

THE LOCATION OF BRITISH GAS OFFICES,
WITH SPECIFIC REFERENCE TO EMPLOYEES,
REORGANISATION AND TECHNOLOGICAL CHANGE

VOLUME II

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requirements of the University of Liverpool
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SECTION THREE

**THE IMPACT OF OFFICE LOCATION ON THE
WORKFORCE**

CHAPTER VIII

CHARACTERISTICS OF THE BRITISH GAS REGIONAL
OFFICE WORKFORCEBritish Gas Regional Office WorkforceDataThe Purpose Of Examining Regional
Office Workforces

In many ways a ubiquitous industry, British Gas exerts considerable influence as a single employer, yet the Regions continue to show independent characteristics, many of which result from their previous autonomy. These differences are being eroded, but geographical features such as topography, population distribution, transportation accessibility, and gas consumer density, as well as workforce characteristics and availability, will ensure the continuing existence of anomalies in the general structure.

To assess the effects of changes in the location of offices, the profile of the Industry's office workforce is represented below by a number of Regions, including Wales Gas. These are used as the basis for an examination of the influences exerted upon this workforce, most particularly through the location and organisation of their offices. Changes have occurred in office size, function, occupational structure, and location which are represented to varying degrees by these Regions.

The major influences upon the British Gas office workforce over the post-nationalisation period have been discussed in some detail,¹ but largely with reference to their effects at the macro-level. Here

the intention is to focus more directly upon the office employees themselves, their present characteristics, and their susceptibility to change. Such an approach has been followed for a single Region, as a final stage in the detailed study of Wales Gas.² However, the reorganisation of Wales Gas may be considered unique in certain details, and this may render the characteristics of its office workforce unrepresentative of other Gas Regions. Following the comprehensive consideration of office location throughout British Gas various locational patterns have been distinguished which may have significant influences on the office workforce.³ These are an important element in the subsequent intra-Regional comparisons. Nonetheless, the basic approach remains that pursued for Wales Gas.

Thus, data derived from the Wales Gas P.M.I.S. has been used above to define the major characteristics of its Regional office workforce in addition to examining the possible long-term effects of its reorganisation, and a number of inter-relationships between selected variables have been observed, the most conspicuous being those relationships dependent upon the office hierarchy and those related to the sex of employees.

Data of a similar type has been used by Lockwood in his small study of Southern Gas office employees affected by the move to new Southampton Headquarters in 1977.⁴ This study concentrated upon 94 part-time employees within the Customer Accounting department (C.A.D.), who were then employed at the Winchester Road site, Southampton. It concluded that the majority of those affected by the relocation would be women aged 40 to 60 years, 14 of whom were aged 55 to 60 years, and therefore would retire shortly. More tentatively, Lockwood suggested that the increased distance travelled to work as a result of a move might cause some employees to leave Southern Gas. However, he claimed

that age and length of service data (Figs. 8.1, 8.2) and an index of stability⁵ suggested that most would remain in employment with the Region following the move. Despite its inconclusiveness, this study does reveal a sex, age and length of service structure for part-time employees which is corroborated by the Wales Gas data; part-time office employees tend to be married women who return to work when middle-aged, and thus tend to have relatively short lengths of service.

British Gas itself has not undertaken this type of study, although there are examples of related work, such as that of North West Gas concerning possible increases in the journey to work of employees affected by relocations. This was undertaken via the Regional P.M.I.S. in order to calculate probable costs in travel and removal allowances and the expected incidence of voluntary redundancies. The primary concern of the North West Gas Industrial Relations department, which has been responsible for the study and subsequent negotiations, has been the minimisation of costs and the retention of key personnel following relocation.⁶ The changes in work sites have been selected by other departments with very different priorities, including the minimisation of expenditure upon land and buildings, and increased efficiency of organisation at all levels. No attempts have been made to assess the social costs of relocations.⁷ A similar assessment of the residences of BGC Headquarters office employees has been undertaken by consultants in their consideration of office employee location and possible relocations. However, their results were presented only at a generalised distance-band and sectional level⁸ (Fig. 8.3).

Arguments in favour of more localised research (as undertaken here on an intra-Regional scale) have been presented by Carmichael in his work on local labour market analysis.⁹ He has noted that higher level occupations are accepted as being most mobile spatially, such

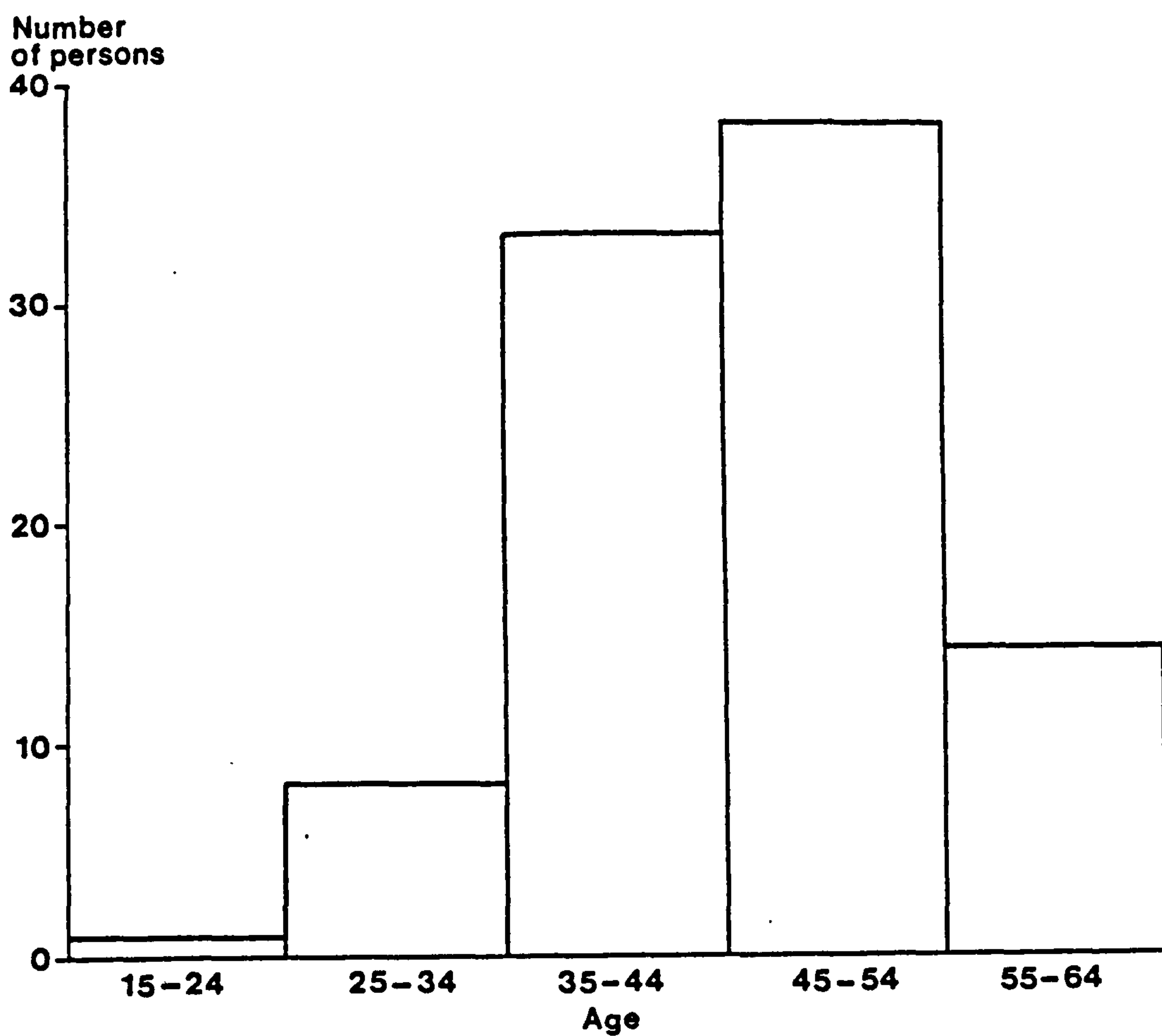


Fig. 8.1 Age of Part-Time Employees in the Customer Accounting Department, Regional Headquarters, Southern Gas

SOURCE: Lockwood, The Personnel Implications of Moving to a new Regional Headquarters.

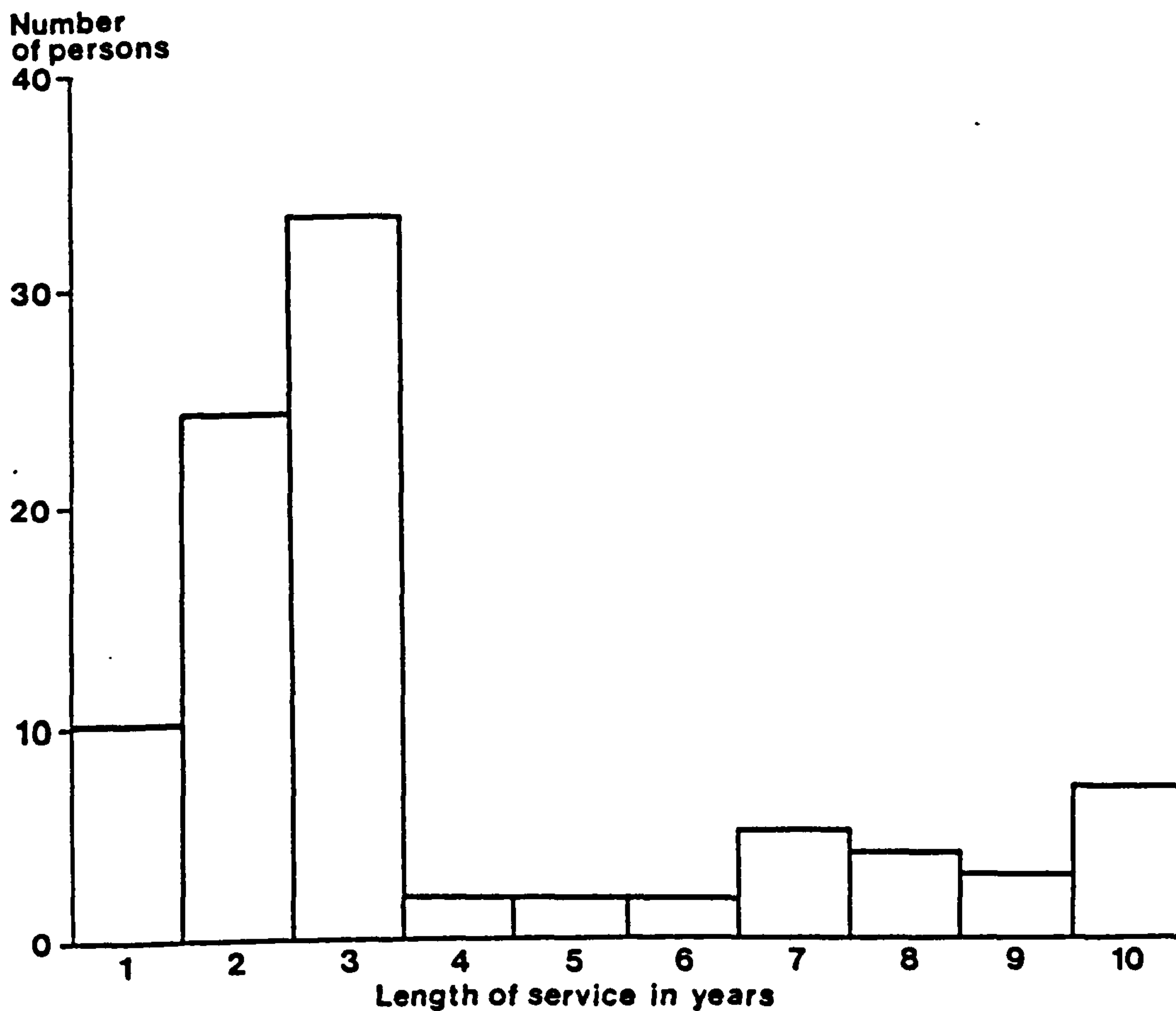
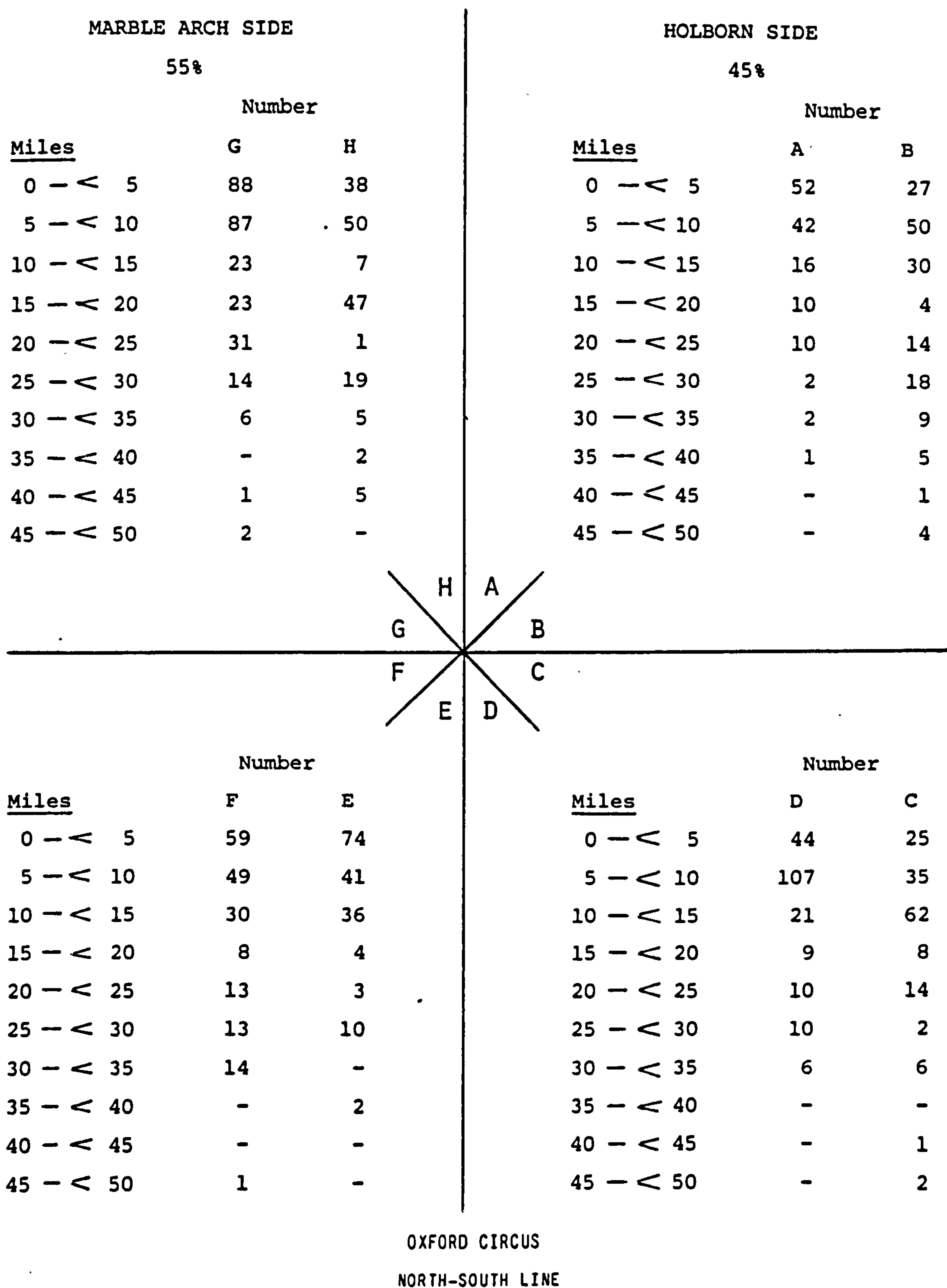


Fig. 8.2 Length of Service of Part-Time Employees in the Customer Accounting Department, Regional Headquarters, Southern Gas



PERCENTAGE IN EACH SECTOR

A = 9.2	E = 11.6
B = 11.1	F = 12.8
C = 10.6	G = 18.8
D = 14.1	H = 11.8

Fig. 8.3 Residence-Work Distance of all London-based Office Employees of the British Gas Corporation residing within a Fifty Mile Radius of Oxford Circus

that professional and managerial workers have a far wider job search area.¹⁰ Also, he noted a similar distinction between the sexes whereby males tend to have a wider job search area than all females, particularly married females, for the latter are required to "combine the responsibilities of home and workplace."¹¹ He concludes that it is at the local level that this occupational effect is likely to be most significant. Although his aims are somewhat different (the definition of manpower requirements) he too has advocated the assembly of data relating to age, sex, occupation and location, with the addition of industry. Notably, he cited corporate structures such as the Electricity and Gas Industries as effective subjects for such study on the basis that they "employ people in almost every urban area in Great Britain,"¹² and that the decisions made by such organisations continue to have a wide and increasing influence.

Within British Gas each Region has given, and undoubtedly should continue to give, consideration to employee characteristics and its own internal operating structure when making decisions regarding the relocation, size and organisation of its office establishments. Examination of the differences amongst Regional office workforce profiles and identification of probable causes for these differences may provide evidence for the projection of the effects of locational changes. The intention is not to present all features of each Region comprehensively but to utilise the data sets selectively, thus emphasising certain important features. Particular consideration is given to issues highlighted in the examination of Wales Gas. Thus basic differences in the Regional structural interpretations of the organisation are examined, as are the distinctions evident between male and female workers, such that these may be regarded as two different though integrated workforces. Within these emphasis is given to the

functional organisation, age patterns, work levels and length of service. Detailed examination of the spatial, rather than hierarchical, locational patterns has been reserved for separate analysis.¹³

The Regions chosen for analysis and the reasons for their choice are discussed below, followed by an indication of their representativeness of British Gas, and the relationship between British Gas employment, national employment and economic activity rates.

Data Availability And The Features Of The Gas Regions Chosen For Comparison

The office workforce of BGC is considerable. Numbering 62,590 on 31 March 1981 and, although decreasing slightly to 61,470 by 31 March 1982, there are obviously extreme difficulties preventing the examination of the characteristics of every member of the office workforce. This would be possible only through direct access to and amalgamation of each Regional P.M.I.S. In addition, such amalgamation is available (to the Corporation) only for Stage I of P.M.I.S.,¹⁴ which would limit the extent and usefulness of the analyses. As a result, and since emphasis is given to the internal organisation of Regions, four Regions have been selected for detailed examination. These represent a third of the Regional structure.

Each data set has been derived from P.M.I.S., but because implementation of this system varies amongst the Regions it was not possible to obtain identical data in terms of format and detail. They were provided as paper output, the data relating to every office employee in each Region at the time of list production, subject to the Region's computer records updating processes. Thus, the Wales Gas data relate to April 1979, South West Gas to April 1980, Eastern Gas to November 1980, and North West Gas to Autumn 1979.¹⁵ For the

purposes of this study these differences are unlikely to be responsible for any greater variance than that which exists between Regions at any single moment in time.¹⁶ Each listing was partially recoded to facilitate ease of handling and re-entered as a computer file.

