ignore such caution. Smith's data for the EDs in Spitalfields and Shadwell show that the majority of households did suffer from a combination of problems. Since over 95 per cent of households lacked a car, only 5 per cent at most were car owners. Even if we assume maximum disparity and that 5 out of the 96 per cent of households lacking amenities owned a car, over 90 per cent of households lacked both. Where overall levels of deprivation are very high this seems all too obvious. Even where the overall levels of deprivation are lower, where deprivation is associated with nominal categories such as house tenure, socio-economic or ethnic categories, it is possible to deduce the extent of coincidence of deprivations at the household level by a similar process of reasoning. This is aided to a great extent by the detailed tabulations in the 1981 census SAS.

The issue of ecological fallacy is extremely relevant to studies of multiple deprivation which use cluster-analytic techniques to extract a typology of social areas. Despite variations in methodological details, techniques for cluster

analysis tend to be based on correlations or differences between individual areas or between individual areas and groups of areas (Everitt, 1974). Thus composite indicators and aggregative models form the basis of clustering algorithms. Unless welfare indicators are selected on *a priori* grounds, the generalisations about the distribution of data units in measurement space and about the socio-spatial structure of society can be misleading. Openshaw *et al* (1980) discussed some technical problems in cluster analysis. In the present context, we need to question the relevance of cluster-analytic procedures to policies of area-based positive discrimination.

Social area analysis is relevant to planning activities which respond to the socio-spatial structure of society. With the diminishing role of social class as a diagnostic indicator of lifestyle and spending habits in postwar Britain, census-based area typologies which include data on social class are becoming useful devices for discrimination and targetting in direct marketing, media advertising and retailing, particularly when used with market research data and/or a firm's own customer profiles. In such applications, area typologies are useful if they can even halve large-scale mailshots or leafletting without undue loss of potential customers. Further reductions in advertising costs are an added bonus. The hit/miss nature of such operations based on aggregate group probabilities is not disconcerting in exercises geared purely towards increasing the efficiency of expensive operations - and stereotypes are adequate for this purpose.

The success of general-purpose area typologies in commerce cannot be taken as an endorsement of their use in positive discriminatory policies of social reform, which must ultimately satisfy issues of both efficacy and equity in their identification of target areas. Area-based social policies are concerned with the 'residual' poor in environments in the extremities of measurement space rather than with modal types and their aggregate probabilities. Methods which are specifically geared towards the identification of dense clusters cannot also be attuned to to the study of diffused exceptions in the peripheral regions of property space. These techniques can only be accepted as temporary expedients in the absence of more incisive methods. The use of the aggregate characteristics of clusters can be misleading, since individual units within clusters may not share cluster characteristics in substantive issues. Statistical aids for evaluating a general purpose classification (Openshaw, 1982) are of limited utility where the broad selection of variables distributes deprived areas between different clusters. The caution against ecological fallacy is particularly relevant in this context but it does not invalidate an area-based corporate approach to problem solving.

In general, the empirical arguments against area-based policies appear to be red herrings based on inappropriate methods. As Eyles (1979, 241) concluded, "Until we definitely know, it would be foolhardy to abandon area-based policies which may simply require refining".

4. CONCLUSION

Planning is not a value-free activity (Masser,1980, 44). Both at the individual and collective levels irrational and primitive instincts influence motivating beliefs and aspirations (Cullen and Knox, 1982). Yet it is generally assumed that empiricism can provide justification for consensus (Carley, 1981; Johnston, 1980; Webber, 1978).

Independent observations, such as the census SAS, are impartial. They do not however remove subjectivity or arbitrariness in the selection and interpretation of welfare indicators. Ideological beliefs and personal experience act as subconscious perceptual filters. This is compounded by the low state of the art of social indicator development, the ambivalent relationship between underlying concepts and their quantitative representations and some callously inappropriate and sloppy application of statistical methods.

Conventional statistical analyses, based on concepts of central tendency and dispersion and aggregate probabilities, do not yield adequate or pertinent information on deprived areas in the tails of statistical distributions. Consequently, statistical 'evidence' can confuse as much as clarify social issues. Thus appropriate graphical displays in the form of maps, Lorenz curves, scatterplots etc., are absolutely necessary for the evaluation of statistical arguments. In the absence of such supporting material, many of the empirical arguments against area-based policies appear questionable and/or irrelevant.

REFERENCES CITED

ALVEY COMMITTEE (1982) A Programme for Advanced Information Technology, The Report of the Alvey Committee, Department of Industry, H.M.S.O., London.

BLACKMORE, K. (1983) "The Asian and West Indian old : their needs are different", Community Care No. 449, Feb. 10, 12-13.

CARLEY, M. (1981) Social Measurement and Social Indicators - Issues of Policy and Theory , George Allen and Unwin, London.

CATTELL, R.B. and COULTER, M. A. (1966) "Principles of behavioural taxonomy and the mathematical basis of the taxonomic computer program", Br. J. Math. Statist. Psychol. 19, 237 -69.

CENSUS RESEARCH UNIT and OFFICE OF POPULATION CENSUSES AND SURVEYS (1980) People in Britain - a Census Atlas, H.M.S.O. London.