Additional data in amalgamated form have been made available by Southern Gas (relating to November 1980), South East Gas (July 1981) and South Eastern Electricity Board (October 1980). These Gas Regions offer useful comparisons since they have undertaken relatively little relocation/reorganisation, whilst the Seeboard data permit comparison between an Electricity Board and the equivalent Gas Region (in this case South East Gas).

The basis for selecting Wales Gas has been presented earlier.¹⁷ Of the other Regions, South West Gas has been chosen because of its similarity to Wales Gas in its labour force size and consumer distribution, and its dissimilar features of a much more gradual reorganisation programme which began with the establishment of a new Regional Headquarters in 1975. It contains few major centres of consumer concentration: the Bristol-Bath area in the north and the somewhat smaller area centred around Plymouth in the south. Otherwise the Region has a very widely dispersed consumer population, again with the most remote parts unserved by the gas grid.

North West Gas also has been chosen because of its reorganisation programme, since it is presently engaged in a major locational restructuring. The greatest changes are occurring in the south west of the Region, notably resulting from the move from Radiant House, Bold Street, Liverpool to Linacre, Bootle. In other parts of the Region extensive use is to be made of existing accommodation but with considerable refurbishing of the original buildings, as at Gould

Street, Manchester. This is also a significantly more industrialised and heavily populated area, as a result of which North West Gas is the largest Regional employer.¹⁸ To reduce the difficulties of data manipulation, this data set has been restricted to those Districts subject to employee relocation and site reorganisation over a contiguous area forming the south west portion of the Region. This embraces the Mersey, Central Lancashire, and part of the South Lancashire Areas (Table 8.1). The resultant data set is comparable in size with those of Wales and South West Regions and represents 42.1 per cent of the North West Gas office workforce. It offers the opportunity both to use the data produced by the Region for its own analysis purposes and to examine personnel characteristics prior to a reorganisation. Its disadvantage for direct comparison with other Regional information is that it contains very few headquarters personnel.

The fourth Region, Eastern Gas, has been selected primarily because of its intra-Regional contrasts, for example between the highly populated metropolitan areas, predominantly north east London (the Outer Metropolitan Area) and the lesser populated areas of East Anglia (particularly the Norfolk Area). The Region itself openly recognises the differences in employee attitudes in its various areas: employees in the rural areas, for example, are reluctant to move to the more urbanised areas, since any movement towards the metropolis involves higher living costs, particularly for accommodation. Despite the attraction of an increase in grade (supplemented by a London allowance where applicable) the salary increase is generally not great enough to counteract these increased costs. Consequently employees perceive a fall in real living standards as a result of such a move.¹⁹ The Region's present office pattern of Customer Service Centres has developed gradually, such that many employees have not been affected

TABLE 8.1
OFFICE WORKFORCES OF SELECTED GAS REGIONS

	No. in data set	% of Regional office workforce	Males		Females	
			No.	%	No.	%
Wales	2674	100.0	1581	59.1	1093	40.9
Eastern	4338	100.0	2591	59.7	1747	40.3
South West	2902	100.0	1897	65.4	1005	34.6
North West	2931	42.1	1628	55.5	1303	45.5
Southern	3515	100.0	2019	57.4	1496	42.6
South East	6153	100.0	n.a..		n.a.	
Seeboard	3218	100.0	1903	59.1	1315	40.9
North West Gas Sample						
Mersey Area	1161	16.7				
Central Lancs Area	1143	16.4				
South Lancs Area	591	8.5				
Headquarters	36	0.5				

SOURCE: British Gas PMIS data; South Eastern Electricity Board personnel data.

by change, whilst others have been subjected to recent change. It is a medium-sized Region in workforce terms, with a domestic gas sales orientation subject to increases in demand as a result of population growth in its area. This, combined with its geographical location in the east of the country, provides an ideal contrast with the declining, more industrialised North West, and the more rural administratively smaller Regions serving Wales and the South West. The overall influence of consumer demand is such that the areal size of each of these Regions is inversely related to the numbers they employ.

The Regional Data Set Variables

Certain information is common to the Regional data sets, namely area and office location, and the sex, grade, department and home location of each office employee, although these data are not entirely uniform. Each Region also provided different additional data, partially as a result of differences in their computerised information (Table 8.2).

Of the amalgamated data sets, Southern Gas provided a breakdown by sex, grade and function within each Area, and South East Gas provided the number of office employees, split into administrative/clerical (including professional) and technical employees at each Regional site. Seeboard detailed for every office location within each District a numerical breakdown of sex within full or part-time employment, within permanent or temporary, within grade (divided into managerial, clerical and administration, and technical).

The inter-relationships which exist amongst the variables are many, but the earlier consideration of the Wales Gas office workforce determined two major groups: firstly the association between descriptive employee variables and their work site, dependent upon the level of the

TABLE 8.2

PMIS PROVIDED FOR MAIN SELECTED GAS REGIONS

Information available	Wales Gas	South West Gas	North West* Gas	Eastern Gas
Area	X	X	X	X
Office Location	X	X	X & office based	X
Sex	X Title	X & Marital Status	X	X
Grade	X Job title	X	X & Job title	X
Home Location	X Exact	X District	X District	X District
Department	X	X	X	X
Perm/Temp.	X	X	X	
Full/Part Time	X	X	X	
Age	X Date of birth	X Years & mnths		X Years
Length of Service	X Starting date	X Years & mnths		X Years
British Gas Service	X Starting date			
Length in position	X Starting date			
Hours worked	X Hrs. & mins.			

More limited information, derived from PMIS, was provided by Southern and South East Regions. Similar data was provided by South Eastern Electricity Board.

*Not a complete enumeration of office employees.

particular office in the Regional hierarchy, and secondly the association between employees' sex and their other characteristics. Thus office location in hierarchical, not necessarily topographical terms) as the basis for intra-Regional comparison appears to be a major independent variable, whilst for the individual employee, sex would appear to be the major determinant of his or her other characteristics.

The Analysis Of British Gas Regional Data

British Gas As A National Employer

As a single employer the Gas Industry accounts for 0.6 per cent of total employment in Great Britain, whilst the Electricity Industry employs 1.1 per cent (public utilities in total, including water, constitute 2.1 per cent of total employment). On a regional basis the percentage of employment provided by the Gas Industry alone varies from 0.4 per cent in East Anglia, through 0.5 per cent in the West Midlands, Wales and Scotland, 0.6 per cent in the South East (including London : the Greater Metropolitan region itself has 0.7 per cent of employment supplied by the Gas Industry), South West and East Midlands, to 0.7 per cent in Yorkshire and Humberside, the North West and the North.²⁰ Generally, therefore, there is little regional variation other than a slightly greater emphasis within the more populated areas of Northern England and London (although not the West Midlands), and lesser emphasis in the more sparsely populated areas of Wales, Scotland and East Anglia. This is associated with domestic consumer demand.²¹

At 31 March 1982 office employees formed 56.5 per cent of British Gas Regional employment. The greatest Regional variation from this amongst those discussed below was only 3.2 per cent (in South West Gas office employees formed 53.3 per cent of Regional employment). Amongst all Regions the proportion varied from 47.9 per cent in North

East Gas to 61.6 per cent in North Thames Gas. For British Gas as a whole office employees formed 58.7 per cent of all employment, an increase upon the Regional average due to the almost entirely office nature of BGC Headquarters, where 92.5 per cent of employees were classified as non-manual.²²

The number of office employees within each Region is very strongly correlated with the number of domestic consumers and the volume of gas sold.²³ The influence of consumer location upon office employee location is less exact and Regional policy is of increasing importance at successive levels of the Regional office hierarchy. Evidence of the possible effects of this are discussed below.

In combination with the increasingly strict organisational hierarchy employment is controlled to a growing extent by BGC Headquarters. This strongly suggests that the overall patterns observed in the selected Gas Regions are unlikely to differ significantly from those to be found throughout the Industry, although obviously some degree of intra-Regional variation is to be expected. This results from the different conditions within each Region, for example the number of service centres and the numbers employed within each, organised in response to consumer numbers. Of course, a major characteristic of each Region, in addition to its geographical features, is its organisational history.²⁴

Female employment within the office workforce of British Gas (as illustrated by the selected Regions) is outweighed by a very strong emphasis upon males in the manual workforce, thus reducing the importance of female employment overall (Table 8.3). By adjusting the percentages for the selected Regions to estimate the importance of females in overall Regional employment, assuming all manual employees

TABLE 8.3

EMPLOYMENT WITHIN SEX : COMPARISONS BETWEEN THE
GAS INDUSTRY AND ALL INDUSTRIES AND SERVICES

	% of all employees	% who are full-time
All Industries and Services		
Male	59.4	94.7
Female	40.6	60.0
Public Utilities		
Male	80.4	99.7
Female	19.6	78.4
Gas Industry		
Male	76.1	99.6
Female	23.9	78.5
Electricity Industry		
Male	81.5	99.8
Female	18.5	17.7
Five Gas Regions - Office employees only		
Male	59.4	99.8*
Female	40.6	86.0
Seeboard - Office employees only		
Male	59.1	100.0
Female	40.9	89.3

SOURCES: British Labour Statistics, 1976. British Gas PMIS data.

*Refers to 4 Regions only.

are male, a result of 22.7 per cent females and 77.3 per cent males is obtained,²⁵ which closely resembles that given for the Industry as a whole (particularly when the inclusion of BGC Headquarters personnel in the latter is given consideration). A similar relationship is evident in the Electricity Industry. Thus, estimating the Seaboard male: female ratio in the same manner, proportions of 20.7 per cent females and 79.3 per cent males are obtained, again resembling that given for the Electricity Industry as a whole. The ratio of part-time to full-time employees indicates that most part-time employees are female, but these form a smaller proportion of the total workforce: evidently nearly all part-time employees in these Industries are female office workers.

Data from the General Household Survey²⁶ may be used as a basis for comparison with the Regions. The general age pattern indicates that only Eastern Gas, which is a Region experiencing recent growth, has an above average representation of employees aged under 25 years (Table 8.4a). All three Regions with available information show relatively high representation of employees aged 45 years and over. This is a feature of long service and low turnover in the Industry and controlled growth in employment. The number of men employed is considerably lower than the national average of economically active males in the under 25 years age group (Table 8.4b), reflecting a high proportion of females in this age range, most of whom are single women (Table 8.4d). This of course reflects the national trend for office employment. Amongst married women, however, there appear to be more employees in the older age categories than for all married women employed nationally²⁷ (Table 8.4c).

However, the main function of these analyses of Regional data is to distinguish the major features of the Regional workforces and to

TABLE 8.4
 THE AGE DISTRIBUTION OF BRITISH GAS REGIONAL OFFICE
 EMPLOYEES COMPARED WITH ALL ECONOMICALLY ACTIVE PERSONS
 IN GREAT BRITAIN

Age in years	Wales	Gas Regions Eastern	South West	Great Britain		
				1978	1979	1980
(a) Age Distribution of All Office Employees/Economically Active Persons						
	%	%	%	%	%	%
15-24	17.0	22.1	12.1	19.3	19.4	20.0
25-34	23.7	21.6	20.5	23.1	23.9	23.4
35-44	21.8	18.1	18.5	21.2	21.4	21.9
45-54	24.6	21.2	29.5	21.4	20.6	20.3
55-64	12.9	17.0	19.5	15.1	14.7	14.5
(b) Proportion of Males In Each Age Group						
	%	%	%	%	%	%
15-24	30.3	35.7	42.0	55.4	55.5	54.6
25-34	65.2	63.4	60.9	62.6	61.8	61.1
35-44	62.4	65.6	63.6	57.8	57.6	56.5
45-54	60.0	62.6	66.8	57.7	56.7	58.4
55-64	78.6	76.3	85.4	64.4	63.9	61.8
(c) Proportion of Married Females In Each Age Group						
	%	%	%	%	%	%
15-24	n.a.	n.a.	8.7	8.8	8.1	8.0
25-34			24.1	24.0	25.0	25.1
35-44			22.9	27.6	27.7	28.7
45-54			34.5	26.7	25.7	24.5
55-64			9.9	12.9	13.5	13.7
(d) Proportion of Single Females In Each Age Group						
	%	%	%	%	%	%
15-24	n.a.	n.a.	52.6	49.6	49.4	50.4
25-34			21.4	14.9	16.0	15.0
35-44			10.5	9.1	9.9	10.9
45-54			11.7	11.7	13.1	11.4
55-64			3.8	13.8	11.6	12.4

SOURCES: British Gas P M I S data.
 General Household Survey, (1980). OPCS Monitor: General Household
 Survey 1979 (Issued 27 May 1980). OPCS Monitor: Preliminary Results
 for 1980 (Issued 16 June 1981).

establish the existence or otherwise of differences resulting from different organisational and/or locational patterns. These should provide evidence for the projection of future trends.

Intra-Regional Comparisons Of The Office Workforce

Each Region has a different organisational and locational structure.²⁸ If it is accepted that these are likely to affect the observable characteristics of the Regional office workforces, then these are obviously independent variables worthy of detailed attention.

Hierarchical division of the organisation, recognised in the responsibilities exercised from each office site, is also to be seen in the authority exercised by each employee. At the least detailed level British Gas recognises a five-fold classification of all its employees into Craftsmen, other Manual grades, Staff grades, Senior Officers and Higher Management, a classification which is partially dependent upon both the type and the level of work undertaken. The Craftsmen and other Manual grades together form the operatives, whilst the Staff grades, Senior Officers and Higher Management constitute the office employees. Considering only office employees, Staff are, not unexpectedly, very much the largest group, forming 78.2 per cent of all British Gas office employment (lower grade clerical employees form the greater part of almost all large office workforces).²⁹

However, the full information available as job titles for each Wales Gas office employee permitted the use of a more detailed seven-fold classification, whilst similar information including salary coding was provided by North West Gas which facilitated the adoption of the same classification. This latter Region's data also distinguished from Higher Management, Senior Officers and Staff the junior clerical staff,

trainees and women on maternity leave. However, South West Gas information provided basic salary gradings, but not job titles. As a result these have been grouped into the three basic categories, although it has been possible to distinguish the junior clerical staff within the Staff. Eastern Gas provided data pre-classified into the three main groups. To make inter-Regional comparisons, each of these classifications must be reduced to the most basic form (Table 8.5).

It is evident that the Staff group forms at least four-fifths of the Regional office workforce, while of the remaining office employees more than twice as many are classified as Senior Officers than Higher Management. Comparisons with the BGC figures for the end of the year reflect considerable seasonal variation in the size of these Higher Management and Senior Officer groups, but probably indicates proportional and not absolute changes due to changes in the size of the Staff group. A comparison between the selected Regions and all BGC Regions indicates that these Regions are not significantly different.³⁰ Comparison between BGC Regions and BGC Headquarters shows a very different pattern, with only half the Headquarters office employees classified as Staff and more than a fifth as Higher Management. This provides additional evidence of the centralisation of control at BGC Headquarters and of the Industry's strongly hierarchical structure.³¹ The location of Higher Management employees provides an indication of decision-making activity: the higher the proportion of Higher Management personnel, the more important the establishment in the Regional organisation.³²

Further evidence of decision-making centralisation, represented by relatively larger Higher Management ratios, may be sought within the Regions. Particularly noticeable is the smaller proportion of Higher Management personnel in the North West Region data, resulting from the absence of Headquarters location employees, for BGC figures indicate

TABLE 8.5

OFFICE EMPLOYEE WORK LEVELS REDEFINED AS GRADES FOR
COMPARISON AMONGST SELECTED GAS REGIONS

	Wales		Eastern		South West		North West*		Southern	
	No.	%	No.	%	No.	%	No.	%	No.	%
Directorate	10	0.4								
Regional	26	1.0								
Higher Management	130	4.9	178	4.1	100	3.4	60	2.0	150	4.3
Senior Officer	313	11.7	604	13.9	358	12.3	249	8.5	503	14.3
Supervisory	590	22.1								
Senior Clerical	469	17.5								
Staff	1136	42.6	3556	82.0	2423	83.6	2528	86.3	2862	81.4
Junior Clerical					21	0.7	38	1.3		
Trainees							48	1.6		
Maternity Leave							8	0.3		

	(b) Combined Grades		(c) Distribution of Office Employee Grades, excluding Headquarters Personnel**	
	No.	%	No.	%
Higher Management	6.2	4.1	3.5	2.0
Senior Officers	11.7	13.9	12.3	8.5
Staff	82.2	82.0	84.2	89.5

	(b) Combined Grades		(c) Distribution of Office Employee Grades, excluding Headquarters Personnel**	
	No.	%	No.	%
Higher Management	3.8	1.9	1.7	2.0
Senior Officers	6.1	11.6	10.1	8.5
Staff	90.1	86.5	88.2	89.5

SOURCE: British Gas P.M.I.S. data.

* Partial data.

** Also excluded are Regional Computing Centre personnel, but not headquarters personnel who are located at Area or District sites.

TABLE 8.6

DISTRIBUTION OF OFFICE EMPLOYEES BY EMPLOYMENT
TYPE IN SELECTED GAS REGIONS

	Wales		South East		North West		Wales, excluding HQ Personnel		South East, ex- cluding HQ Personnel	
	No.	%	No.	%	No.	%	No.	%	No.	%
Management	255	9.5	n.a.		232	7.9	143	7.6	n.a.	
Technical	434	16.2	967	15.7	403	13.7	247	13.1	755	16.5
Supervisory	350	13.1	n.a.		257	8.8	264	14.0	n.a.	
Clerical	1635	61.2	n.a.		2039	69.6	1228	65.3	n.a.	

SOURCE: British Gas P.M.I.S. data.

* Partial data.

TABLE 8.7

NUMBER OF OFFICE EMPLOYEES EMPLOYED AT END OF YEAR
BY BRITISH GAS (THOUSANDS)

Financial year ended March:	General Engineering and Production	Transmission and Distribution	Marketing and Sales *	Customer Service and Conversion	Customer Accounting	Administration and General Services	Total
1969	7.0	4.0	-	22.3	10.6	12.0	55.9
1970	6.6	4.3	-	24.3	10.7	12.9	59.0
1971	5.7	4.8	-	26.3	11.0	13.8	61.6
1972	4.4	5.0	-	25.6	11.3	14.3	60.6
1973	4.3	5.3	-	25.2	11.6	13.4	59.8
1974	3.9	5.8	10.7	13.7	11.9	13.6	59.6
1975	3.5	6.8	10.3	13.3	12.4	15.1	61.4
1976	3.3	7.5	9.7	12.6	12.3	15.6	61.0
1977	3.2	7.7	9.5	11.9	12.0	15.3	59.6
1978	2.7	8.3	9.8	11.3	11.7	15.6	59.4
1979	2.6	9.1	9.9	11.8	11.7	16.3	61.4
1980	2.7	9.4	9.9	11.8	11.4	16.8	62.0
1981	2.8	9.9	9.5	11.7	11.2	17.5	62.6
1982	2.9	10.0	9.0	11.3	10.7	17.5	61.4

SOURCE: British Gas Corporation Annual Reports and Accounts : Statistics for the Industry.

* Numbers employed in Marketing and Sales included with Customer Service and conversion prior to 1973/74.

that the overall proportion in this Region approximates to the average for all Regions.³³ By removing headquarters employees from the other Regions the employees' work level distribution may be compared amongst the Regions on an equitable basis and the extent of intra-Regional decentralisation of responsibility may be observed (Table 8.5c). The comparatively larger proportion of Higher Management employees at non-headquarters sites in Wales Gas is largely a result of the decentralisation of Area control from Regional Headquarters to the Area offices (alternatively viewed as the concentration or locational centralisation of control from Districts into these Areas, since initially much of their responsibility was exercised from District level offices by Group Managers). Differences in the distribution of responsibility is greatest between Wales Gas and South West Gas, for despite its reorganisation programme South West Gas has maintained control centrally and the responsibility exercised by employees at the Operational Control Centres is considerably less than that exercised at the Wales Gas Area offices.³⁴

Conditions in Eastern Gas resemble those in South West Gas, although the Higher Management and Senior Officer groups are slightly larger, as should be expected in a more geographically centralised Region. Both Eastern and Southern Regions represent the expected pattern for a stable Region which has achieved an acceptable office locational pattern for purposes of internal organisation. North West Gas has a surprisingly high proportion of Higher Management personnel considering the impact of reorganisation has yet to become fully manifest. This is nonetheless counteracted by a smaller Senior Officer group. The large degree of intermediate control required by the South West Gas organisation is indicated by the relatively high proportion of Senior Officers (10.1 per cent, excluding headquarters

employees). The even higher Eastern Gas proportion (11.6 per cent, excluding headquarters employees) similarly indicates a large degree of organisational control exercised from Potters Bar and Enfield, which is perhaps marginally greater than that exercised by Southern Gas from Southampton.

Classification by type of work performed, available for Wales Gas and North West Gas office employees, is helpful in distinguishing the technical staff, particularly gas engineers. The correspondence between these Regions is very close, especially when the Wales Gas Regional Headquarters employees are excluded (Table 8.6), suggesting that the number of technical staff required is related to the size of the office workforce, whereas the number of supervisory staff is related to the organisational structure: the greater the centralisation, the smaller the number of supervisory personnel required to ensure work efficiency. Although proportionately similar in size, the technical workforce of South East Gas differs in locational characteristics since many of the Engineering personnel are sited at the three Engineering control centres at Croydon, Ashford and Haywards Heath, whilst large numbers of technical personnel are employed at the largest of the three central stores at Old Kent Road and at the central spare parts depot at Sydenham. As a result the number of technical personnel at headquarters is comparatively small.

Lateral division of the Industry, like most large organisations, is into major functions.³⁵ As at 31 March 1982 the British Gas Corporation had five Managing Directors and seventeen Departmental Directors classed as Principal Officers, not all of whom have representatives at the Regional level. BGC publishes statistics for the numbers employed in six major functional groups, although prior to 1973/74 the numbers classified as Marketing and Sales were included with Customer Service

and Conversion. An examination of the figures over the period 1968/69 to 1981/82, which embraces the pre-BGC period (the first moves to re-organise the Industry being made in 1969) and includes the natural gas conversion programme (the major expansion of the high pressure transmission system beginning in 1968 following from the decision to change to natural gas, taken in 1966), indicates a relatively small growth overall (Table 8.7). Also, much of this growth occurred in the immediate pre-reorganisation period. If 1972 is taken as the base year, the year when BGC assumed responsibility for the Industry, movement since has been no more than -2.0 per cent or +3.3 per cent. By comparison the decrease in the number of manual employees measured against the same base year reveals falls as great as 19.8 per cent. Thus, following a sharp increase in size in the late 1960's, the size of the office workforce remained relatively stable throughout the 1970's and it was the fall in the number of manual employees that contributed to the slight overall decline in the British Gas workforce.

Following the adoption of natural gas and the change in emphasis from a major energy-producing industry to a major energy-distributive industry it is to be expected that employment associated with gas production will have declined (although the continuance of major pipelaying schemes and the development of the Morcambe Bay Project for example have maintained some engineering skill demands), whilst the growth in computerisation and customer service has increased the demands for personnel in these departments. An examination of the major functions within the office workforce does reveal some changes in their relative importance. Not surprisingly, General Engineering and Production has declined, from 12.5 per cent of the total office employment on 31 March 1969 to 4.7 per cent on 31 March 1982, and reaching its lowest level of 4.2 per cent at 31 March 1979. But this decline in General Engineering and

Production has been more than matched by the increasing proportion employed in Transmission and Distribution, such that the overall importance of these combined Engineering functions has increased, from 19.7 per cent (31 March 1969) to 21.0 per cent (31 March 1982).

The combined importance of Marketing and Sales with Customer Service and Conversion also has declined over this period, as would be expected a higher proportion of the decline being of Customer Service and Conversion personnel, primarily because of the gradual cessation of conversion work. Customer Accounting office employment has remained at a comparatively constant level, reaching a peak in both absolute and proportional terms in the mid-1970's, but at the end of March 1982 employing only some one hundred more than at 31 March 1969. Whilst this represents a growth in Customer Accounting personnel of only 0.9 per cent, growth in the number of customers over the same period was 7.6 per cent³⁶ and British Gas office employment as a whole rose by 9.0 per cent. The Customer Accounting function undoubtedly has achieved greater workforce efficiency. It is, of course, a major beneficiary of improvements in office technology. Considerable changes have occurred in the characteristics of the personnel employed by this function, notably in the computer skills required, and the higher workload processed by many individuals.

Lastly, the Administrative and General Services office employees have undergone considerable growth, both relatively (these formed 21.5 per cent of all office employment in 1969, rising to 28.5 per cent in 1982) and absolutely (employee numbers increased 31.4 per cent over the same period).

Since each Region has a somewhat different functional and departmental division (Table 8.8), it is difficult to make direct

TABLE 8.8

DISTRIBUTION OF OFFICE EMPLOYEES BY FUNCTION IN SELECTED
GAS REGIONS

	Wales		Eastern		South West		North West*		Southern	
	No.	%	No.	%	No.	%	No.	%	No.	%
Chairman's	7	0.3	-	-	-	-	7	0.2	-	-
Secretariat	199	7.4	34	0.8	47	1.6	19	0.6	72	0.2
Stores & Supplies ^x	131	4.9	333	7.7	206	7.1	93	3.2	74	2.1
Corporate Planning	204	7.6	7	0.2	-	-	-	-	3	0.1
Marketing ^{xx}	481	18.0	1633	37.6	1148	39.6	611	20.8	909	25.9
Engineering	563	21.1	828	19.1	527	18.2	426	14.5	691	19.7
Finance	621	23.2	1017	23.4	661	22.8	969	33.1	806	22.9
Sales ⁺	390	14.6	-	-	-	-	-	-	579	16.5
Personnel	78	2.9	187	4.3	102	3.5	134	4.6	46	1.3
Management Services	-	-	255	5.9	172	5.9	-	-	183	5.2
Surveyor's	-	-	27	0.6	-	-	-	-	-	-
Medical	-	-	12	0.3	-	-	-	-	11	0.3
Press & Public Relations	-	-	5	0.1	-	-	-	-	8	0.2
'Other' ⁺⁺	-	-	-	-	39	1.3	-	-	-	-
Service	-	-	-	-	-	-	636	21.7	-	-
Transport	-	-	-	-	-	-	36	1.2	56	1.6
Solicitor's	-	-	-	-	-	-	-	-	21	0.6
Training	-	-	-	-	-	-	-	-	56	1.6

SOURCE: British Gas P M I S data.

* Partial data.

x In Eastern, South West, and North West, known as Purchasing & Supplies.
In Southern known as Stores.

xx In Southern Gas known as Marketing - Service.

+ In Southern Gas known as Marketing - Sales.

++ South West Gas definition.

comparisons of the departmental numbers amongst the Regions, although increasing pressure from BGC Headquarters is actively reducing these Regional distinctions. The absence of a particular function in a Region is not to suggest that its departments do not exist, but that they are subordinated to another function. These differences are best exemplified through the Regional organisational charts.³⁷ Thus the Marketing and Sales functions of Wales Gas are combined in other Regions as the Marketing function, whilst the separate Transport function of North West Gas and Southern Gas is a section of the Stores and Supplies function of some Regions. The difficulties these differences present underlie the British Gas Corporation's policy of increasing the comparability of every Region's organisation.

Nevertheless, it is possible to distinguish the operational functions (Marketing including Sales, Finance, and Engineering) from those functions containing the internal 'service' departments, whose members do not directly serve the consumers but provide services to the operational departments. A typical feature of industry, the operational functions contain a very large proportion of Regional office employees³⁸ (Table 8.9) and do so throughout British Gas, containing more than three-quarters of all office employees. The very high North West Gas proportion, which does not include its Regional Headquarters employees, illustrates the dominance of the operational departments at Area office sites and below, whereas the general services office employees are concentrated at headquarters. Throughout British Gas non-operational departments are the most centralised in terms of the location of their employees, for most are employed at headquarters sites. This is again a well-recognised phenomenon.³⁹

The distribution of office employees amongst the operational departments and the service departments may be compared with BGC figures

TABLE 8.9
PROPORTIONS OF THE REGIONAL OFFICE WORKFORCES WITHIN THE
OPERATIONAL FUNCTIONS OF SELECTED GAS REGIONS

Percentage of Regional Office Workforce					
	Wales	Eastern	South West	North West*	Southern
Marketing**	32.6	37.6	39.6	42.5	42.3
Finance	23.2	23.4	22.8	33.1	22.9
Engineering	21.1	19.1	18.2	14.5	19.7
Total	76.9	80.2	80.6	90.1	84.9

SOURCE: British Gas P M I S data.

* Partial data.

** Includes the Sales and Service departments.

TABLE 8.10
DISTRIBUTION OF OFFICE EMPLOYEES BY MAJOR FUNCTION
WITHIN SELECTED GAS REGIONS AND BRITISH GAS

Percentage of Office Workforce						
	All British Gas	Wales	Eastern	South West	North West*	Southern
Engineering	21.0	21.1	19.1	18.2	14.5	19.7
(Marketing & Sales (Customer Service	33.1	32.5	37.6	39.6	42.5	42.3
(Customer Accounting (Finance	17.4	23.2	23.4	22.8	33.1	22.9
Administration and General Services	28.5	23.2	19.9	19.4	9.9	15.1

SOURCE: British Gas P M I S data; British Gas Corporation Annual Report and Accounts, 1981/82.

* Partial data.

for the Industry as a whole (grouping the various functions as in Table 8.10). The difference between the proportions in the Finance function within the Regions and in all British Gas reflects the Regional location of the majority of these personnel, contrasted with the bias towards BGC Headquarters location of Administrative and General Services personnel. The relatively high Wales Gas proportion in this group is a result of its separate and relatively large Corporate Planning function, which in the other selected Regions is subordinated to the operational departments.

Overall, there would appear to be only small differences in the sex ratios of the various functions, these being primarily a result of their demands for clerical labour. Thus the operational functions contain the highest proportions of both male and female workforces, together containing 80.3 per cent of the male workforce and 80.0 per cent of the female workforce in Eastern Gas, for example, 84.7 per cent and 85.2 per cent respectively in Southern Gas.⁴⁰ Employment in the Finance and Marketing departments is particularly female orientated (these contain, respectively, 47.8 per cent and 46.5 per cent female employment in Eastern Gas, 50.5 per cent and 48.7 per cent in Southern Gas). Of the larger non-operational departments the Secretariat has a notable contribution of female employment; 58.8 per cent in Eastern Gas, and 76.4 per cent in Southern Gas.

It has been stated that the proportion of employees at each work level is partly a result of the organisational level of the worksite; thus there are more Higher Management personnel at Regional Headquarters than in the Areas. A further factor is the distribution of members of different functions amongst the various organisational levels. In Eastern Gas, for example, the operational functions, containing 80.2 per cent of all office employees, embrace only 67.4 per cent of Higher

Management (Table 8.11), whilst 27.6 per cent of the non-operational departments' office employees are Higher Management or Senior Officers, compared with only 15.7 per cent of the operational departments' office employees. In Southern Gas the difference is even greater, with 34.3 per cent of the non-operational departments' office workforce classified as Higher Management, but only 15.8 per cent of the operational departments' office workforce. Testing the null hypothesis that there is no relationship between function (operational or non-operational) and work level this is rejected in favour of the alternative that there is a relationship (chi square = 490.3, $\alpha = 0.01$, for Eastern Region).⁴¹

A number of observed differences and similarities amongst the Regions, not necessarily the result of differences in work level nor functional division but associated with the differing organisational and locational structures, also encourage inter-Regional comparison. For example, the age distribution of office employees differs in each of the three Regions for which information is available (Table 8.12), with Eastern Gas having the youngest workforce and South West the oldest.⁴² Examining the grouped age data and using the Kruskal Wallis test to compare the means of the age distributions in these Regions a significant result is obtained ($H = 53.6$), in support that there are differences in the age distribution of office employees in these Regions. Further, comparison of the age distributions of both the male and female workforces separately also permits rejection of the null hypothesis that there is no difference in the age distributions of these workforces in the Regions (for males $H = 50.6$, for females $H = 48.9$; $\alpha = 0.01$).

Wales Gas data suggest that there is a relationship between age and work location, which Eastern Gas data give the opportunity to examine in more detail as a relatively stable Region, but with significant differences in its Areas.⁴³ It is not possible to prove any significant

TABLE 8.11
 DISTRIBUTION OF OFFICE EMPLOYMENT GRADES BETWEEN THE
 OPERATIONAL AND NON-OPERATIONAL FUNCTIONS IN EASTERN
 AND SOUTHERN GAS

	Total		Higher Manage- ment		Senior Officers		Staff	
	No.	%	No.	%	No.	%	No.	%
Eastern								
Operational	3478	80.2	120	67.4	425	70.4	2933	82.5
Non-operational	860	19.8	58	32.6	179	29.6	623	17.5
Southern								
Operational	2985	84.9	84	56.0	387	76.9	2514	87.8
Non-operational	530	15.1	66	44.0	116	23.1	348	12.2

SOURCE: British Gas PMIS data.

See also Appendix Table B.9.

TABLE 8.12
 DISTRIBUTION OF OFFICE EMPLOYEES BY AGE WITHIN WALES,
 EASTERN AND SOUTH WEST GAS

Age in years	Wales		Eastern		South West	
	No.	%	No.	%	No.	%
Less than 25	385	14.4	957	22.1	352	12.1
25-34	634	23.7	937	21.6	596	20.5
35-44	584	21.8	784	18.1	538	18.5
45-54	671	25.1	921	21.2	849	29.3
55-64+	400	15.0	739	17.0	567	19.5

SOURCE: British Gas PMIS data.

difference in the age distribution among the Eastern Gas Areas,⁴⁴ suggesting that the age distribution of Area personnel is the result of its organisational structure and not its geographical location. To further test this the age distribution of Area personnel may be compared with that of Regional Headquarters personnel: this does vary significantly between the Areas and Regional Headquarters.⁴⁵ Similarly, the age distribution of office employees varies significantly between the Areas and lower level offices.⁴⁶ As in Wales Gas, Regional Headquarters has a younger office workforce than the Areas, which themselves have a younger workforce than the lower level office sites (Table 8.13): Regional Headquarters has a large proportion in the under 35 years category, even though the Area offices contain the highest proportion aged less than 25 years. Also, 46.6 per cent of lower site office employees are aged 45 years or over; only 31.7 per cent are aged less than 35 years, compared with 50.4 per cent at Regional Headquarters and 47.4 per cent at Area offices.

The correlation between age and work level of office employees has been distinguished in Wales Gas (Pearson's correlation $r = 0.53$); however, each variable 'explains' only 28.0 per cent of the variance in the other.⁴⁷ In Eastern Gas calculation of Pearson's correlation co-efficient gives a value of 0.64, and the co-efficient of determination indicates that each variable 'explains' 41.0 per cent of the variance in the other.⁴⁸ Similarly, using grouped age data for South West Gas the significant association between age and work level is strongly correlated, such that as age increases, so work level decreases.⁴⁹ This suggests that the younger members of the workforces no longer necessarily enter the Industry at clerical levels and progress to, perhaps, Higher Management positions, but that a substantial number of younger employees are recruited directly into higher positions.

TABLE 8.13
DISTRIBUTION OF THE REGIONAL OFFICE WORKFORCE
BY AGE WITHIN TYPE OF WORK SITE IN EASTERN GAS

	Age in years					
	Total	Less than 25	25-34	35-44	45-54	55-64+
Headquarters	26.0	28.7	31.2	20.7	22.5	25.7
Non-Headquarters	74.0	71.3	68.8	79.3	77.5	74.0
Area Offices	45.4	55.3	43.1	44.9	44.7	45.4
Other sites	28.7	16.0	25.7	34.4	32.8	28.7

SOURCE: Eastern Gas PMIS data.

TABLE 8.14
THE WORK BASE OF OFFICE EMPLOYEES IN NORTH WEST GAS

	In-Based		Out-Based		% of Division Out-Based
	No.	%	No.	%	
All Office Workforce	2018	68.9	913	31.1	31.1
(b) Work Base within Work Type					
Managerial	181	9.0	51	5.6	22.0
Technical	166	8.2	237	26.0	58.8
Supervisory	100	5.0	157	17.2	61.1
Clerical	1571	77.8	468	51.3	23.0
(c) Work Base within Employment Level (Grade)					
A Regional	4	0.2	0		
A Higher Management	48	2.4	25	2.7	34.2
Senior Officers	169	8.4	91	10.0	35.0
Supervisory	221	11.0	260	28.5	54.1
B Senior Clerical	414	20.5	131	14.3	24.0
B Clerical	1162	57.6	406	44.5	25.9

SOURCE: North West Gas PMIS data.