CHAYES, F. (1971) Ratio Correlation, University of Chicago Press, Chicago.

COMPUTER WEEKLY (1983) "Leeds opens a women-only micro-centre" No 852 (March 24), 6.

CULLEN, J. and KNOX, P.L. (1982) " The city, self and urban society", Trans. I.B.G. N.S. 7, 276-91.

COVENTRY COMMUNITY DEVELOPMENT PROJECT (1975) Final Report Part 1: "Coventry and Hillfields : prosperity and persistence of inequality" - quoted by Hamnett (1979), op. cit.

DAHRENDORF, R. (1982) "Dahrendorf on Britain" BBC1 Serial, 4th - 8th January, 1982.

DAVIDSON, R.N. and FRANCIS, M.K. (1973) "Kingston upon Hull and Haltemprice Social Area Analysis 1966 : Part II Commentary" University of Hull, Department of Geography, Miscellaneous Series No. 15, 36-41.

EDWARDS, J. (1975) " Social indicators, urban deprivation and positive discrimination", J. Soc. Policy, 4(3), 275 - 87.

ELGIE, R.A. (1979) "The segregation of socio-economic groups in urban areas: a comment", Urban Studies 16 (2), 191 - 5.

EVERITT, B.(1974) Cluster Analysis, Heinemann, London.

EYLES, J. (1979) "Area-based policies for the inner city : context, problems and prospects", in Herbert, D.T. and Smith, D.M. (eds.) op. cit., 226 - 243.

EYLES, J. and Lee, R. (1982) "Human geography in explanantion", Trans. I.B.G. N.S. 7, 117-22

HAKIM, C. (1978) " Social and community indicators from the census", O.P.C.S. Occ. Paper 5.

HAKIM, C. (1982) "The social consequences of high unemployment", J. Social Policy, 11(4), 433-67.

HAMNETT, C. (1979) "Area-based explanations : a critical appraisal", in Herbert, D.T. and Smith, D.M. (eds.), op. cit., 245-260.

HAMNETT, C.(1983) "The conditions in England's inner cities on the eve of the 1981 riots", AREA 15 (1), 7-13.

HATCH, S. and SHERROTT, R. (1973) "Positive discrimination and the distribution of deprivations", Policy and Politics, 1, 223 - 40.

HERBERT, D.T. and SMITH, D.M.(eds.) (1979) Social Problems and the City : geographical perspectives, Oxford University Press, New York.

HOLTERMANN, S.(1975) " Areas of urban deprivation in Great Britain : an analysis of 1971 data", Social Trends 6, 33 - 47.

IMBER, V. (1977) "A classification of the English Personal Social Services Authorities", DHSS Statistical and Research Report Series No. 16, H.M.S.O., London.

JOHNSTON, R.J. (1980) "On the nature of explanation in human geography", Trans. I.B.G. N.S. 5, 402-12.

JOHNSTON, R.J. (1982) "On the nature of human geography", Trans. I.B.G. N.S. 7, 123-5.

JONES, K. and KIRBY, A.(1980) " The use of chi-square maps in the analysis of census data", Geoforum 11, 409 - 417.

KIRBY, A.(1981) "Geographic contributions to the inner city deprivation debate: a critical assessment", Area, 13(3) 177-181.

KNOX, P.L.(1978) "Territorial social indicators and area profiles : some cautionary observations", Town Plan. Rev. 49 (1), 75 - 83.

LAWLESS P. (1979) Urban Deprivation and Government Initiative, Faber, London.

MASSER, I. (1980) "The limits to planning", Town Planning Review 51 (1), 39-49.

McENERY, J.H. (1981) Manufacturing Two Nations, Institute of Economic Affairs, London

MACLARAN, A. (1981) "Area-based positive discrimination and the distribution of well-being", Trans. I.B.G. N.S. 6, 53 - 67.

MORGAN, B.S. (1976) "The bases of family status segregation : a case study in Exeter", Trans. I.B.G. N.S. 1(1), 83-107.

OPENSHAW, S. (1982) "A suite of portable FORTRAN IV computer programs (CCP) for classifying 1981 census data for areas" Report, Centre for Regional Development Studies, University of Newcastle upon Tyne.

OPENSHAW, S., CULLINGFORD, D. and GILLARD, A. (1980) " A critique of the national classifications of OPCS/PRAG", Town Planning Review, 51, 421 - 39.

PEARSON, K. (1982) "End of IT82 : 'just the beginning' - Thatcher", Computer Weekley, Dec 16/23, No 840, 5.

REX, J. and MOORE, R. (1967) Race, Community and Conflict: a study of Sparkbrook, Oxford University Press for the Institute of Race Relations, London.

ROBSON, B.T. (1979) "Housing, empiricism and the state", in Herbert, D.T. and Smith, D.M. (eds.), op. cit., 66-83.

SHEPHERD, J., RYAN, L. and CONGDEN, P. (1982) "Londoners are moving out", Geographical Magazine, LIV (12) (Dec 1982), 669-673.