A = Higher Management (of whom 32.5% are out-based)

B = Staff (of whom 29.8% are out-based)

This provides a contrast with the traditional system of recruitment and career progression. The older clerical workers, some of whom are long-term employees, particularly men who have persisted in employment at small sites, are considerably swelled in numbers by those who join the Industry, often for the first time, when already in middle age, many of whom are married women with low work aspirations and who seek employment very locally, hence their occurrence at sites low in the office hierarchy.⁵⁰ Nevertheless, there is also a very low but significant correlation between age and years of employment evidenced in South West Gas, illustrating the influence of long-term employees.⁵¹

The need for some employees to work from their offices has important implications for office planning, influencing the design of office sites, not least because car parking facilities are required for use at irregular periods during the day, as is office work space. The importance of this is recognised by North West Gas in its Development Plan programme, and data are included in the P.M.I.S. analyses.⁵² The sample data available suggest that about a third of District or Area office employees can be expected to work from their office (Table 8.14). Unfortunately, no information was available for Headquarters employees, but the differing representation of different work levels and functions suggests that these are likely to display a different relationship, probably with higher proportions of senior personnel visiting other office sites.⁵³ Thus the propensity to work from the site increases with increasing seniority, such that members of Higher Management and Senior Officers are considerably more likely to be out-based than Staff (Table 8.14c). Out-based employees also form the highest proportion by type classification within the technical group (Table 8.14b). Although the greatest number of out-based employees are clerical, their proportion of clerical staff is the smallest of

all four types of employment and of all work levels.

The Regional Male And Female Workforces

The male:female ratio of office employees is approximately 3:2. However, this ratio differs at the various work hierarchies. Although male employment is larger at all hierarchical site levels it forms a significantly lower proportion at headquarters sites than at all other office sites. Similarly, the proportion of males at Area offices or Customer Service Centres, though greater than at Regional Headquarters (with the exception of Eastern Gas), is smaller than at lower office sites, which include District offices, reporting centres and showrooms (Table 8.15). It is suggested that the more centralised sites, in terms of larger employment numbers, attract more female employment, best exemplified by Regional Headquarters, but also emphasised by the Customer Service Centres. Further, the more numerically centralised the Region in terms of this middle hierarchy the greater the contrast between male employment proportions at middle and lower level hierarchy offices. This is greatest in Wales Gas, least in North West Gas. Thus it is likely that the realisation of changes in South West Gas, and perhaps to an even greater extent in North West Gas, will decrease the number of male office employees at the middle order offices of the Regional hierarchy. This also reflects changes in the proportions of office employees at the different work levels, since almost all female office employees are classed as Staff.

Examination of length of service with the Regions suggests this is longest in South West Gas, and longer in both South West Gas and Eastern Gas than in Wales Gas (Table 8.16). More than three-fifths of Wales Gas office employees have been employed by the Region for less than 10 years, but the overall growth in the office workforce in this

TABLE 8.15
 PROPORTIONS OF MALE OFFICE EMPLOYEES AT DIFFERENT
 TYPES OF WORK SITE IN SELECTED GAS REGIONS

	Percentage of Regional Workforce				
	Wales	Eastern	South West	North West*	Southern
Headquarters**	50.9	54.5	54.0	—	47.3
Non-Headquarters	62.9	62.8	69.2	55.5	62.3
Area Offices***	54.3	53.5	63.3	50.7	n.a.
Other Sites	80.4	77.5	76.1	58.3	n.a.

SOURCE: British Gas PMIS data.

* Partial data.

** Wales Gas = Snelling House/Bute Terrace; Eastern = Potters Bar and Tower Point; South West = Riverside and Sydney Wharf.

*** North West Gas = Hind Street, Birkenhead; Wavertree; Wensley Road, Blackburn; Pocket Nook; Spa Road, Bolton.

TABLE 8.16
 LENGTH OF SERVICE WITH REGION OF OFFICE EMPLOYEES
 IN WALES, EASTERN, AND SOUTH WEST GAS

Years of Employment	Region					
	Wales		Eastern		South West	
	No.	%	No.	%	No.	%
(a) All office employees						
0 - 9	1631	61.0	2553	58.9	1432	49.3
10 - 19	582	21.8	916	21.1	635	21.9
20 - 29	294	11.0	356	8.2	320	11.0
30 - 39	127	4.7	335	7.7	330	11.4
40 - 49	39	1.5	175	4.0	183	6.3
50+	1	*	3	0.1	2	0.1
(b) Males						
0 - 9	693	43.7	1100	42.5	656	34.6
10 - 19	472	29.7	678	26.2	461	24.3
20 - 29	267	16.8	325	12.5	280	14.8
30 - 39	116	7.3	317	12.2	316	16.7
40 - 49	39	2.5	168	6.5	182	9.6
50+	0	-	3	0.1	2	0.1
(c) Females						
0 - 9	939	86.4	1453	83.2	776	77.2
10 - 19	110	10.1	238	13.6	174	17.3
20 - 29	27	2.5	31	1.8	40	4.0
30 - 39	10	0.9	18	1.0	14	1.4
40 - 49	0	-	7	0.4	1	0.1
50+	1	0.1	0	-	0	-

SOURCE: British Gas PMIS data.

Region has been no greater than South West and Eastern Regions over this period. It is thus reasonable to assume that the effects of this Region's massive reorganisation are partly responsible for the observed difference. This is true of both the male and female workforces, although the average length of service is greater amongst males than females in all Regions; the number of females is greater than that of males in only the less than 10 years service group (Table 8.16c). Nonetheless, amongst both sexes the majority of employees have taken up Regional employment within the last 10 years, and the modal length of employment is only one year. The very high proportion of females in the less than 10 year service group (more than four-fifths) reflects the higher turnover experienced among females than males. It is apparent that length of employment is associated with sex, but the correlation is weak.⁵⁴ Comparing the length of service in the three Regions it is possible to reject the null hypothesis that there is no difference in the length of service and that they are drawn from one population.⁵⁵ Further, using the Wilcoxon matched samples test to compare each of the Regions with the others, a two-tailed test permits the null hypothesis to be rejected except between Wales and Eastern Gas, where the obtained value is equal to the tabled value.⁵⁶

Nevertheless, a comparison of the mean age of employees in Eastern and Wales Regions reveals this to be 11 years in both Regions, and similarly the mode for both is one year. In addition, the median length of employment is 6 years in Eastern Gas, but 7 years in Wales Gas. This may suggest that the impact of reorganisation has had little medium-term impact upon the latter. A comparison of the ages of the office employees also reveals similarities: the mean age in Eastern Gas is 39 years, in Wales Gas it is 40 years; the respective median ages are 38 years and 39 years. The only distinctive difference lies in

the modal ages: 23 years in Eastern Gas, 52 years in Wales Gas. This serves to demonstrate a distinction between these Regions; Eastern which is presently subject to expansion and has increased its workforce accordingly, Wales which elicits considerable employee loyalty reflected in long service. Nonetheless, this long service is most evident at the smaller office sites, least affected by reorganisation.

Length of service is correlated with work level,⁵⁷ even though at Eastern Gas the effect of labour turnover ensures that the largest proportion of employees at each work level have been employed for less than 10 years (Table 8.17). A stronger relationship exists between employee age and length of employment, each variable explaining 41.0 per cent of the variation of the other within the Eastern Gas data.⁵⁸

A major contributor to the overall age pattern is the sex of employees, since the male and female workforces display very different age structures in each Region⁵⁹ (Table 8.18). Each Region also displays its own individual age distributions for both male and female workforces, although this difference is small.⁶⁰ Within the female workforce married and single women have a differing age distribution, single women tending to be considerably younger.⁶¹

Largely a result of the differing male:female ratios, different age patterns occur at the various office hierarchies. Again using Eastern Gas as an example (since it has a comparatively established and stable office hierarchy),⁶² just over half of those employed at Regional Headquarters are aged less than 35 years, whereas at the lowest office hierarchy level less than a third are aged less than 35 years. Similarly, at this lowest level nearly half are aged 45 years or older, compared with only just over a quarter at Headquarters. The distribution of ages at the Customer Service Centres lies between these extremes.

TABLE 8.17
 DISTRIBUTION OF LENGTH OF SERVICE WITHIN EMPLOYMENT GRADE OF EASTERN GAS OFFICE EMPLOYEES

Years of employment	Higher Management		Senior Officers		Staff		Percentage of Each Length of Service Group		
	No.	%	No.	%	No.	%	Higher Management	Senior Officers	Staff
0 - 9	66	37.1	217	35.9	2270	63.8	2.6	8.5	88.9
10 - 19	50	28.1	184	30.5	682	19.2	5.5	20.1	74.5
20 - 29	16	9.0	80	13.2	260	7.3	4.5	22.5	73.0
30 - 39	25	14.0	82	13.6	228	6.4	7.5	24.5	68.1
40 - 49	20	11.2	41	6.8	114	3.2	11.4	23.4	65.1
50+	1	0.6	0	-	2	0.1	33.3	-	66.7

SOURCE: Eastern Gas PMIS data.

TABLE 8.18
AGE DISTRIBUTIONS OF THE MALE AND FEMALE OFFICE
WORKFORCES OF WALES, EASTERN, AND SOUTH WEST
GAS

Age in years	Regions					
	Wales		Eastern		South West	
	No.	%	No.	%	No.	%
Males						
> 25	112	7.1	342	13.2	148	7.8
25 - 34	397	25.0	594	22.9	361	19.0
35 - 44	366	23.1	514	19.8	341	18.0
45 - 54	400	25.2	577	22.3	563	29.7
55 - 64+	312	19.7	564	21.8	484	25.5
Females						
> 25	273	25.1	615	35.2	204	20.3
25 - 34	237	21.8	343	19.6	235	23.4
35 - 44	218	20.1	270	15.5	197	19.6
45 - 54	271	24.9	344	19.7	286	28.5
55 - 64+	88	8.1	175	10.0	83	8.3
Married females						
> 25	76	10.0			64	8.7
25 - 34	181	23.8			178	24.1
35 - 44	196	25.8			169	22.9
45 - 54	229	30.1			255	34.5
55 - 64+	79	10.4			73	9.9
Single females						
> 25	197	60.4			140	52.6
25 - 34	56	17.2			57	21.4
35 - 44	22	6.8			28	10.5
45 - 54	42	12.9			31	11.7
55 - 64+	9	2.8			10	3.8

SOURCE: British Gas PMIS data.

Part-time office employees form only some twentieth of Regional office employment, ranging from 6.5 per cent in Wales Gas to 4.9 per cent in South West Gas (Table 8.19). This is a result of deliberate British Gas policy discouraging the recruitment of part-time personnel in recent years. Those who are employed are typically engaged on specific work tasks which have labour demand requirements of less than a normal working day's duration, for example telephone enquiries and the handling of postal correspondence receipt. Almost all of these part-time employees are female, and most are married: 97.7 per cent of part-time employment in Wales Gas is female, 99.3 per cent in South West Gas. Length of employment with South West Gas indicates that some four-fifths of part-time employees have been employed by the Region for less than 10 years⁶³ (Table 8.20), while North West Gas data indicate that part-time employees are almost entirely clerical staff, and form 10.0 per cent of the lowest clerical level within this data set (Table 8.21), with very weak but significant correlations existing between work level and full or part-time employees.⁶⁴

Very few British Gas office employees are engaged on a temporary basis. Only 1.5 per cent of the North West Gas sample are temporarily employed, and only 3.2 per cent of Wales Gas office employees. Permanent and temporary employment is related to the sex of employees, for example in North West Gas there is a significant difference between the sexes, but correlation is very weak.⁶⁵ Similarly in both South West and Wales Regions there is a significant association at the 0.01 level, but the phi co-efficients indicate only very weak correlation.⁶⁶

However, despite similar characteristics of full/part-time office employees and temporary/permanent office employees, these variables are not themselves associated, for example in North West Gas the null hypothesis that there is no relationship between these cannot

TABLE 8.19
PART-TIME OFFICE EMPLOYMENT WITHIN WALES, SOUTH WEST,
AND NORTH WEST GAS

	Wales		South West		North West*	
	No.	%	No.	%	No.	%
All Office Employees						
Full-time	2499	93.5	2760	95.1	2762	94.2
Part-time	175	6.5	142	4.9	169	5.8
Males						
Full-time	1582	99.7	1894	99.8	1626	99.9
Part-time	5	0.3	3	0.2	2	0.1
Females						
Full-time	917	84.4	866	86.2	1136	87.2
Part-time	170	15.6	139	13.8	167	12.8

SOURCE: British Gas PMIS data.

* Partial data.

TABLE 8.20
LENGTH OF SERVICE OF FULL AND PART-TIME OFFICE EMPLOYEES
OF SOUTH WEST GAS

Years of Employment	Full-time		Part-Time	
	No.	%	No.	%
0 - 9	1316	47.7	116	81.7
10 - 19	613	22.2	22	15.5
20 - 29	316	11.4	4	2.8
30 - 39	330	12.0	0	—
40 - 49	183	6.6	0	—
50+	2	0.1	0	—

SOURCE: South West Gas PMIS data.

TABLE 8.21
WORK LEVELS OF PART-TIME OFFICE EMPLOYEES OF NORTH WEST GAS

	No.	%	% of work level
Senior Officer	1	0.6	0.4
Senior Clerical	11	6.5	2.0
Clerical	157	92.9	10.0

SOURCE: North West Gas PMIS sample data.

be rejected ($\chi^2 = 0.04$ with one d.f., $\alpha = 0.01$) and a phi co-efficient of 0.00 indicates no correlation.

Not surprisingly, the chi square test for association indicates an association between full or part-time employment and title (that is, men, married women and single women) in Wales Gas, but although significant this correlation is very weak.⁶⁷ Similar tests conducted on the full and part-time employees of North West Gas and Eastern Gas reveal similar results: a weak but significant correlation between full or part-time status and sex.⁶⁸

Finally it should be noted that relationships evidenced within intra-Regional comparisons also exist between the sexes. For example, a significant but weak correlation exists between the sex and work level of Eastern Gas office employees.⁶⁹ Likewise the relationship between function and work level, also evidenced in Eastern Gas, is additionally evident within the sexes.⁷⁰

Implications Of Findings For The Projected
Impact Of Future Changes In The British Gas
Office Structure

The Usefulness Of Examining The Regional
Office Workforce

Although a number of relationships dependent upon the pattern of office organisation and characteristics of the office workforce, notably an individual's sex, have been identified for the Gas Regions examined above, it is not suggested that these relationships are a unique feature of British Gas. Indeed, it has been demonstrated earlier that its pattern of office organisation may be observed elsewhere, most particularly in the Electricity Industry. Likewise features of its office workforce are shared by many large office employers.

Thus, to briefly consider the characteristics of the Seeboard office workforce, which is related in function to the Gas Regions but is part of a separate industry structure, some obvious similarities may be observed (Table 8.22). Despite being smaller than its equivalent Gas Region (it has an office workforce of 3218 compared with 6153 in South East Gas), it is larger than some of the Gas Regions under consideration. More importantly, its proportions of males/females, permanent/temporary employees, full/part-time employees and managerial/clerical employees are not atypical of those found within British Gas.

Extensive comparisons have not been drawn with other office organisations in terms of their workforce characteristics since the primary purpose of this examination of British Gas office workforces has not been to distinguish the main features of an office workforce, but to isolate those features of the workforce which are most easily subjected to change, those features which vary under differing locational and organisational conditions, and the possibilities for projecting the effects of future (also projected) changes in these conditions. It is to be noted that some previous causes of change (such as the very extensive Wales Gas reorganisation) are unlikely to occur on the same scale in the near future, but processes such as the renewal of office premises will continue, despite the significant improvements in British Gas office provision in the late 1960's - 1970's, since office requirements are constantly subject to change. The changing role of information technology is, of course, a factor in these changing requirements.

The Regional Office Workforce And Relocation

Many of the relationships described above are not unexpected, since not only may they be observed in many other organisations, but in

TABLE 8.22

THE SOUTH EASTERN ELECTRICITY BOARD OFFICE
WORKFORCE

	Office employees		
	Males	Females	Total
Full-time	1903	1175	3078
Part-time	0	140	140
Permanent	1894	1291	3208
Temporary	9	24	10
Technical	756	1	757
Managerial	89	0	89
Clerical & Administration	1058	1174	2232
Totals	1903	1315	3218

SOURCE: Seeboard Management Services Department.

some cases the distribution of one variable is, of necessity, an integral part of another. Thus, for example, as seniority is in part a function of length of service (which is itself a reflection of experience), then, all other things being equal, there should be a connection between age and rank in the organisational hierarchy.

An important disturber of this equilibrium is the initiation of an office relocation. It is generally recognised that the suggestion of such movement creates employee unease, and employee response, especially at lower levels, is largely unfavourable.⁷¹ Thus periods immediately prior to and for some months following an office relocation are associated with higher labour turnover, particularly of clerical personnel. Eventually the new site stabilises and will establish a new employee catchment area, but until this stage is reached the workforce will continue to reflect the characteristics of the previous office site or sites (where amalgamation of offices has occurred).⁷² Where relocation is combined with a reorganisation process, as has generally occurred in British Gas, then the effects upon the status quo are even greater. This has been seen to best effect in Wales Region, where organisational changes first precipitated by computerisation and the establishment of a new headquarters in 1964 were greatly enhanced by the comprehensive reorganisation and subsequent relocation process initiated in 1970.

In the light of these considerations the identified features of the Regional workforces are discussed below in relation to their various organisational and locational structures. These highlight the possibilities for future change, perhaps best considered for North West Gas where organisational changes are likely to further centralise Higher Management and locate decision-making power at fewer, larger worksites, whilst locational changes are likely to result in a realignment of the office workforce as new catchment areas are defined and

evolve, particularly through the turnover of female employees.