SILK, J. (1982) "Comment on 'On the nature of explanation in human geography' ", Trans. I.B.G. N.S. 7, 380-4.

SMITH, D.M. (1979a) " The identification of problems in cities: application of social indicators", in Herbert, D.T. and Smith, D.M. (eds.) op. cit., 13-32

SMITH, D.M.(1979b) "Conclusion" in Herbert,D.T. and Smith,D.M. (eds.) op. cit., 261-266.

URWICK/COMPUTING SURVEY (1983) "Outlook seems bleak as budgets are cut back", Computing, 11 (1) (Jan 6 1983), 2-3.

VISVALINGAM, M. (1981a) " The signed chi-score measure for the classification and mapping of polychotomous data", Cart. J. 18 (1), 32-43.

VISVALINGAM, M. (1981b) "Area-based social indicators: problems and prospects", Census Research Unit Working Paper No. 20, Department of Geography, University of Durham.

VISVALINGAM, M. (1982) "Area-based social indicators: signed chi-score as an alternative to ratios" Int. Symp. on "Problems of social indicators: their role in social development", Tenth World Congress of Sociology, 16-20 Aug. 1982, Mexico City.

VISVALINGAM, M. (1983) "The operational definition of area-based social indicators", Environment and Planning A, in press.

VISVALINGAM, M. and DEWDNEY, J.C. (1977) " The effects of the size of areal units on ratio and chi-square mapping", Census Research Unit Working Paper 10, Department of Geography, University of Durham.

WEBBER, R.J. (1975) Liverpool Social Area Study, 1971 data : Final Report, PRAG TP 14, Centre for Environmental Studies, London.

WEBBER, R.J. (1978) "Making the most of the census for strategic analysis", Town Planning Review, 49 (3), 274 -284.

WILLIAMSON, W. and BYRNE, D.S. (1979) " Educational disadvantage in an urban setting", in Herbert D.T. and Smith, D.M. (eds). op. cit., 186 - 200.

TABLE 1: The lack of amenities and overcrowding in five one-kilometre squares in Hull in 1971

Ward	Households				
	All	Lack Amenities		Overcrowded	
		No.	%	No.	%
St. Andrews (5070 4270)	3384	2998	(88.59)	56	(1.65)
Sculcoates (5090 4300)	2020	1850	(91.58)	48	(2.38)
Drypool (5110 4290)	2474	1986	(80.27)	56	(2.26)
St. Andrews (5070 4280)	3906	2465	(63.11)	80	(2.05)
Beverley (5080 4290)	3659	2202	(60.18)	79	(2.16)
Total	15,443	11,501	(74.47)	319	(2.06)
Hull total	115,813	28,470	(24.58)	1262	(0.84)

source: the 1971 grid square population census data, provided by the Office of Population Censuses and Surveys

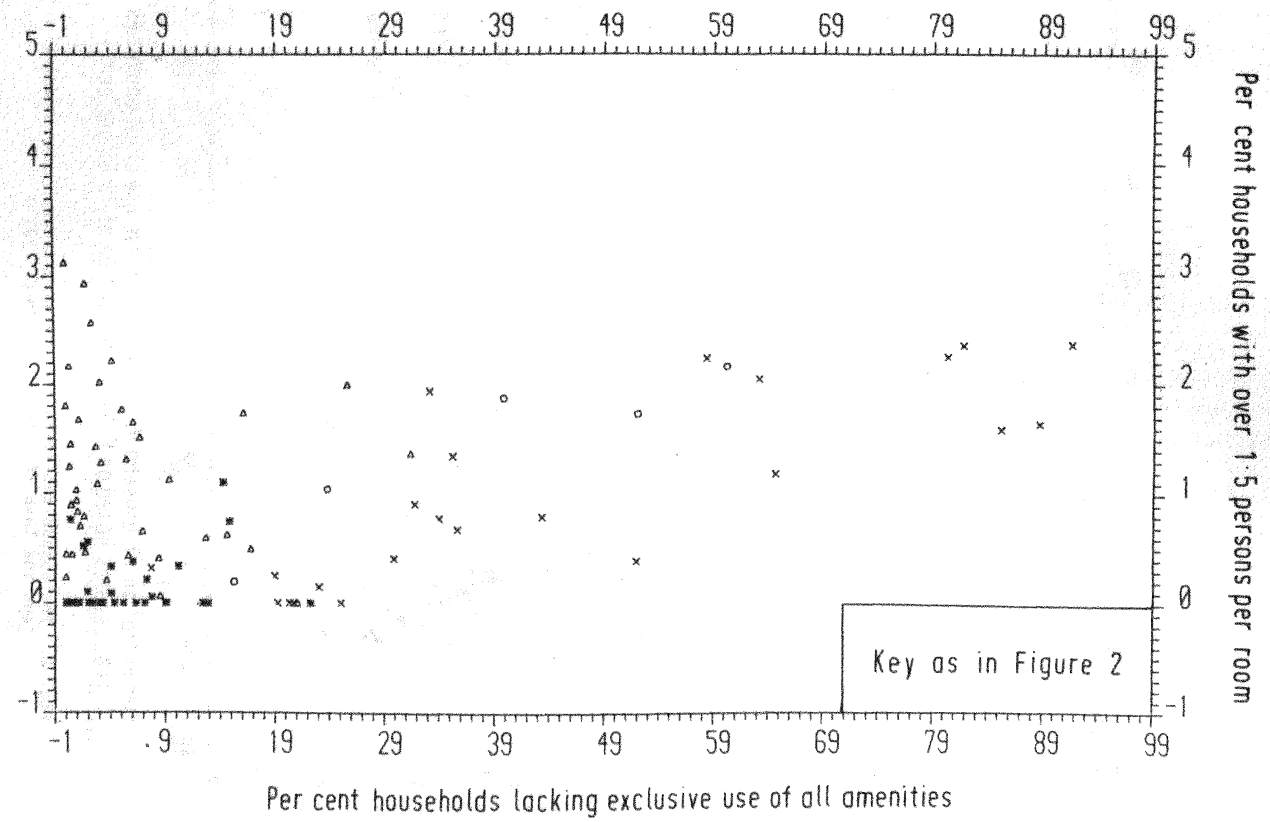


Fig. 1: The ratio relationship between overcrowding and lack of amenities in Hull (1971)