Notably there is insufficient evidence to suggest that such changes cause large, or even medium-sized, changes in the workforce. This is predominantly because the personnel most likely to "suffer" are not only those of least importance to British Gas as individuals, but are also those least likely to display long-term allegiance to a single employer. In addition, changes in the workforce are produced by the changing characteristics of existing employees, for example some personnel gain promotion as a result of organisational changes. Undoubtedly some of the Staff turnover which occurs at such times is the result of the replacement of promoted individuals by new Staff employees. Upward movement of employees is facilitated by retirement⁷³ and increases in the proportions of employees at higher levels. This latter feature is also encouraged by absolute reductions in the personnel required at lower levels.⁷⁴

Important features in the evolution of most large organisations, of which British Gas is an example, are the increase in the number of large offices, the decrease in the number of offices overall, and the increasing specialisation of the workforce. The preceding examination of the outcome of these processes forms a basis for assessment of on-going and future changes. Nevertheless, it is important to accept that small overall changes in the workforce can mask considerable impact of changes upon individuals, which may be assessed only through consideration of many single individuals.⁷⁵

The Influence Of Organisational And
Locational Patterns Upon The Office
Workforce

It has been noted that larger centralised offices contain higher

proportions of female office employees and also have larger proportions of younger personnel. Although such offices have large employment catchment areas, they are not necessarily sited directly within large urban centres. South West Gas Headquarters, Riverside, for example is located in the small town centre of Keynsham, a residential area which acts as a suburban centre for both Bristol and Bath, and to which it is easily accessible. Similarly, the Area offices of Wales Gas are located on the fringe of large urban areas at less popular sites more closely identified with industrial land use. In addition, the clerical functions of the major departments are no longer predominantly located at local levels in the office hierarchy, but have been centralised increasingly at both Area and Headquarters sites. Hence it is not surprising that such tasks have become increasingly performed by women, who are most easily attracted to work at large, centrally located sites, both by accessibility and the greater employee facility attractions.⁷⁶

Where small, very localised sites have been preserved, notably as reporting centres, office employees are more likely to be men, are older and have been employed by the Region for some time, generally having been initially recruited by the former Gas Board. These represent the remnants of those employees affected by successive reorganisations within the Industry. Those who have achieved positional advancement within the Industry, but whose length of service is greater than that of the latest Regional reorganisation are both those who have benefitted from and suffered most change as a result of such reorganisation. Particularly where major locational changes have been introduced, as in Wales Gas, but also less comprehensively in the other Regions, such employees have undergone considerable changes in their journey to work, which has sometimes necessitated a change in home location. Female employees, because of their higher turnover rate,

show less long-term effects of such changes. In addition, the nature of their employment, which is mostly clerical, dictates that they form the greatest part of the more expendible section of the workforce. Even major reorganisations and relocations have only a minor effect within the medium to long-term patterns of female labour turnover. Nonetheless, the effect of Wales Gas reorganisation, for example, is evident in a comparison between the length of service in Wales Gas and South West Gas, where organisational changes have been more gradual and less dramatic. Amongst both males and females Wales Gas has recruited a higher proportion of its office workforce in the last 10 years than South West Gas.⁷⁷

Differences in the ratios of Higher Management, Senior Officers and Staff are a further demonstrable outcome of variable organisational patterns. The institution of large offices controlled by functional Area Managers devolves daily responsibilities to these levels: the larger the area of control the greater the decision-making control which may be exercised at that level. Where this devolution is relatively large, as in Wales Gas, the Higher Management group is larger as a result, whereas in South West Gas, where the decision-making control is maintained at Headquarters and the functional representatives at Customer Service Centres tend to fulfil a more 'supervisory' role, the proportion of Senior Officers is larger.⁷⁸

The major difference in susceptibility to change must lie in the distinctions between the male and female workforces. It is generally recognised that management personnel are the most geographically mobile and often more malleable in terms of work task.⁷⁹ Career success in itself is often dependent upon such changeability in work location and work task in combination with the employees' own willingness to accept such change. These employees are likely to gain most and suffer

least from imposed structural change. They are also predominantly male. Even non-managerial male employment is frequently technical in nature, and as such demands skills which the Industry is generally anxious to retain. Also, the long-term benefits of service within the Industry, notably in the form of pension rights, combined with union support for employment protection, has encouraged the redeployment of personnel whose initial skills are no longer required by the Industry.

In contrast, the female workforce is predominantly clerical, a proportion of whom are part-time. Skill requirements are not high (although every encouragement is given to further education and training) such that individuals may be replaced without particular difficulty. Longer serving females and females occupying more senior posts within the Industry do exist, of course, but in proportionate terms these form such a small group that for the purposes of structural forward planning their possibly different response to change is relatively unimportant. As in the small study performed in Southern Gas, when the relocation of clerical staff from older office sites is considered, many of these employees are found to be female,⁸⁰ and many are relatively close to retirement, such that their replacement in the workforce is already a feature of medium-term planning.

However, the movement of centralised office employees, for example from major headquarters locations, creates rather different problems. Here the threat of employee loss is greater: movement to a less accessible site could rapidly deplete the female workforce which would be more difficult to replace at a less favourably sited office in accessibility terms. Similarly, the male workforce, which is generally younger and more mobile, though willing to move, is also more willing to move out of the Industry into alternative employment. The fear of potentially damaging losses of senior personnel, combined with a

preference amongst the decision-makers themselves to minimise any such change in location, ensure that relocations of headquarters offices, particularly in more recent years, have taken place over the minimum distance possible. A prime example of this is the relocation of Wales Gas Regional Headquarters, at present in progress.

In summary, changes in location which involve office employee movements are favoured where these changes involve the centralisation of employees from a number of locations to a single site, whereas simple relocations of a single office to an alternative site are discouraged and tend to occur over the minimum distance possible. Explanations for these observations are to be found in the differing sex, age and work level compositions of the office workforces observed to be characteristic of the different office hierarchy levels. At the same time, it must be noted that these differences are themselves a manifestation of the reorganisation and relocation procedures which have occurred since nationalisation. Employment at sites which have been of contracting importance in the office structure have not benefitted from the regular recruitment of new personnel associated with the larger office sites with their more dynamic workforces.

NOTES

1. See Chapters II and V.
2. See Chapter III.
3. See Chapter V.
4. M.J. Lockwood, Manpower Planning Officer, Personnel Department, Southern Gas, "The Personnel Implications of Moving to a New Regional Headquarters", project for the Associateship of the Institute of Personnel Management, Summer 1976 (typewritten).
5. Index of stability = no. of employees with 12 months service now/total no. employed a year ago. Lockwood, The Personnel Implications of Moving to a New Regional Headquarters, p.10.
6. Industrial Relations Manager, North West Gas, interview at Regional Headquarters, Altrincham, 4 March 1980. See Chapter VI.
7. Although it is debatable as to whether an employer has any obligation to assess social costs. For example studies, see M. Bateman and D. Burtenshaw, "The Social Effects of Office Decentralisation", in Spatial Patterns of Office Growth and Location, ed. P.W. Daniels (New York: Wiley, 1979), pp.325-47.
8. Design Group for Industry, "British Gas Corporation HQ Accommodation Study", prepared for British Gas Corporation, 1979.
9. C.L. Carmichael, "Local Labour Market Analysis : Its Importance and a Possible Approach", Geoforum 9 (1978), 127-48
10. Cyril Sofer, Men in Mid-Career : A Study of British Managers and Technical Specialists, Cambridge Studies in Sociology 4 (Cambridge: Cambridge University Press, 1970).
11. Carmichael, Local Labour Market Analysis, p.130. These are examined in more detail in Chapters IX and X. See also A. Myrdal and V. Klein, Women's Two Roles : Home and Work, 2nd ed. (London: Routledge and Kegan Paul, 1968).
12. Carmichael, Local Labour Market Analysis, p.132.
13. See Chapter IX.
14. See Chapter IV.
15. The exact date of the North West Gas data is unknown, since it was produced by the Region for its own internal use.
16. As a measure of this variability, see the difference between these totals and the nearest end of year totals.
17. See Chapter III.
18. See Appendix Table B.1.

19. Regional Secretary, Eastern Gas, interview at Regional Headquarters, Potters Bar, 12 September 1980.
20. Department of Employment, British Labour Statistics, Yearbook 1976 (London : HMSO, 1976). These relate to the Standard Regions of England and Wales.
21. See Appendix Table B.1.
22. This includes other, non-London sites, such as Hinckley, and the various Research Stations.
23. Calculation of Spearman's rank correlation (r_s) using Regional data as at 31 March 1982 : relationship between office employees and domestic customers, $r_s = 0.95$, indicating a very strong correlation; $t = 9.6$, significant at 0.01 level. Relationship between office employees and volume of gas sold, $r_s = 0.94$, also indicating a very strong correlation, $t = 8.7$, significant at 0.01 level.
24. The rather different pattern of employment distribution displayed by the Electricity Industry results from the inclusion of CEGB workers whose work location is influenced by electricity production sites and their distribution. This effectively distorts the pattern of Electricity Board employment distribution.
25. See Appendix B, Table B.7.
26. OPCS, General Household Survey, OPCS Social Survey Division, series GHS no. 8 (London : HMSO, 1980); OPCS Monitor, "General Household Survey 1979 (Preliminary Tables)", GHS 80/1, published by Government Statistical Service, 27 May 1980; OPCS Monitor, "Preliminary Results for 1980", GHS 81/1, published by Government Statistical Service, 16 June 1981.
27. This is probably because the office employment offered by British Gas is particularly suited to older married women who return to work after raising a family.
28. See Appendix A, Figs. A.5 - A.16.
29. See British Gas Corporation, Report and Accounts, 1981/82, "Statistics for Regions", pp. 68-69. Also see Regina Belz Armstrong, The Office Industry : Patterns of Growth and Location, ed. Boris Pushkarev, a report of the Regional Plan Association (Boston : M.I.T. Press, 1972).
30. This, of course, further supports their use as representative of all Regions.
31. This is discussed in more detail in Chapter II.
32. See L.D. Phillips, "Organisational Structure and Decision Technology", Acta Psychologica 45 (1980), 247-64.
33. British Gas Corporation, Report and Accounts, 1981/82.

34. Major functional heads at Wales Gas Area offices have been classed as members of Higher Management, at South West Gas Operational Centres these are frequently Senior Officers, for they have less responsibility.
35. For direct comparisons in the Electricity Industry, see the Electricity Council, Electricity Supply in the United Kingdom : Organisation and Development, Intelligence Section, Secretary's Department, The Electricity Council, 3rd ed. (London: Electricity Council, April 1978).
36. Hence the ratio of Customer Accounting personnel to customers increased from 1:1251 to 1:1468.
37. See Appendix A.
38. Other companies with large operational sections include British Telecom and the water supply industry.
39. For example CEGB, the Electricity Council, and the major banks and insurance companies. This can be used as a basis for decentralisation policies, for example Sun Life Assurance, which moved from Central London to Bristol.
40. Appendix B, Table B.8.
41. For full details see Appendix B, Table B.9.
42. $t = 2.89$.
43. See Chapter III. South West Gas is less suitable because its organisation is still subject to change.
44. $\chi^2 = 17.1$ with 24 d.f., not significant at 0.01 level.
45. $\chi^2 = 23.0$ with 4 d.f., significant at 0.01 level.
46. $\chi^2 = 118.2$ with 4 d.f., significant at 0.01 level.
47. Co-efficient of determination (r^2) = 0.28.
48. $r^2 = 0.41$.
49. $\chi^2 = 238.2$ with 12 d.f., significant at 0.01 level, as is Kendall's Tau value (τ) of - 0.08.
50. $\chi^2 = 1791.1$ with 20 d.f., significant at 0.1 level, as is $\tau = 0.48$.
51. See Chapter III for a discussion of this in Wales Gas.
52. The North West Gas P.M.I.S. data indicates whether each office employee is in or out based, dependent on their requirements to work from the office site.

53. Essential car users allowances are paid to personnel who are required to use their own cars for Industry business. The proportion receiving this allowance is largest at Regional Headquarters.
54. Eastern Gas, length of employment by sex, $\chi^2 = 405.8$ with 3 d.f., significant at 0.01 level, or, using ungrouped data, $\chi^2 = 902.9$ with 50 d.f., $r = -0.35$, both significant, $\alpha = 0.01$.
55. Kruskal - Wallis test (H) = 55.9, significant, $\alpha = 0.01$.
56. Wilcoxon matched samples test (T) : Wales Gas and South West Gas, T = 6, significant at $\alpha = 0.05$; Eastern Gas and South West Gas, T = 3, significant at $\alpha = 0.05$; Wales Gas and Eastern Gas, T = 0, cannot reject H_0 (each with six pairs of variables).
57. For example, Kendall's Tau values of 0.21 in Eastern Gas and 0.26 in South West Gas indicate a low correlation, but significant at $\alpha = 0.01$.
58. For example, calculation of Pearson's product moment correlation co-efficient (r) using Eastern Gas data (one tailed): $r = 0.64$, indicating a moderate correlation, significant at $\alpha = 0.01$. Using grouped data for South West Gas, $r = 0.13$, indicating a very weak but significant relationship at 0.01 level.
59. Wales Gas, $\chi^2 = 209.3$; Eastern Gas, $\chi^2 = 333.2$; South West Gas, $\chi^2 = 192.0$, all with 4 d.f., significant at $\alpha = 0.01$.
60. For males, $\chi^2 = 113.7$, 8 d.f.; for females, $\chi^2 = 96.4$, 8 d.f. Both significant at $\alpha = 0.01$.
61. Wales Gas, $\chi^2 = 320.4$, 4 d.f.; South West Gas, $\chi^2 = 246.9$, 4 d.f. Both significant at $\alpha = 0.01$.
62. This is to ensure the effects are not those of reorganisation.
63. Association between full/part-time employees in South West Gas and 10 year employment groups is demonstrated by $\chi^2 = 70.1$ with 5 d.f., significant at $\alpha = 0.01$.
64. Association between full/part-time employment and work level in North West Gas demonstrated by $\chi^2 = 114.1$ with 5 d.f., significant at $\alpha = 0.01$, as is $r = 0.18$; association of full/part-time employment with employment type (North West Gas) revealed by $\chi^2 = 75.5$ with 3 d.f., $r = 0.15$, both significant at $\alpha = 0.01$, but these associations are very weak.
65. $\chi^2 = 29.6$ with 2 d.f., $r = 0.10$, significant at 0.01 level.
66. South West Gas, corrected $\chi^2 = 19.3$ with 1 d.f. phi coefficient (ϕ) = 0.08; Wales Gas, corrected $\chi^2 = 60.5$ with 3 d.f., $\phi = 0.14$; significant at $\alpha = 0.01$.
67. $\chi^2 = 405.9$ with 3 d.f., $r = 0.23$, significant at $\alpha = 0.01$.

68. North West Gas, $\chi^2 = 3145.6$, with 4 d.f., $\tau = 0.27$; Eastern Gas, $\chi^2 = 261.0$, with 1 d.f., $\phi = 0.30$; both indicate a weak but positive relationship, significant at 0.01 level.
69. $\chi^2 = 526.8$ with 3 d.f.; $\tau = 0.34$, both significant, $\alpha = 0.01$.
70. Association between function and work level amongst females in Eastern Gas: $\chi^2 = 354.0$, 40 d.f. Males : $\chi^2 = 300.7$ with 42 d.f.; both significant, $\alpha = 0.01$.
71. See, for example, S.J. Carey, Relocation of Office Staff: A Study of the Reactions of Office Staff Decentralised to Ashford, Location of Office Bureau, Research Paper no. 4 (London: Location of Offices Bureau, 1969); also see Chapter VII.
72. See Chapter IX, where this is identified for the Llandarcy office, Wales Gas, and Colchester office, Eastern Gas. But this is not the case if only key personnel are moved, of course.
73. The retirement of senior personnel has been used on many occasions as an opportunity for reorganisation: demonstrated by British Gas even in the pre-nationalisation period and also a feature of other organisations. This has not been examined in this thesis, however.
74. It should be noted that larger office sites always have a higher proportion of senior personnel than smaller sites: this is a function of BGC centralisation of both decision making and employment.
75. As is undertaken in Chapter X.
76. Of course, British Gas large sites, though centralised, are often not at centrally-located sites, hence the need to provide special facilities in order to attract and maintain the female workforce.
77. See Table 8.16.
78. See tables in British Gas Corporation, Report and Accounts, 1981/82.
79. This is more market amongst younger managers, see Sofer, Men in Mid-Career.
80. Lockwood, The Personnel Implications of Moving to a new Regional Headquarters.

CHAPTER IX

THE WORK AND RESIDENCE PATTERNS OF
REGIONAL OFFICE WORKFORCESThe Analysis Of Residential And Work Site LocationThe Aims Of This Approach

Two main characteristics of the Regional office workforce, namely the residential and work locations of each individual, have yet to be considered in depth. The purpose of this chapter is to evaluate the numbers employed at each site and the length of the work journey of individuals, and to describe the observed pattern of the office employee catchment areas as defined by the residential distribution of those employed at each site. The straight-line distance travelled to work has been calculated from the national grid locations of residence and work site for each employee using Pythagoras' Theorem.¹

Hillman et al recognised three main components governing the journey to work: the location of homes, the location of work, and the means of transport used to overcome the intervening distance. To these they added a further component, time.² Here, only the two locational components are available permitting analysis of the intervening distance, but these provide ample evidence for further evaluation of the argument that changes in organisation and technology, particularly within the office framework, influence the workforce characteristics. It is accepted that the subsequent analysis is restricted in comparison with much journey to work research, where the aims are somewhat different. Office location research and journey to work studies have been given brief

consideration earlier,³ but the following synopsis of the main features of relevant studies (which, moreover, have not been confined to office employees) is intended to identify the role of the present approach within the wider context of journey to work research, especially in relation to office locational studies.

Office Relocation And The Journey To
Work: A Summary Of Research

Thompson identified three main factors which shape commuting patterns, namely area factors, plant or industry factors, and personal factors.⁴ In terms of British Gas office employees these may be interpreted respectively as the geographical features of the office catchment areas or their individual labour markets, the organisation of the Industry, and thirdly the known characteristics of the personnel, although also embraced by the term "personal factors" are their non-measurable preferences and social characteristics.

Studies concentrating on the impact of office decentralisation on the journey to work have demonstrated that private transport (the motor car) is the dominant transport mode to decentralised sites⁵ and that private transport adoption is unrelated to previous workplace or occupation.⁶ Despite a paucity of positive evidence that office relocations are a major factor, there is a general acceptance that, "job dispersal may also cause some workers to relocate residence, although this is an area of uncertainty".⁷ Brown, for example, demonstrated that workplace changes play a minor role in residential mobility, and accounts for only a "minority of moves".⁸ Nevertheless, it is generally assumed that access to employment is a basic determinant of residential location patterns,⁹ even though, as Cullingworth has asserted, "only a small part of labour mobility entails residential movement and only a minor (but

nevertheless significant) part of residential mobility involves a change of job."¹⁰ Parnes expressed the adjunct to this argument, that moves in connection with employment form only a small proportion of total housing movements.¹¹ Thus, before reviewing the effects of office movements, it is helpful to consider the basic determinants of the length of the journey to work itself, since by implication these may be used to define an office's workforce catchment area.

In attempting to model the causes of increasing separation between residence and workplace, Warnes has listed a number of factors which affect residential and employment locations. Amongst the former he included increasing real income and decreasing hours of work, which together facilitate an ability to pay for, and to spend time on, longer journeys to work, changes in passenger transport use, and declining housing densities accompanying the creation of specialised residential areas. Amongst the latter he listed the increasing size of employment units, and their demand for larger sites, the declining primary and increasing tertiary sectors, and the concentration of employment into urban areas.¹² These factors may be identified within office employment generally, and more particularly within British Gas. From this, it follows that the level of occupational status must be an important determining factor in the potential length of the journey to work, as has been recognised by Daniels: "The higher status occupation groups command higher incomes and this permits a wider choice of residential location as well as the ability to accommodate higher commuting costs."¹³ Thus it is apparent that following relocation of the work site, there will be greater loss of lower grade clerical employees than of higher grade, professional and executive personnel.¹⁴ In this study increased length of employment with the Industry has been found to be correlated with higher employment grades and it is to be expected that this will be particularly marked at

the newer office sites where turnover of lower grade personnel is expected to be greater.

The number of employees who fail to move with their employer following relocation, the "separation rate", is correlated with the relocation distance: the further an office moves, the greater the separation rate.¹⁵ Not only is there an increasing differential with decreasing employment level, but there are also distinct differences in the separation rates of the sexes, and between the marital status groups of women, although this latter relationship is partly explained by different rates associated with different age groups. Thus, "job transfer is likely to be highest among female workers: this reflects both their preponderance in the clerical workforce, and the apparent preference among many single females for a central workplace."¹⁶ In addition, working women are more often found in large towns than elsewhere. A further factor is that single women are more dependent upon public transport. Greater mobility amongst men facilitates longer average service as office employees than women, and this difference should be more marked at recently established sites.¹⁷ Alternatively, long service amongst females is expected to be more frequent at stable office sites than at 'newer' sites.

In the late 1950's and early 1960's there was a trend in Britain towards increases in both the time and distance involved in the journey to work,¹⁸ but by the early 1970's improved transportation and decentralisation policies had contributed to both shorter and quicker work journeys for many office workers. It is the growth in private transport use to locationally decentralised office sites that has facilitated shorter times spent on travelling. At the same time, "a major effect of time saving is to introduce workers and employers to a larger labour market".¹⁹ An early definition of a "local market area" described "a geographical

area surrounding a central city (or cities which are only a few miles apart) in which there is a concentration of labour demand, and in which workers can change jobs without changing their residence."²⁰ However, this somewhat simplistic interpretation has been sophisticated by the addition of relationships believed to exist between employment site and a considerably more wide ranging employee catchment area, such that:

It is ... inadequate to speak of residential mobility within a local labour market area. Rather one has to consider housing factors which deter or facilitate workers taking jobs in particular employment areas. This involves a consideration of communications, ease and cost of access on the one side and personal preferences and possibilities (for example in terms of income) on the other ... close proximity to work is not necessarily of predominant importance except for certain groups such as low income workers and married women.²¹

Clearly, the relationship between residential and work locations is complex and involves not only measurable quantities such as income, the availability of alternative employment and the housing market, but also intangible variables including personal preference, satisfaction levels and aspects of employees' life cycles. Prior to Rossi's exposition on the importance of the life cycle, Parnes had expressed the importance of attachment to the neighbourhood and the resultant break-up of social relationships following movements. He also noted the growing importance of these factors with increasing age of the individual.²² Social factors play an important part in movement decisions.

Concentration here is upon the aggregate distance and distributive patterns. These are examined in terms of the influence of the office upon both its catchment area and its employee composition, through its hierarchical position, its geographical location, its size, and its function. The relationship with individuals is developed in the following chapter.

Inter-Regional Comparisons Of Office Sites

Regional Centralisation And The Concentration Of Office Employment

The number of office sites in each Region is partially dependent upon its number of office employees, but the numbers of both sites and employees are dependent upon the gas consumers of the Region, their numbers, type and location. Nevertheless, within the constraints imposed by consumers every Region is to some extent free to develop the locational pattern it considers most suitable. Thus each Region has adopted and adapted a somewhat different locational pattern.

As a very basic indication the numbers of office sites per se reflect the extent of centralisation within each Region, but as these do not serve equable areas a better measure is provided by the average number of office employees per site²³ (Table 9.1). This also permits a commensurate consideration of North West Gas, even though in total it is a much larger Region and data are available for only a portion of its area.

At Vesting Date the North Western Gas Board inherited a relatively centralised organisation, since the Gas Industry was well-established and for the most part efficiently organised in the north west of England. The former Liverpool Gas Company²⁴ in particular influenced the structural and locational organisation of the area contained within the North West data set under consideration. Therefore the Region already has a largely centralised structure. Features of the Region in addition to factors of inheritance which have encouraged this structure include its relatively dense and centralised population and its industrial base. Thus the level of centralisation suggested by the data is not unexpected, whilst the present reorganisation will result

TABLE 9.1
 NUMBERS OF OFFICE SITES AND THEIR AVERAGE
 WORKFORCE IN SELECTED GAS REGIONS

Gas Regions	No. of office sites	Average No. of office employees		
		At all sites	At non-HQ sites	At HQ + sites (%)
Wales	59	45	34	26.7
Eastern	128	34	26	25.9
South West	138	21	16	25.8
North West *	88	33	33	n.a.
South East	89	89	52	25.5
Southern	n.a.	n.a.	n.a.	32.4
Seeboard	37	87**	69	24.5

SOURCES: British Gas PMIS data; South Eastern Electricity Board personnel data.

* Partial data.

** Excluding showroom only sites. Equivalent figure for South East Gas is 107.

+ South West and Eastern Gas computer centres considered part of HQ.

TABLE 9.2
 RESIDENCE-WORK DISTANCES OF OFFICE EMPLOYEES IN
 SELECTED GAS REGIONS

Distance in Kilometres	Gas Regions							
	Wales		Eastern		South West		North West	
	No.	%	No.	%	No.	%	No.	%
0-< 5	1034	38.7	2074	47.8	1496	51.6	1197	40.8
5-< 10	754	28.2	859	19.8	604	20.8	1024	34.9
10-< 15	367	13.7	539	12.4	401	13.8	372	12.7
15-< 20	253	9.5	248	5.7	132	4.5	142	4.8
20-< 25	90	3.4	190	4.4	103	3.5	95	3.2
25-< 30	57	2.1	148	3.4	71	2.4	55	1.9

SOURCE: British Gas PMIS data - derived.

in amalgamation of offices and further increases in the average number of employees at each site.

However, centralisation is not simply dependent upon the number of employees at each office site but results from the concentration of decision-makers at relatively few sites. It is necessary to consider not only the centralisation of employees at fewer, larger sites (which may themselves be sited at decentralised locations) but also the degree of centralisation of control. For example, although the number of consumers served by Wales Gas and South West Gas are similar,²⁵ and so too are the numbers of employees, South West Gas has adopted a less centralised policy at Area level, basing its main Area office activities in seven Customer Service offices serving six Areas, compared with the four Area offices of Wales Gas. This difference in policy partly results from the timing of reorganisation implementation. Thus Wales Gas, reorganising in the early 1970's, was able to follow a rapidly imposed, very centralised pattern.²⁶ This it was able to achieve without prominent trade union reaction and related problems of employee relations which have increasingly influenced decisions in later periods. South West Gas, following a much more gradual programme of reorganisation based upon site renewal and updating begun in the mid-1970's and yet to be completed, has become very much subject to financial constraints. It has introduced locational and organisational changes which have created greater efficiency, but have been less overtly dramatic, largely because each change requires integration with the existing locational pattern of the Region.

The Eastern Gas pattern of eight Area Service Centres which each serve a similar number of consumers within units of varying areal extent has evolved gradually, but predominantly results from the implementation of two differing reorganisation policies.²⁷ The most recent change was

the closure of the main Ipswich office as an Area Service Centre and the redeployment of its personnel at Colchester (although some employees remain at the Ipswich site who do not form part of the Service Centre organisation).

The predominance of a small number of major sites in Wales Gas, namely Regional Headquarters, the four Area offices and the Central Stores complex at Cefn On, results in these sites containing more than two-thirds of all office employees within the Region. The remaining fifty-three sites collectively contain 32.2 per cent of Regional office employees, with an average of only twelve at each site. In Eastern Gas, if sites are ranked by the size of their office workforce, a quarter of all office employees are housed at 117 sites, with an average of nine personnel at each site. In South West Gas the same proportion occupy 122 sites, with an average of only six at each. This suggests that with increasing centralisation fewer small office sites, measured as the number of personnel these house, but with a larger average number employed therein, are contained in the office pattern.

The degree of centralisation at Area level does not necessitate a similar concentration at a Region's other hierarchic levels, however. Indeed, centralisation of Regional Headquarters employees is similar in most Regions for which data are available. The exception is Southern Gas, where 32.4 per cent of office employees are at Regional Headquarters. Undoubtedly this results from the high degree of centralisation of control at Headquarters rather than at the Area offices, for this contains 77.3 per cent of Higher Management personnel, plus 47.7 per cent of Senior Officers, but only 27.3 per cent of Staff. This may be compared with only 58.4 per cent of Higher Management, 39.6 per cent of Senior Officers and 26.0 per cent of Staff at

Wales Regional Headquarters. Nevertheless, Southern Gas Headquarters maintains a large proportion of Staff, these forming 68.7 per cent of its personnel, compared with 72.1 per cent at Wales Regional Headquarters. The generous accommodation available to Southern Gas Headquarters is a factor in this extra-ordinary centralisation, which reduces the responsibilities exercised from the Area offices, even though these contain the majority of non-headquarters personnel.

As has been stressed earlier, failure to locate all headquarters personnel within a single building is a result of building availability and office accommodation constraints, not of deliberate Regional locational policy.²⁸ Thus it is reasonable to class all headquarters employees as a single group. The number of headquarters personnel form at least a quarter of Regional office employment, even though these are not necessarily located at one site. Data available for South Eastern Electricity Board²⁹ (Seeboard), one of the Boards at present involved in providing new accommodation for its headquarters personnel, has employees spread among five sites, including the Computer Centre. These collectively form 24.5 per cent of total Board employment, suggesting that the observed ratio of headquarters to non-headquarters personnel may be found outside British Gas within this type and areal size of organisation. In South East Gas, which serves a comparable Region to Seeboard, a similar proportion are housed at Regional Headquarters, although this is a single site complex occupying contiguous offices.³⁰ In general terms South East Gas has a more centralised organisation than Seeboard, demonstrated by a higher average number of employees at each site (107 in South East Gas, 87 in Seeboard, excluding showroom only sites).

Movement to the new Wales Gas Headquarters site, which will incorporate those headquarters personnel at present located at Grangetown,

will (at present employment levels) increase the number of headquarters employees to a level representing 32.1 per cent of all office employees within the Region. However, this includes telemetry personnel who are excluded from the centralised Eastern and South West Regional Headquarters employees. Nevertheless, inclusion of Widcombe Grid Control Centre employees with the headquarters personnel of South West Gas, for example, only increases the headquarters representation to 27.4 per cent. It thus seems possible that the new Wales Gas Regional Headquarters will increase the level of headquarters centralisation. The full realisation of this may be prevented by the increasing trend towards decentralisation of data input from Regional Headquarters to Area offices, now partially implemented in Wales Gas, which will counteract headquarters increases by retaining employment levels in the Areas through the dispersal of input stations and related personnel. There is no evidence of increases in Area office employment, but there should be a reduction in data handling personnel at Regional Headquarters. Nevertheless, as demonstrated in Southern Gas, the generous provision of headquarters accommodation permits considerable headquarters centralisation of Regional personnel.

Regional Patterns Of Residence - Work Distances

The composite distances between residential and work locations define the individual office catchment areas (although these are most clearly seen by mapping techniques). To facilitate comparison between the patterns observed in each Region and to minimise any distortion resulting from the locational accuracy levels of the Regional samples,³¹ distance data have been grouped into distance categories or bands.

Grouping of all office employees into 10 Kilometre (Km) distance bands reveals that the number of employees within each band decreases with increasing distance for all Regions (Fig. 9.1). The slight increase

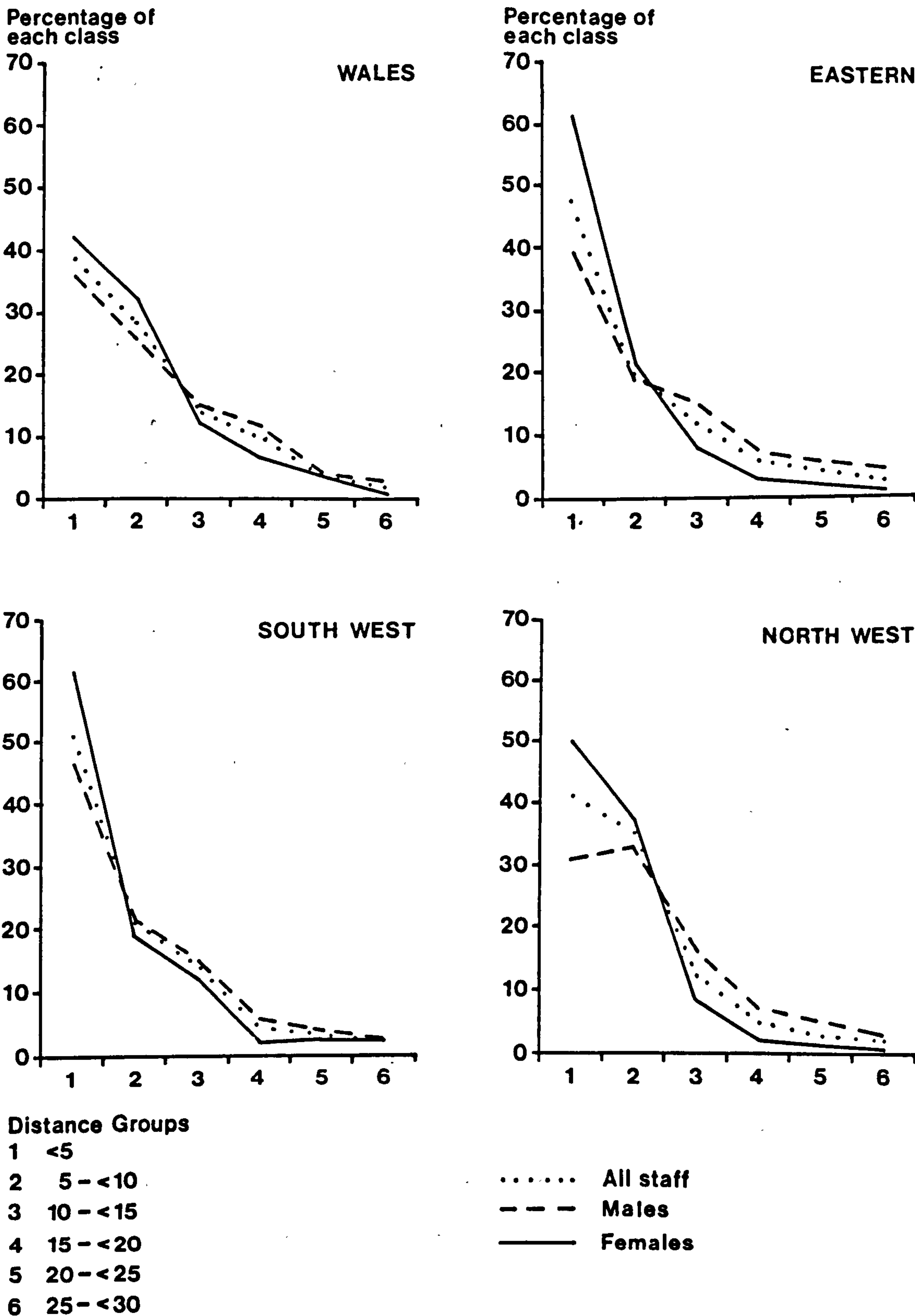


Fig. 9.1 Residence-Work Distances of the Male and Female Office Workforces of Selected Regions

in the 50 Km and over band is, of course, partly due to its unspecified outer limit, while also included are employees whose recorded address is incorrect in terms of their daily travel.³² Fundamental features revealed are that more than two-thirds of all employees reside within 10 Km of their place of work, while less than one in seven resides more than 20 Km from his or her place of work.

These distance patterns may be examined in more detail by grouping office employees into 5 Km distance bands. However, the subsequent tables display this division only up to 30 Km, since the percentages living beyond this distance are small (4.5 per cent in Wales Gas, 6.5 per cent in Eastern Gas, 3.3 per cent in South West Gas, and 1.6 per cent in the North West sample) and further sub-division does not reveal any significant features of the office workforce distribution. Again, the pattern of decreasing numbers with increasing distance from the workplace is observable (Table 9.2).

The lowest proportion residing within 5 Km occurs in Wales Gas, followed by North West Gas, Eastern Gas, and South West Gas. However, a comparison of the proportions residing within 10 Km shows the North West proportion to be greatest (75.8 per cent), whilst Wales Gas remains the smallest (66.9 per cent), followed by Eastern Gas and South West Gas. Thus, in general terms, North West Gas office employees appear to travel less far to work. This may be attributed to two factors. Firstly, the Region is undergoing a process of reorganisation involving greater centralisation. The present locational organisation has been established for some considerable time so that the labour market or 'catchment area' for each site has become optimised, a situation which is presently undergoing change : many of the employees who are contained within the available sample are those very employees who are to be affected most by this change. Secondly, the sample excludes headquarters personnel. The

possible influence of these employees may be removed from the other Regional data for comparative purposes.

This removal of central headquarters and computer personnel appears to have little effect upon the distribution of residences in relation to workplace in the three other Regions (Table 9.3). Obviously the headquarters personnel distance distribution does not differ significantly from that of other office employees : it is not possible to reject the null hypothesis that there is no significant difference between the distance distribution of headquarters and all other Regional office employees of any of these Regions.³³

Nonetheless, the pattern of journey to work distances in the Regions does appear to reflect the degree of locational centralisation resulting from Regional reorganisation. This centralisation has been shown to be dictated by the degree of control exercised from the Area offices. To examine whether this is evident in the numbers employed at each level in the office hierarchy, the minor locations, that is most showrooms, depots and other small sites (which are primarily a function of consumer numbers and locations in their areas and only a secondary result of Regional locational structure) have been removed from the Regional data. This leaves as the major locations the Regional Headquarters, and Area and District main offices (the latter included only in North West and South West Gas). These major sites and their number are as follows:

Wales Gas (6) - Snelling House/Bute Terrace, Cardiff (Regional Headquarters); Cefn On (Regional Stores); and the Area offices, Maelor, Crindau, Grangetown and Llandarcy.

Eastern Gas(10)- Star House, Potters Bar (Regional Headquarters); Tower Point, Enfield (Regional Computer Centre); and the Area

TABLE 9.3

CUMULATIVE FREQUENCIES OF THE RESIDENCE-WORK
DISTANCES OF OFFICE EMPLOYEES, EXCLUDING REGIONAL
HEADQUARTERS AND CENTRAL COMPUTER PERSONNEL, IN
SELECTED REGIONS

Distance in Kilometres	Gas Regions			
	Wales	Eastern	South West	North West
	%	%	%	%
< 5	38.2	50.2	52.2	40.8
< 10	67.4	68.4	74.6	75.7
< 15	81.3	80.4	85.2	88.4
< 20	90.7	86.0	89.4	93.2
< 25	93.7	90.5	93.2	96.4
< 30	95.5	93.9	96.3	98.3
< 40	96.7	96.4	97.7	99.1
< 50	97.7	97.7	98.4	99.4
50+	100.0	100.0	100.0	100.0

SOURCE: British Gas PMIS data - derived.

Service Centres at Barnet, Harlow, Hemel Hempstead, Luton, Peterborough, Colchester and Norwich; plus the Regional Stores, Letchworth.