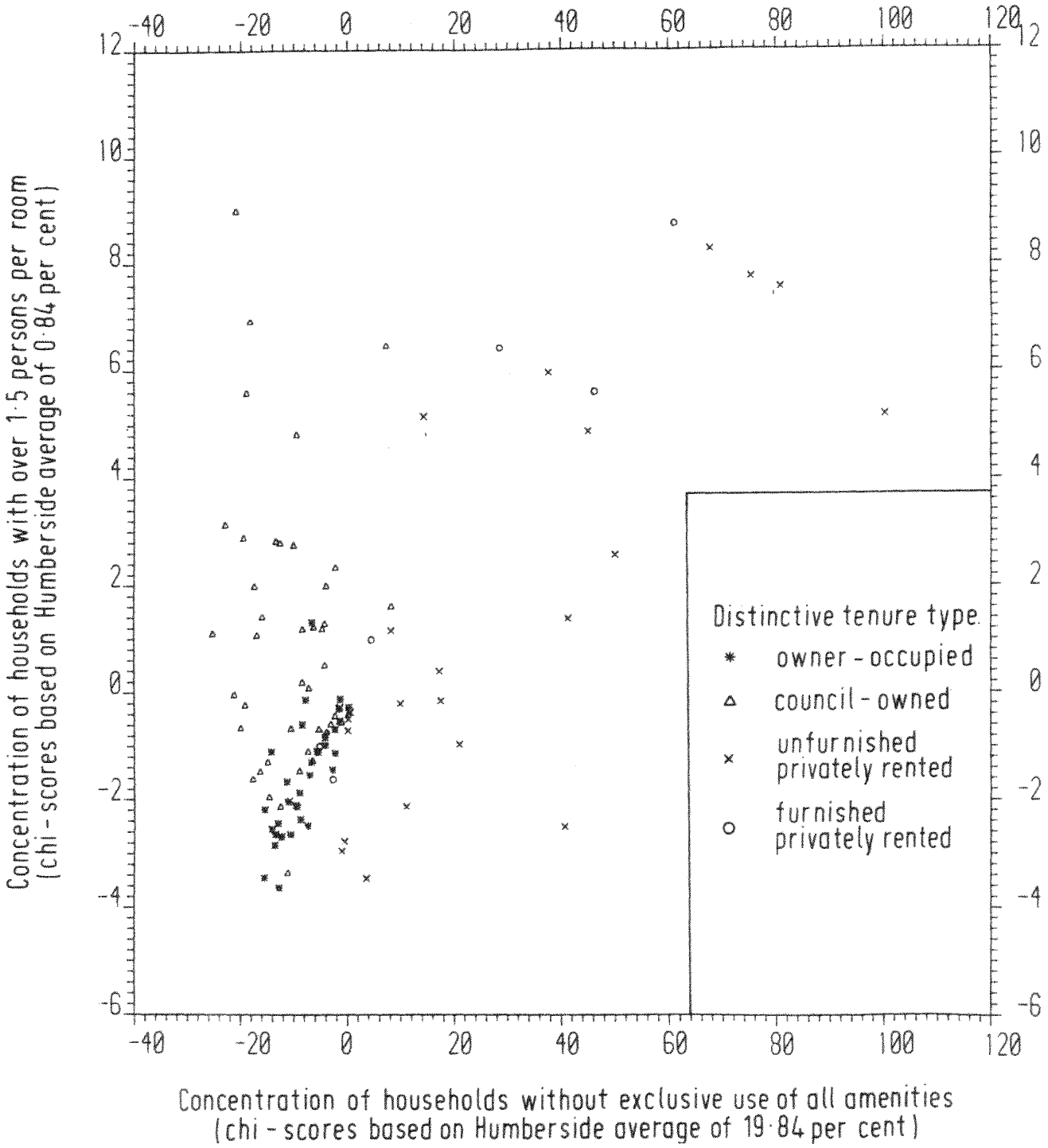
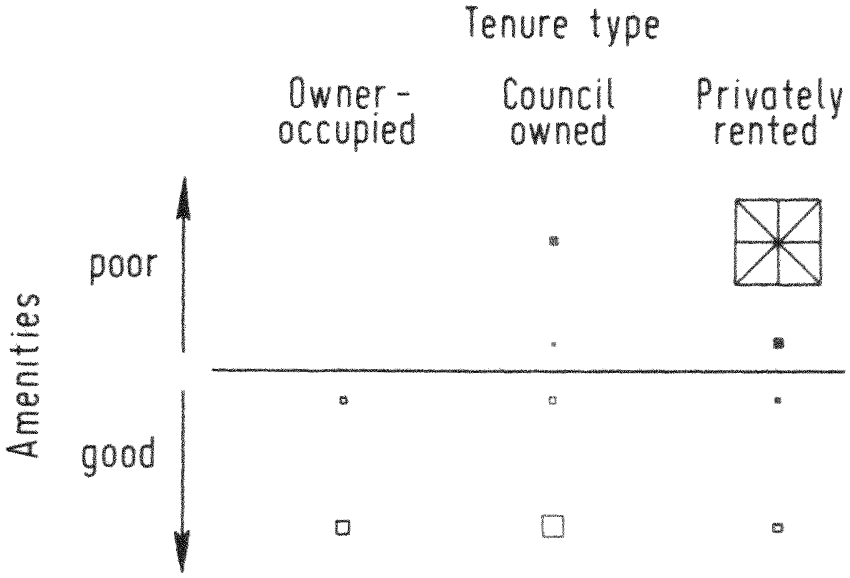