South West
Gas (11)

- Riverside, Keynsham (Regional Headquarters); Sydney Wharf, Bath (Regional Computer Centre); and the Customer Service Centres at Weston; Union Street, Torquay; Castle Street, Taunton; Gorse Hill, Swindon; Radiant House, Plymouth; Eastgate House, Exeter; Staverton; Malago, Bristol; and Upper Bristol Road, Bath.

North West
Gas (10)

- Pocket Nook, St. Helens; Hind Street, Birkenhead; Linacre; Wavertree; Radiant House, Liverpool; Wensley Road and Duke Street, Blackburn; Spa Road, Bolton; Silver Street, Bury; and Higginshaw.

The proportions of the total Regional office workforces employed at these sites, and the average numbers at each site appear to reflect the degree of Regional centralisation (Table 9.4a).

Yet this pattern may not be observed through a simple examination of the medium and large employment sites. There are a number of additional sites of lesser organisational importance which nevertheless employ thirty or more personnel, but by including these with the main sites the relationships expressed above no longer exist (Table 9.4b).

By reducing the data sets to embrace only those sites which employ one hundred or more the following are included:

Wales Gas (5) - Snelling House/Bute Terrace, Maelor, Crindau, Grangetown, and Llandarcy.

Eastern Gas

(9) - Potters Bar, Enfield, Barnet, Hemel Hempstead, Luton,

TABLE 9.4
 AVERAGE EMPLOYMENT AT DIFFERENT SIZE OFFICE SITES
 IN SELECTED GAS REGIONS

	No. of sites	No. of employees	Average no. at each site	% of Regional total
^d Office sites employing less than 30				
Wales	41	528	13	19.8
Eastern	109	620	6	14.3
South West	117	542	5	18.7
North West*	71	464	7	(15.8)
South East	55	406	7	6.6
^b Office sites employing 30 to less than 100				
Wales	6	198	33	7.4
Eastern	10	572	57	13.2
South West	13	630	49	21.7
North West*	8	427	53	(14.6)
South East	19	1204	63	19.6
^c Office sites employing 100 or more				
Wales	5	1948	390	72.8
Eastern	9	3146	350	72.5
South West	8	1730	216	59.6
North West*	9	2040	227	(69.6)
South East	15	4543	303	73.8
^a Major office sites				
Wales	6	2027	338	75.8
Eastern	10	3224	322	74.3
South West	11	1899	173	65.4
North West*	10	2103	210	(71.8)
South East	21	4863	232	79.0

SOURCE: British Gas PMIS data.

* Partial data.

Letchworth, Peterborough, Colchester and Norwich.

South West

Gas (8)

- Riverside; Sydney Wharf; Staverton; Swindon; Bath; Malago, Bristol; Union Street, Torquay; and Radiant House, Plymouth.

North West

Gas (9)

- Higginshaw; Spa Road, Bolton; Silver Street, Bury; Duke Street, Blackburn; Wavertree; Linacre; Radiant House, Liverpool; Hind Street, Birkenhead; and Pocket Nook, St. Helens.

Obviously, these slightly smaller groups employ only marginally fewer personnel (Table 9.4c) but the average per site increases disproportionately. Again the relationship between average size of site and degree of centralisation, and between the proportions of employees in these selected sites and degree of centralisation, is evident.

It is apparent that those sites which form the lower parts of the organisational hierarchy show little relationship with Regional centralisation in the form of residence-work distance patterns (Table 9.4d). The position an office occupies in the structure of the Region is not simply a result of size but is related to its organisational role. It is those sites which employ persons at Higher Management and Senior Officer levels in addition to larger numbers of Staff which reflect Regional centralisation. Hence the distribution of the major centralised sites reflects the decision-making structure of the Region. Wales Gas is the most centralised since control is exercised from only four offices below the headquarters level; South West Gas is least centralised because control is held by nine offices below headquarters level, which both individually and collectively exercise considerably less power than the Wales Gas offices of the same apparent level. Subsidiary office locations

which form the remaining hierarchical levels are subject to geographical constraints: reporting depots for example need to be easily accessible to the areas they serve and are limited by a maximum number of consumers who can be served efficiently from a single site; showrooms are located in relation to sales potential, again a function of the consumer catchment area.³⁴ Changes in the organisation of these lower levels do take place, but in response to changes in consumer accessibility and requirements. They do not affect, except to a minor degree, the organisation at higher levels. Nevertheless, changes at these lower levels can accompany changes at higher levels, as in North West Gas, where the entire organisation is subject to revision in an attempt to overcome problems of an outmoded locational structure at all levels below headquarters. This is largely the result of a reluctance to introduce gradual change in the past: the Region may be said to have reached a crisis-point in its locational pattern and structure. The new pattern now evolving is influenced by the changed geographical circumstances of a very much improved transportation system and a shift in consumer demand.

In general terms, the distance distribution of office employee residences in relation to workplace is similar in each selected Region (Table 9.5). The main catchment area for the majority of offices is defined by a 10 Kilometre band, but the proportions of employees residing within this distance do vary both intra- and inter-Regionally (Table 9.6). In terms of the absolute size of the office sites, measured by the number of office employees, at the intra-Regional level the proportions residing within 10 Km is greater at sites employing less than thirty office employees than at sites employing between thirty and ninety-nine employees. This is most marked in Wales Gas and Eastern Gas, which both have lower overall proportions in the 10 Km band compared with the

TABLE 9.5

CUMULATIVE FREQUENCIES OF THE RESIDENCE-WORK
DISTANCES OF OFFICE EMPLOYEES IN SELECTED
GAS REGIONS

Distance in Kilometres	Gas Regions			
	Wales	Eastern	South West	North West
	%	%	%	%
< 5	38.7	47.8	51.6	40.8
< 10	66.9	67.6	72.4	75.7
< 15	80.6	80.0	86.2	88.4
< 20	90.1	85.7	90.7	93.2
< 25	93.5	90.1	94.2	96.4
< 30	95.6	93.5	96.6	98.3
< 40	96.9	96.2	97.7	99.1
< 50	97.8	97.4	98.4	99.4
50+	100.0	100.0	100.0	100.0

SOURCE: British Gas PMIS data - derived.

TABLE 9.6

PROPORTIONS OF THE REGIONAL OFFICE WORKFORCES RESIDING
WITHIN TEN KILOMETRES OF THE OFFICE WORKSITE, BY TYPE
OF SITE, IN SELECTED GAS REGIONS

	No. of employees at site			All office employees	Major sites	CSC's	HQ
	0 < 30	30 < 100	100+				
	%	%	%	%	%	%	%
Wales	74.9	54.0	66.0	66.9	66.5	66.4	66.7
Eastern	73.9	55.6	68.6	67.6	68.7	70.5	65.2
South West	73.1	72.5	72.1	72.4	73.1	77.6	65.8
North West*	77.8	75.9	75.3	75.8	75.1	75.1	n.a.

SOURCE: British Gas PMIS data.

* Partial data.

South West and North West Regions. These former Regions also have higher proportions of personnel at sites of one hundred or more office employees compared with the sites employing thirty to ninety-nine, unlike South West and North West Regions, but these latter Regions have comparatively larger proportions employed at sites with one hundred or more office employees residing within 10 Km of their work sites. As might be expected as a result of their larger overall catchment areas, the proportions of Regional headquarters employees residing within 10 Km of their work location is somewhat less than those employed at Area level offices (C.S.C!'s), although this is not the case in Wales Gas. It would appear that the larger the Area offices, that is, the more they resemble headquarters offices (which by implication includes greater centralisation of control, as well as a larger workforce), the greater the number of office employees who live more than 10 Km from their place of work. Based upon this premise and the relative proportions employed in the larger offices, it is suggested that the greater centralisation of Wales Gas following its reorganisation is responsible for its comparatively low proportion living within 5 Km of their workplace, although these form a significant group even here, representing 38.7 per cent of all office employees. In contrast, it is suggested that the more decentralised structure of South West Gas is responsible for more than half of its office employees residing within 5 Km of their workplace (51.6 per cent).

Of course, centralisation of Area office employees in Wales Region and concentration of Area control has involved decentralisation of the office site. The decentralised location of such offices are a possible factor in the increased residence-work distances associated with these sites, as is the length of their establishment. For example Daniels found in his decentralisation survey areas of New Malden and

Gants Hill that the proportions living within 10 Km of their offices over the period 1969 to 1976 had increased from 56.8 per cent to 70.4 per cent at New Malden and from 75.1 per cent to 80.8 per cent at Gants Hill.³⁵ This supports the hypothesis that the proportions living within 10 Km of their workplace are higher in areas with greater office locational stability, as in North West Gas where the proportion is as high as 75.5 per cent, with the implication that the longer an office remains at a location the smaller its catchment area becomes in proportional if not absolute terms.

Nonetheless, office size simply measured by the number of employees is a significant factor. By expressing the numbers in each distance band of the sites employing thirty to ninety-nine and those employing one hundred or more as a percentage of those within each distance band of the Regions as a whole, these may be compared with the average representations of Regional employment within these office sizes (Table 9.7). These indicate that residences less than 5 Km from the workplace are under-represented at sites employing thirty to ninety-nine and at sites with one hundred or more, with the exception of sites with one hundred or more in Eastern Gas. It also illustrates that employees at sites with one hundred or more office employees are less likely to travel more than 30 Km to work.

The Influence Of Workforce Characteristics Upon
Office Catchment Areas: An Intra-Regional Assessment

The Influence Of Workforce Charac-
teristics Upon The Residence-Work
Distance

In the examination of Regional workforces two major variables found responsible for differences in office workforces, particularly at the different office hierarchy levels, were the sex and grade (work

TABLE 9.7
 PROPORTIONS OF THE REGIONAL OFFICE WORKFORCES EMPLOYED AT DIFFERENT SIZE SITES,
 GROUPED BY RESIDENCE-WORK DISTANCE, FOR SELECTED GAS REGIONS

Distance in Kilometres	Regional Sites with 30 < 100 employees				Regional Sites with 100+ employees			
	Wales %	Eastern %	South West %	North West %	Wales %	Eastern %	South West %	North West %
0 < 5	7.1	10.8	23.5	16.9	70.1	72.9	56.9	64.1
5 < 10	4.6	10.9	17.5	11.8	74.5	75.1	65.6	75.1
10 < 15	7.6	15.0	21.4	13.7	78.2	72.4	61.6	74.2
15 < 20	9.4	16.1	22.8	14.1	78.7	73.4	56.8	63.4
20 < 25	12.2	18.4	17.5	20.0	65.6	72.1	71.8	72.6
25 < 30	14.0	18.9	15.5	12.7	66.7	75.0	66.2	67.3
30 < 40	20.0	29.4	43.7	9.1	57.1	58.0	21.9	59.1
40 < 50	4.4	25.4	5.7	12.5	73.9	62.8	58.0	75.0
50+	19.7	20.0	25.0	18.7	70.5	61.8	50.0	81.3
Average	7.4	13.2	21.7	14.6	72.9	72.5	59.6	69.6

SOURCE: British Gas PMIS data - derived.

level) of employees.³⁶ Since differences in employee residential distributions have been observed at different levels in the office hierarchy, it is suggested that these differences may be largely the result of differences in the residential patterns of male/female employees and employees of the various grades.

An examination of residence-work distances of the sexes does reveal that the residences of male employees are more widespread, with between a fifth (in Eastern Gas) and a tenth (in North West Gas) residing at least 20 Km from work (Table 9.8a). Also, with the exception of Wales Gas (where a quarter of female employees travel at least 10 Km), less than a fifth of female employees reside at least 10 Km from work (Table 9.8b). Nevertheless, the general pattern of distribution, if not the aggregate distance, is similar within the sexes of each Region, giving a pattern of decreasing numbers with increasing distance, measured in 5 Km bands about the work site. The only exception to this is found amongst the male office employees of North West Gas, where there are slightly more in the 5 to less than 10 Km band than in the less than 5 Km band, although this difference represents only 1.1 per cent of all males in the available data for the Region.³⁷

The marital status of female employees does not appear to be important, since within both Wales and South West Gas (where data on the marital status of female employees are available) there is little difference in the distribution of married and single female employees amongst the 10 Km distance bands (Table 9.8c,d).

It has been noted that those in higher status employment have higher incomes and wider residential choice.³⁸ Amongst British Gas office employees different occupation status groups are represented by the grades of Higher Management, Senior Officers and Staff. Daniels

TABLE 9.8

RESIDENCE-WORK DISTANCES OF THE MALE AND FEMALE
OFFICE WORKFORCES OF SELECTED GAS REGIONS

Distance in Kilometres		Gas Regions							
		Wales		Eastern		South West		North West	
(a)		Males							
		No	%	No	%	No	%	No	%
0	10	975	61.4	1494	57.7	1295	68.3	1093	67.1
10	20	417	26.3	589	22.7	390	20.6	369	22.7
20	30	104	6.6	281	10.8	127	6.7	130	8.0
30	40	26	1.6	104	4.0	28	1.5	17	1.0
40	50	22	1.4	46	1.8	16	0.8	7	0.4
50+		43	2.7	77	3.0	41	2.2	12	0.7
Totals		1587		2591		1897		1628	
(b)		Females							
		No	%	No	%	No	%	No	%
0	10	813	74.8	1439	82.4	805	80.1	1128	86.6
10	20	203	18.7	198	11.3	144	14.3	145	11.1
20	30	43	4.0	57	3.3	46	4.6	20	1.5
30	40	9	0.8	15	0.9	4	0.4	5	0.4
40	50	1	0.1	5	0.3	3	0.3	1	0.1
50+		18	1.7	33	1.9	3	0.3	4	0.3
Totals		1087		1747		1005		1303	
(c)		Married females							
		No	%	n.a.		No	%	n.a.	
0	10	572	75.2			589	79.7		
10	20	144	18.9			108	14.6		
20	30	27	3.5			36	4.9		
30	40	6	0.8			4	0.5		
40	50	-	-			-	-		
50+		12	1.6			2	0.3		
Totals		761				739			
(d)		Single female							
		No	%	n.a.		No	%	n.a.	
0	10	241	73.9			216	81.2		
10	20	59	18.1			36	13.5		
20	30	16	4.9			10	3.8		
30	40	3	0.9			-	-		
40	50	1	0.3			3	1.1		
50+		6	1.8			1	0.4		
Totals		326				266			

SOURCE: British Gas PMIS data - derived.

provided empirical evidence of the influence of grade upon journey to work length in his New Malden and Gants Hill survey when he attributed an increase in the proportion travelling more than 48 Km over the period 1969 to 1976 to an increase in the number of managerial and professional respondents in his sample.³⁹ In the Gas Regions this is manifest in the degree of organisational centralisation. Thus, in Wales Gas, the higher degree of organisational centralisation at the Area offices increases the proportions of Higher Management employees at these sites and is to a considerable degree responsible for the higher proportions living more than 10 Km from their workplace, particularly compared with South West and North West Gas.

An examination of British Gas grades in a detailed search for such relationships evidenced by greater residence-work distances, given below, excludes the smallest employment sites, mostly small reporting depots and showrooms, since most employment at these sites is of Staff, who as a group are amply represented at the larger sites. The proportions of the Regional office workforces included are large (Table 9.9).

A comparison of the cumulative percentages with increasing distance between residential and work locations reveals that Staff tend to travel considerably shorter distances to work than Higher Management or Senior Officers, and that approximately three-quarters of all Staff employees reside within 10 Km of their place of work (Table 9.10). Also evident is that few Higher Management personnel live within 1 Km of their work location, the highest percentage occurring in South West Gas (7.2 per cent) which additionally has the highest percentage of Senior Officers in this distance band (11.2 per cent). The absence of Higher Management personnel combined with only 2.1 per cent of Senior Officers living within 1 Km in Wales Gas suggests that residential distributions may be related to the degree of Regional office central-

TABLE 9.9
 PROPORTIONS OF THE REGIONAL OFFICE WORKFORCES
 EMPLOYED AT MAJOR SITES IN SELECTED GAS REGIONS

	No. of sites	% of total office workforce
Wales	4	48.2
Eastern	20	86.2
South West	18	75.0
North West	20	82.8

SOURCE: British Gas PMIS data.

TABLE 9.10
 CUMULATIVE FREQUENCIES OF THE RESIDENCE-WORK DISTANCE BY
 EMPLOYMENT GRADE OF THE OFFICE EMPLOYEES IN SELECTED GAS
 REGIONS

Distance in kilo- metres	Higher Management				Senior Officers				Staff			
	W.G. %	E.G. %	S.W. %	N.W. %	W.G. %	E.G. %	S.W. %	N.W. %	W.G. %	E.G. %	S.W. %	N.W. %
< 1	-	4.0	7.2	-	2.1	8.2	11.2	2.2	2.3	17.9	12.9	12.5
< 5	22.4	11.9	25.8	13.3	25.5	24.9	34.7	19.7	40.9	52.8	54.2	42.3
< 10	44.8	26.0	46.4	31.7	50.6	42.0	57.4	50.6	76.5	73.6	75.5	79.2
< 15	73.1	52.0	84.5	55.0	70.2	60.9	77.9	71.7	88.7	84.3	87.3	91.2
< 20	94.0	71.8	90.7	70.0	86.6	69.1	87.5	82.8	95.3	89.0	90.9	94.9
< 25	97.0	79.7	91.8	83.3	89.2	75.8	95.0	89.7	97.2	93.0	94.5	97.7
< 30	97.0	88.1	91.8	88.3	91.8	84.5	96.7	95.3	98.2	95.5	97.5	99.0
< 40	97.0	94.4	92.8	90.0	93.3	92.0	97.4	97.0	98.4	97.2	98.3	99.5
< 50	98.5	97.7	96.9	95.0	96.1	95.1	98.3	97.9	98.7	98.1	98.8	99.6
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

SOURCE: British Gas PMIS data - derived.

isation. However, these Regions have similar proportions of Higher Management personnel residing within 10 Km (44.8 per cent in Wales Gas; 46.4 per cent in South West Gas), such that, in combination with the observed distributions of Senior Officers and Staff, it cannot be claimed that increased Regional centralisation is evidenced by considerably longer journey to work distances. Nonetheless, the greater average residence-work location distances of Higher Management, and to a lesser extent Senior Officers, amongst the Regions does appear to verify the role of occupation status or grade as a factor of residential location by British Gas office employees.⁴⁰

To summarise the main features of the distance distribution of the main grades, these are a decrease in Staff numbers with increasing distance and a Higher Management peak in the 10 to less than 15 Km distance band. Senior Officers have the most irregular distribution in terms of inter-Regional comparison, but have the smallest variation within distance bands of the different grades (Fig. 9.2).