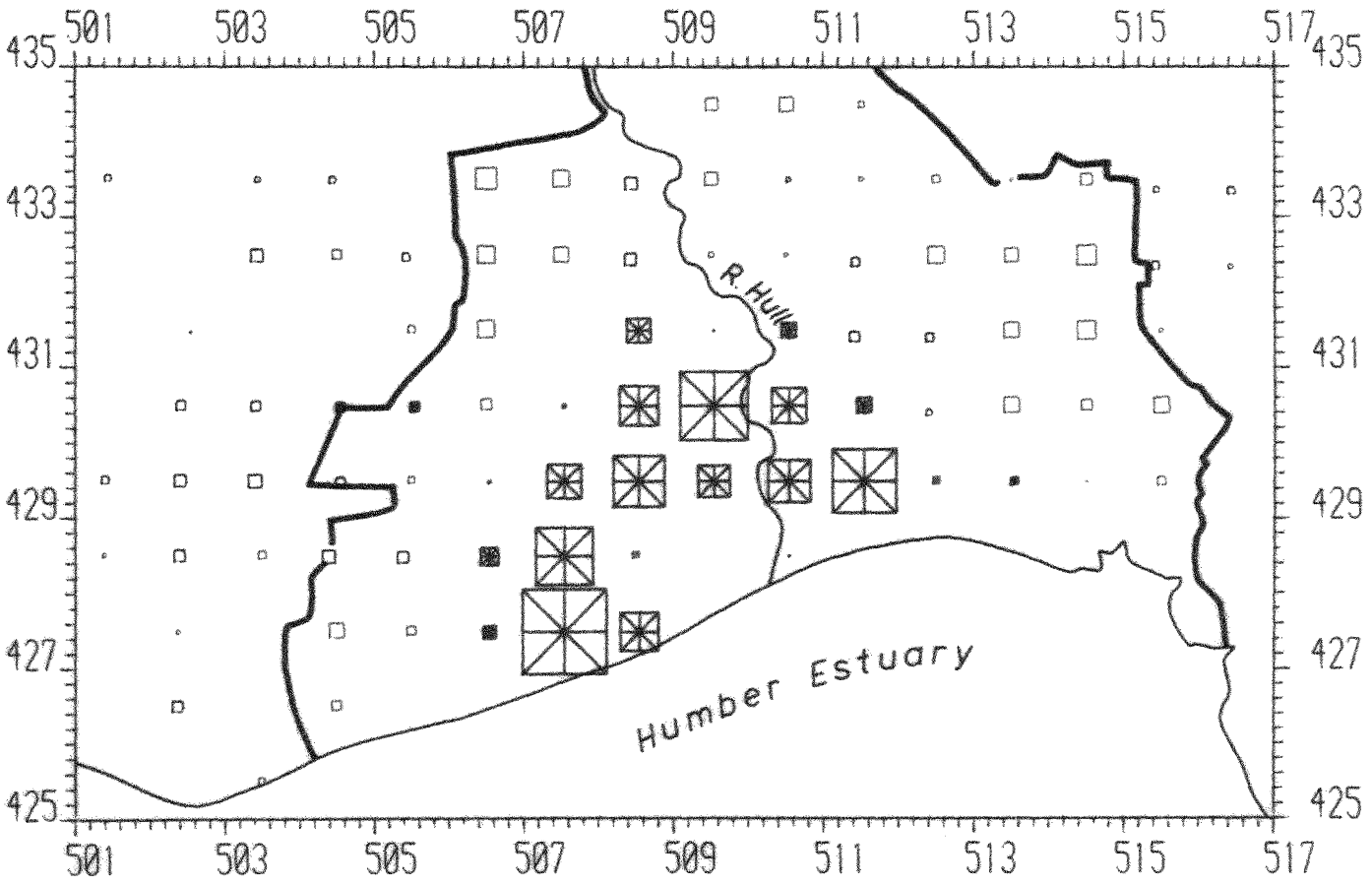
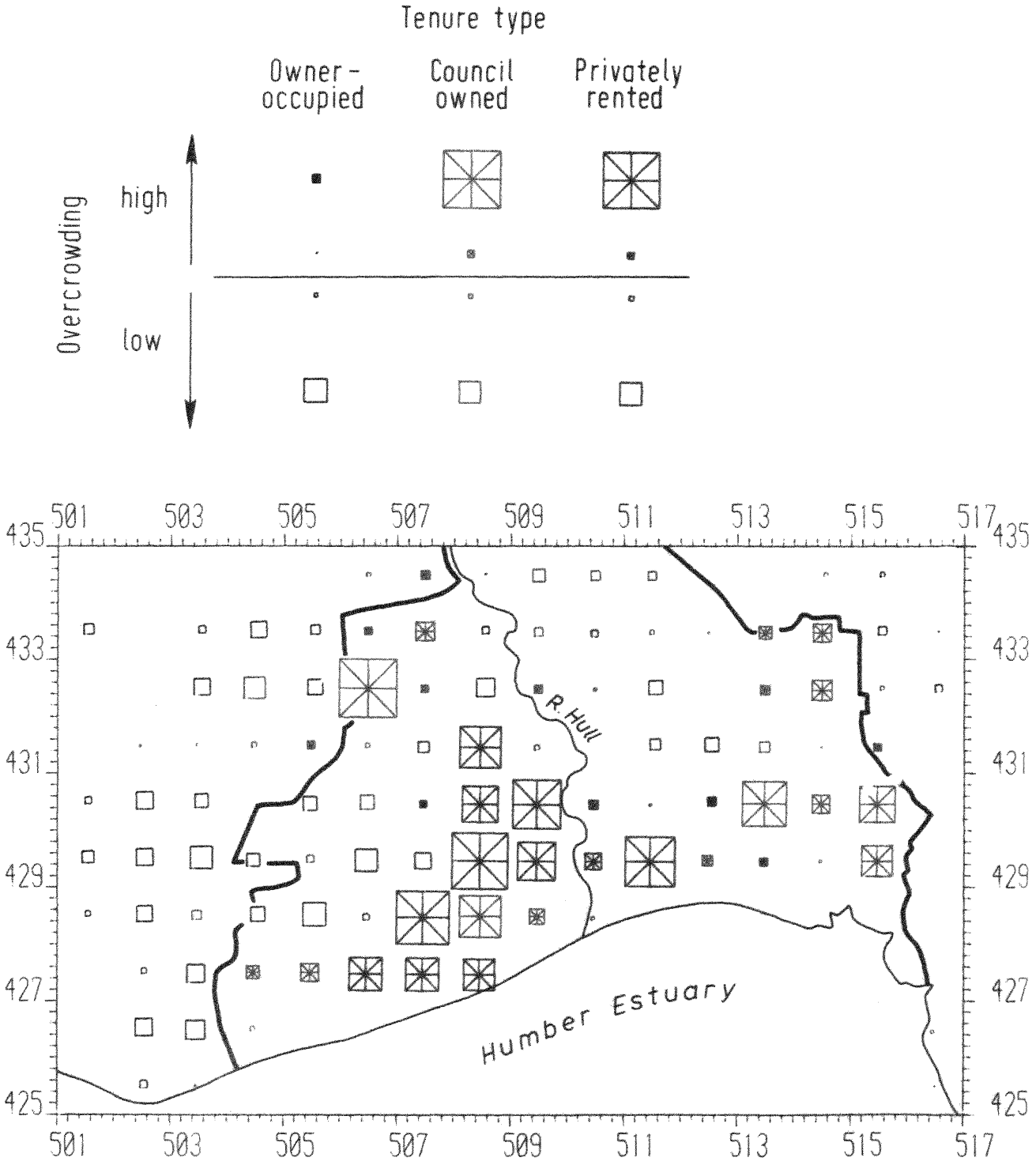


Fig. 2: The signed chi-score relationship between overcrowding and the lack of amenities in Hull (1971)

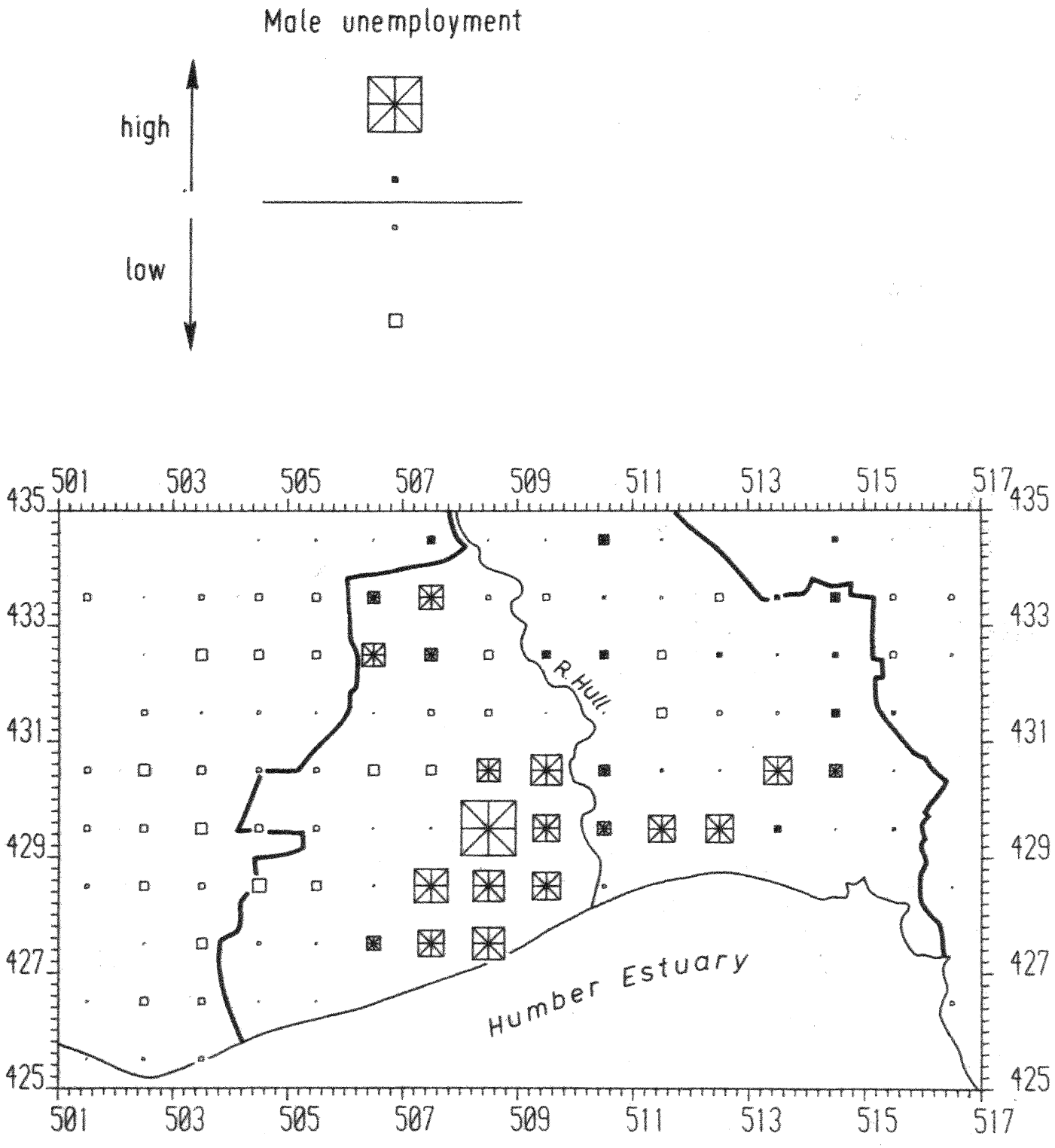




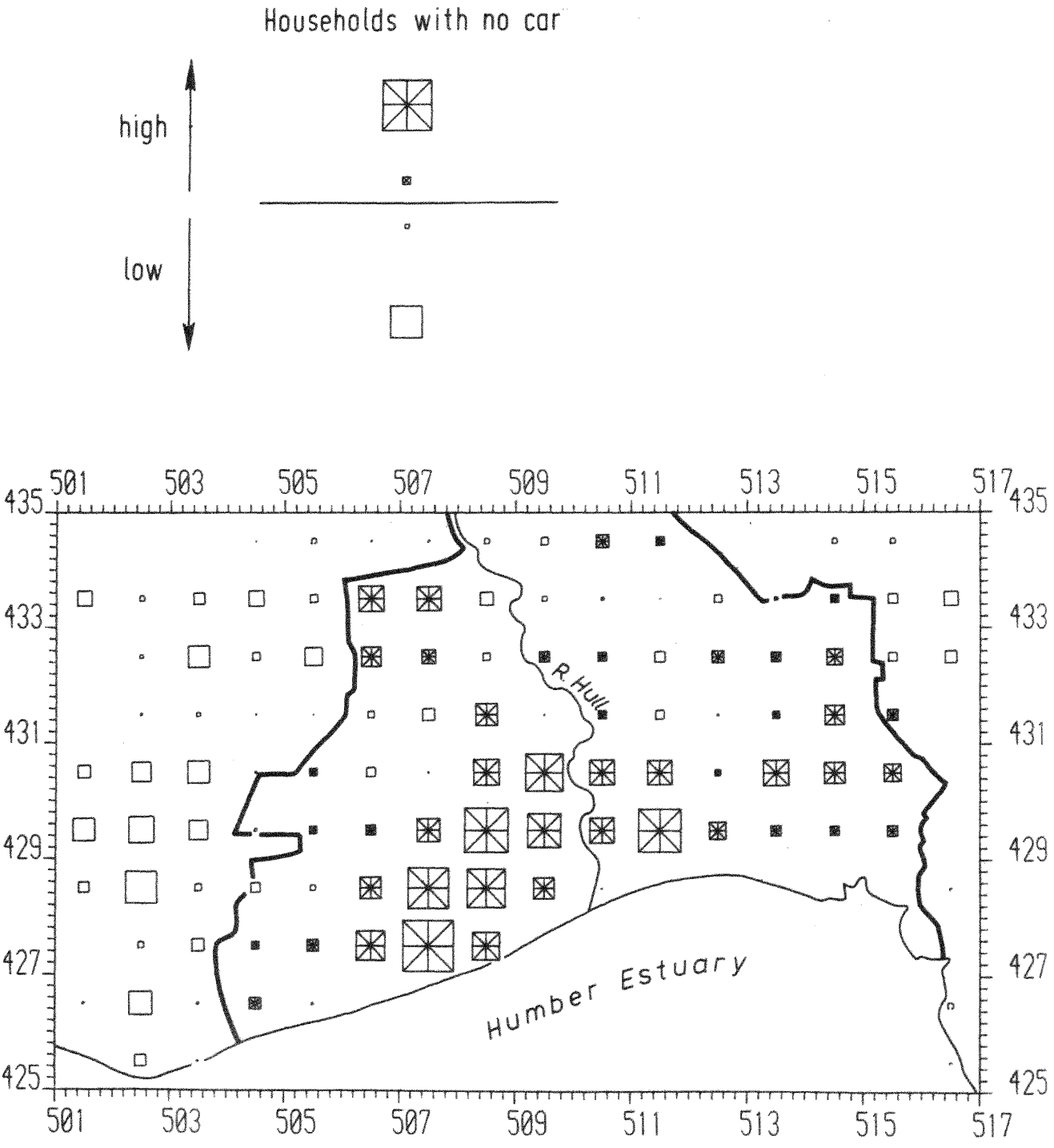
Map 1: The spatial distribution of households lacking amenities in Hull (1971)



Map 2: The spatial distribution of overcrowded households in Hull (1971)



Map 3: The spatial distribution of male unemployment in Hull (1971) : signed chi-scores based on Humberside average of 5.36 per cent.



Map 4: The spatial distribution of households without a car in Hull (1971) : signed chi-scores based on Humberside average of 53.06 per cent.

CRU Working Papers available in August 1983

Editor : J.C. Dewdney

1. Population and scale; by J.I. Clarke (1975)
2. Specific transformations are necessary; by I.S. Evans, J.W. Catterall and D.W. Rhind (1975)
3. Geographical analysis and mapping of the 1971 UK Census data; by D.W. Rhind (1975)
4. Storage of the 1971 UK Census data; some technical considerations; by M. Visvalingam (1975)
5. The relationship between the size of areal units and the characteristics of population structure; by J.I. Clarke and D.W. Rhind (1975)
6. Data interchange on industry-compatible tapes; by M. Visvalingam, M.J. Norman and R. Sheehan (1976)
7. Storage of the grid-square based 1971 GB Census data; checking procedures; by M. Visvalingam and B.J. Perry (1976)
8. Chi-square as an alternative to ratios for statistical mapping and analysis; by M. Visvalingam (1976)
9. The derivation of new variables from population census data; by D.W. Rhind, I.S. Evans and J.C. Dewdney (1977)
10. The effects of the size of areal units on ratio and chi-square mapping; by M. Visvalingam and J.C. Dewdney (1977)
11. Population distribution in and around selected British cities; by D.W. Rhind, K. Stanness and I.S. Evans (1977)
12. A locational index for the 1971 kilometre-square population census data for Great Britain; by M. Visvalingam (1977)
13. Grid-square census data as a source for the study of deprivation in British conurbations; by J. Coulter (1978)
14. The identification of demographic types : a preliminary report on methodology; by M. Visvalingam (1979)
15. The use of grid-square census data in the location of hospital facilities : a case study of the Durham Health District; by J. Mohan (1979)
16. The 1981 census : the user's perspective; by Peter Norris (1980)
17. British census data and their use in quantitative geography; by I.S. Evans (1980)

18. Comparison of population changes within Great Britain during 1971-75 and 1975-79; H. Mounsey and J.I. Clarke (1981)

19. Census areas in County Durham, 1971-1981; by P. Norris (1981)

20. Area-based social indicators : problems and prospects; by M. Visvalingam (1981)

21. Linking and analysing census and medical data : mortality experience in County Durham, 1969-1977; by J. Mohan and D.W. Rhind (1983)

22. An examination of some area-based policies; by M. Visvalingam (1983)

Also available

People in Durham - a census atlas; by J.C. Dewdney and D.W. Rhind (eds.) (1975)

Copies of series may be ordered from:

The Librarian, Department of Geography, Science Laboratories, South Road, Durham, DH1 3LE, England.