Having noted that the residence-work distance varies between the sexes, it is to be expected that this variability may be observed between the sex groups within grade. Since grade is itself related to sex, the numbers of women classified as Higher Management and Senior Officers are unfortunately too small to permit valid comparisons between the sexes within these grades. Only within the Staff are there sufficient numbers of males and females for valid comparison.⁴¹ Although the residences of both sexes in each Region are most numerous within a 5 Km radius of the respective work site, this dominance is most marked amongst females. Female residences are also proportionately more numerous than those of males within a 5 to 10 Km radius of the work site, but beyond 10 Km the male percentage is consistently greater, illustrating the longer average distance between residence and work location of men

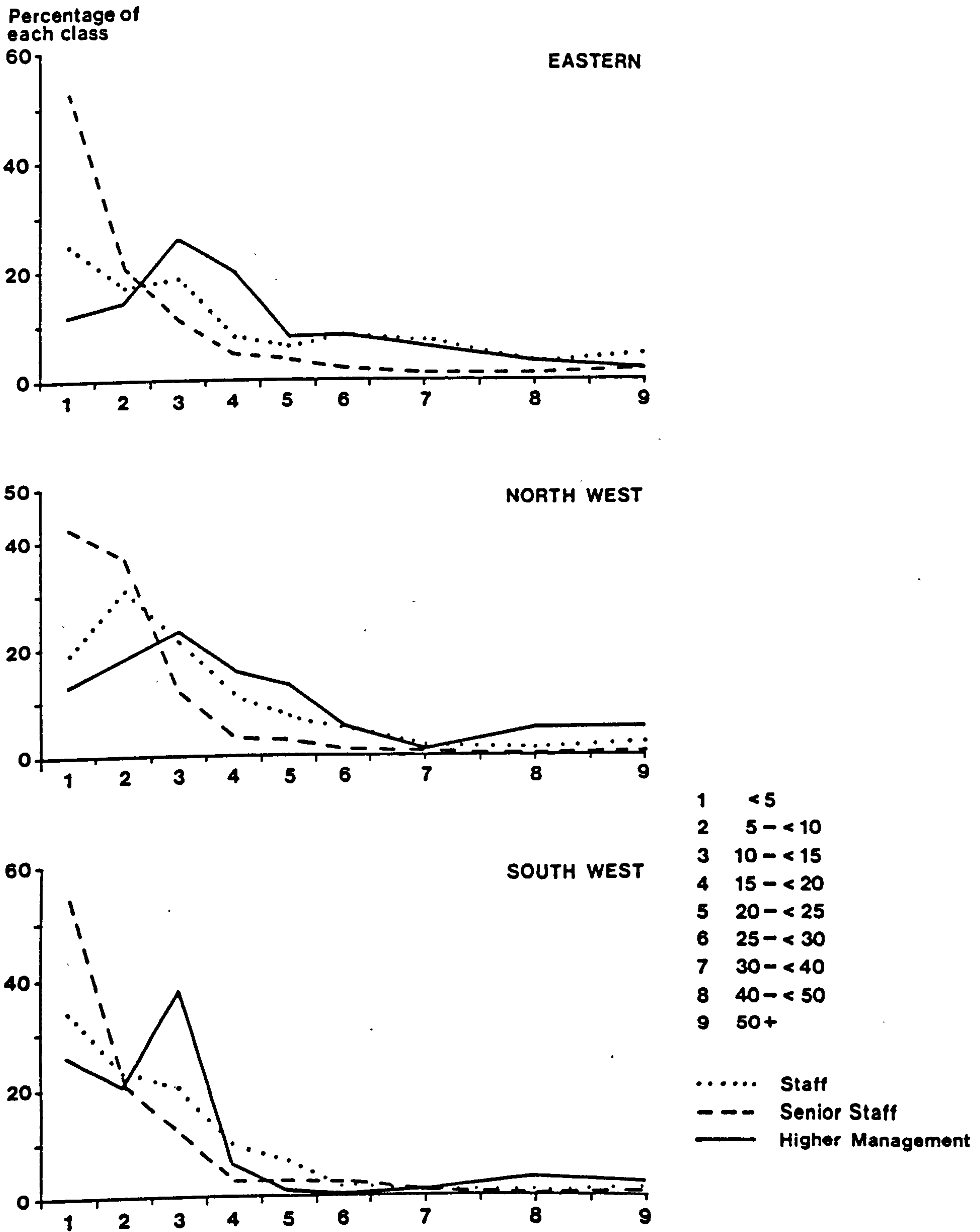


Fig. 9.2 Residence-Work Distances for the Office Workforce Grades in Selected Regions

than women.

Case Studies Of The Intra-Regional
Pattern Of Residence-Work Distances

Eastern Gas

Since considerable intra-Regional variability exists in Eastern Gas, this Region has been selected in which to examine the effect of such diversification upon the residence-work distance, with reference to the main offices serving the various Areas of the Region.

Eastern Gas is divided into six Customer Service Areas, one of which (Outer Metropolitan) is served by two offices, giving seven Area Service Centres, although Harlow is considerably smaller than the others (this has 78 office employees; the next smallest, Peterborough, has 256 office employees). For this reason the Harlow and Barnet workforces are combined, giving an employment total for the Outer Metropolitan Service Area which may be compared with the other five Area Service Centres (A.S.C.'s) which are single office sites.⁴²

More than half of the office employees at each of these sites reside within 5 Km of the site, except those in the Outer Metropolitan Area and Colchester Area. By ranking the Area offices in terms of the percentages of their employees who reside within 5 Km of their workplace, and similarly those who reside within 10 Km of their workplace, a pattern emerges which suggests a relationship between the density of the workforce catchment area and the degree of 'urbanisation' (Table 9.11). This is not a simple relationship with direct distance from London, but largely an outcome of the ease of travel between the regional towns and the centre of London; the greater the ease of travel to London and therefore the greater the intervening opportunity for obtaining office employment within London itself, the further on average the

TABLE 9.11
 VARIOUS RANKINGS OF THE AREA SERVICES CENTRES OF
 EASTERN GAS

	Distance from London	% travelling <5 Km.	% travelling <10 Km.
Direction of increase ↓	Barnet	Barnet	Colchester
	Hemel Hempstead	Colchester	Barnet
	Harlow	Hemel Hempstead	Hemel Hempstead
	Luton	Harlow	Peterborough
	Colchester	Peterborough	Harlow
	Peterborough	Luton	Luton
	Norwich	Norwich	Norwich

SOURCE: British Gas PMIS data - derived.

TABLE 9.12
 PROPORTIONS OF EASTERN GAS AREA SERVICE CENTRE OFFICE
 EMPLOYEES WHOSE RESIDENCE-WORK DISTANCE IS ONE TO LESS
 THAN FIVE KILOMETRES

	% ASC office employees
Harlow	10.3
Colchester	14.6
Luton	19.9
(Outer Metropolitan	26.4)
Barnet	29.3
Hemel Hempstead	29.7
Peterborough	53.5
Norwich	61.4

SOURCE: British Gas PMIS data - derived.

Eastern Gas Service Centre workforces travel to their offices, (or alternatively the larger the number of employees who travel further). An exception from this simple distance relationship, Colchester, has a surprisingly small number travelling less than 5 Km, and comparatively fewer travelling less than 10 Km, since it continues to show the effects of its absorption of the main Ipswich office.

A number of office employees continue to commute from parts of the former Ipswich catchment area. This has resulted in a quarter of all Colchester office employees travelling between 20 and less than 30 Km to work (measured as a straight-line distance). Yet there remains a large core of office employees who reside within Colchester itself, many residing less than one kilometre from the work site (30.7 per cent). The most sensitive distance band to office location appears to be between 1 and less than 5 Km from the workplace: this gives the closest correlation with access to the central London employment market (Table 9.12).

Another feature of office workforces apparently affected by office location in relation to accessibility to London and alternative employment opportunities is the ratio of male to female employees (Table 9.13). This sex ratio is not related to overall Service Centre size, but those Areas which are or have been least accessible to London have commensurately larger proportions of male personnel. The sex ratio varies amongst the distance bands (Table 9.14), with females dominating the less than 5 Km band except in Norwich and Peterborough, both of which have a lower overall proportion of female employees. The 5 to less than 10 Km band contains varying proportions of males to females, but this variation is again in relation to office location and accessibility: the proportion of males decreases with increasing accessibility. The low Harlow female percentage at this distance is a result of the very low female employment (28 women) at this office, and the combined Outer Metropolitan percentage

TABLE 9.13

PROPORTIONS OF MALE OFFICE EMPLOYEES AT EASTERN GAS AREA SERVICE CENTRES, AND THE PROPORTIONS OF THESE WHOSE RESIDENCE-WORK DISTANCE IS ONE TO LESS THAN FIVE KILOMETRES

	Males as % of ASC office workforce	% males whose residence-work distance is 1 5 Km.
Norwich	70.9	66.8
Harlow	64.1	83.3
Peterborough	59.0	42.4
Colchester	56.7	58.1
Barnet	47.5	37.6
Luton	44.6	52.0
Hemel Hempstead	43.5	44.4

SOURCE: British Gas PMIS data.

A = Male dominated.

B = Female dominated.

TABLE 9.14

PROPORTIONS OF MALE OFFICE EMPLOYEES IN THE RESIDENCE-WORK DISTANCE BANDS OF EASTERN GAS AREA SERVICE CENTRES

	Distance in Kilometres				
	0-< 5	5-< 10	0-< 10	10-< 20	20-< 30
	%	%	%	%	%
Harlow	46.7	83.3	54.4	92.3	80.0
Barnet	31.0	37.6	34.1	73.0	69.2
Outer Metropolitan*	34.5	41.2	37.4	75.0	72.2
Colchester	42.5	58.1	46.0	60.0	80.3
Norwich	66.8	77.5	68.7	79.2	85.0
Peterborough	59.1	42.4	56.0	48.4	81.0
Hemel Hempstead	29.2	44.4	32.1	69.7	57.1
Luton	33.5	52.0	37.6	60.0	76.9
Average	44.2	49.3	45.5	67.7	77.8

SOURCE: British Gas PMIS data - derived.

* Harlow and Barnet offices combined.

gives a better relative position of these Area personnel.

The proportion of male employees residing between 20 and 30 Km from their work site exceeds the corresponding proportions of female employees at every Area Service Centre. This is further demonstrated by the individual distributions of males and females, where those residing within 10 Km form 81.8 per cent of all female employment at the Service Centres, but only 59.3 per cent of male employment.⁴³

Wales Gas

In the above consideration of the distances between residences and work locations these have been grouped into various distance bands. Highly accurate mapping has been attempted only for Wales Gas where the majority of locations are coded to within 100 metres (Table 9.15). The mean distance travelled to work (measured as a straight-line) by Wales Gas office employees is 12.1 Km.

From an examination of the journey to work distances available from the 1921, 1951, 1961 and 1966 censuses Warnes showed that the mean distance travelled to work has increased, and that the results for his selected area of study, North West England, showed an increase over the period 1921 to 1966 from 2.35 Km to 3.54 Km, an annual increase of approximately 0.9 per cent.⁴⁴ Assuming this annual rate to be constant, the 1979 rate would be projected at 3.96 Km. This is very much less than the average distance observed for Wales Gas office employees, and that of other Regions, but this does not necessarily imply that these employees travel unusually long distances to work. One explanatory factor is the exclusion of manual workers, whom it is generally accepted have shorter journey to work patterns.⁴⁵ In addition, the work status of employees is associated with journey to work length, as is the sex of employees, both of which are illustrated above. These are unlikely

TABLE 9.15

ACCURACY OF RESIDENTIAL LOCATION CODINGS FOR
OFFICE EMPLOYEES OF WALES GAS

Accuracy levels	% of office workforce
I - exact address	84.5
II - within village/district	11.0
III - within town/area	4.5

TABLE 9.16

DIFFERENCES IN THE AVERAGE RESIDENCE-WORK DISTANCE OF
THE MALE AND FEMALE OFFICE WORKFORCES OF WALES GAS

	Distance in Km.			
	Males	Females	Married females	Single females
Mean	13.42	10.04	8.79	12.98
Mode	0.45	2.16	2.16	6.48
Median	7.11	5.64	n.a.	n.a.

SOURCE: British Gas PMIS data - derived.

TABLE 9.17

QUARTILE RESIDENCE-WORK DISTANCES OF WALES GAS
OFFICE EMPLOYEES

	Distances in kilometres		
	Males	Married Females	Single Females
25%	3.72	3.26	3.70
50%	7.11	5.63	5.63
75%	14.55	9.90	10.54

SOURCE: British Gas PMIS data - derived.

to occur in the same proportions in British Gas as throughout employment in the North West. Further factors are that the distribution of distances are strongly positively skewed,⁴⁶ particularly amongst the male employees, which is reflected in the low modal figures of 0.45 Km for males, 2.16 Km for married females, and increasing to 6.48 Km for single females. Similarly, the median distances are less than the mean distances (Table 9.16).

In all Regions male office employees display a tendency to travel further to work than female employees, in Wales Gas represented by a mean residence-work distance 3.4 Km greater for males than females. In addition, within the Wales Gas female group single women display an average 4.2 Km longer residence-work distance than married women. Dividing the distances into quartiles (Table 9.17) married women form the most highly clustered groups in relation to their work locations, whilst males are more widely distributed than females. There are some single women prepared to travel further to work than married women, but for the most part their distribution resembles that of married women more closely than that of male employees.

Residential Distributive Patterns
Associated With The Various Office
Work Sites

The distribution of office employees may be examined further by plotting employee residences in relation to each office upon a grid square locational map, based upon the National Grid. This technique reveals the directional bias of office employee home distributions which is not evident in the previous examination of straight-line distances. One influence creating such bias is the transportation network in relation to the individual office. Others are the intervening opportunity for alternative employment, particularly office employment, and the

distribution of residential areas. These patterns also reveal differences between the distribution of male and female employees, and to a lesser extent between female married and single personnel. The following descriptive analyses of residential locations in relation to work site are based upon such a superimposition of a regular grid lattice, producing matrices of office employee residential locations which may be assessed as distributive networks.

The overall distribution of office employees in Wales Gas very much reflects the consumer density of the Region, with distinctive clusters of office employees in the south east and north east, but with a great paucity of employees in Mid-Wales. The individual distributions of males and females indicate a more widespread male office workforce, as has been suggested by the longer average residence-work distance.⁴⁷

The distribution of office employees relating to the Wales Gas Area offices and the Regional Headquarters, for example, do reflect variations in individual catchment areas. Employment at Regional Headquarters is mostly supplied by South and Mid Glamorgan, with a small number from Gwent. More than a third of male employees (34.4 per cent) and two fifths of female employees (40.6 per cent) reside within the same 10 Km grid square as their work location (Fig. 9.3). The pattern of workforce residences beyond this is a result of the main transport routes from Cardiff city centre particularly following the road and rail links with the south-eastern valleys.

A consideration of the distribution of these Headquarters employees' residences in greater detail reveals that many reside within a contiguous sector embracing the west to north-east sector on an arc from the main office site embraced by a radius of approximately 10 Km (Fig. 9.4). This sector, of course, embraces the main residential areas

LEGEND - Fig. 9.3 et seq.



LOCATION OF OFFICE



NUMBER OF EMPLOYEES RESIDING WITHIN
AREA OF SQUARE (100 sq. km)

not shown (n.s.)

NUMBER OF EMPLOYEES WHOSE RESIDENTIAL
LOCATIONS ARE BEYOND THE AREA DISPLAYED

Note:

Fig. 9.4 - shaded squares indicate location
of one or more residences

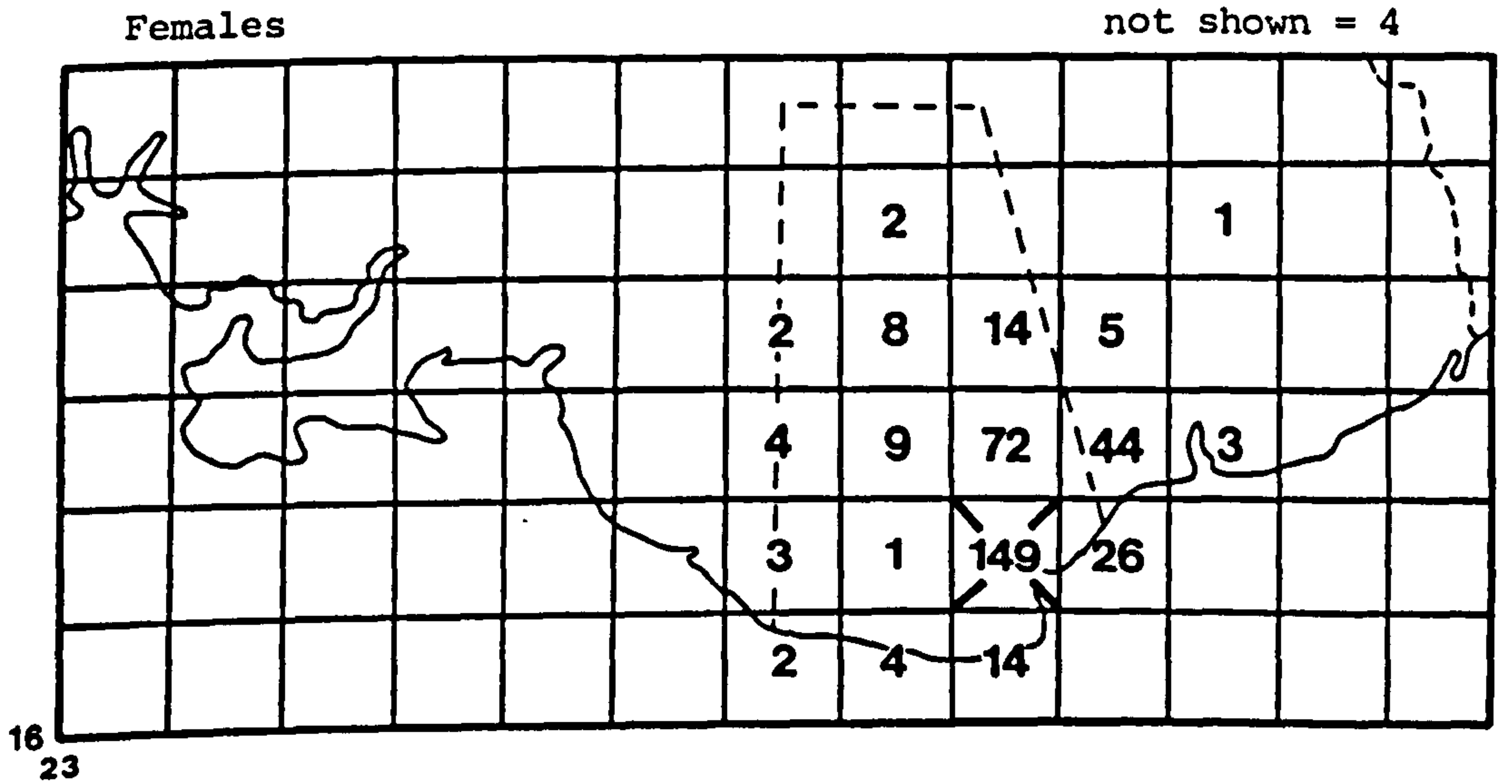
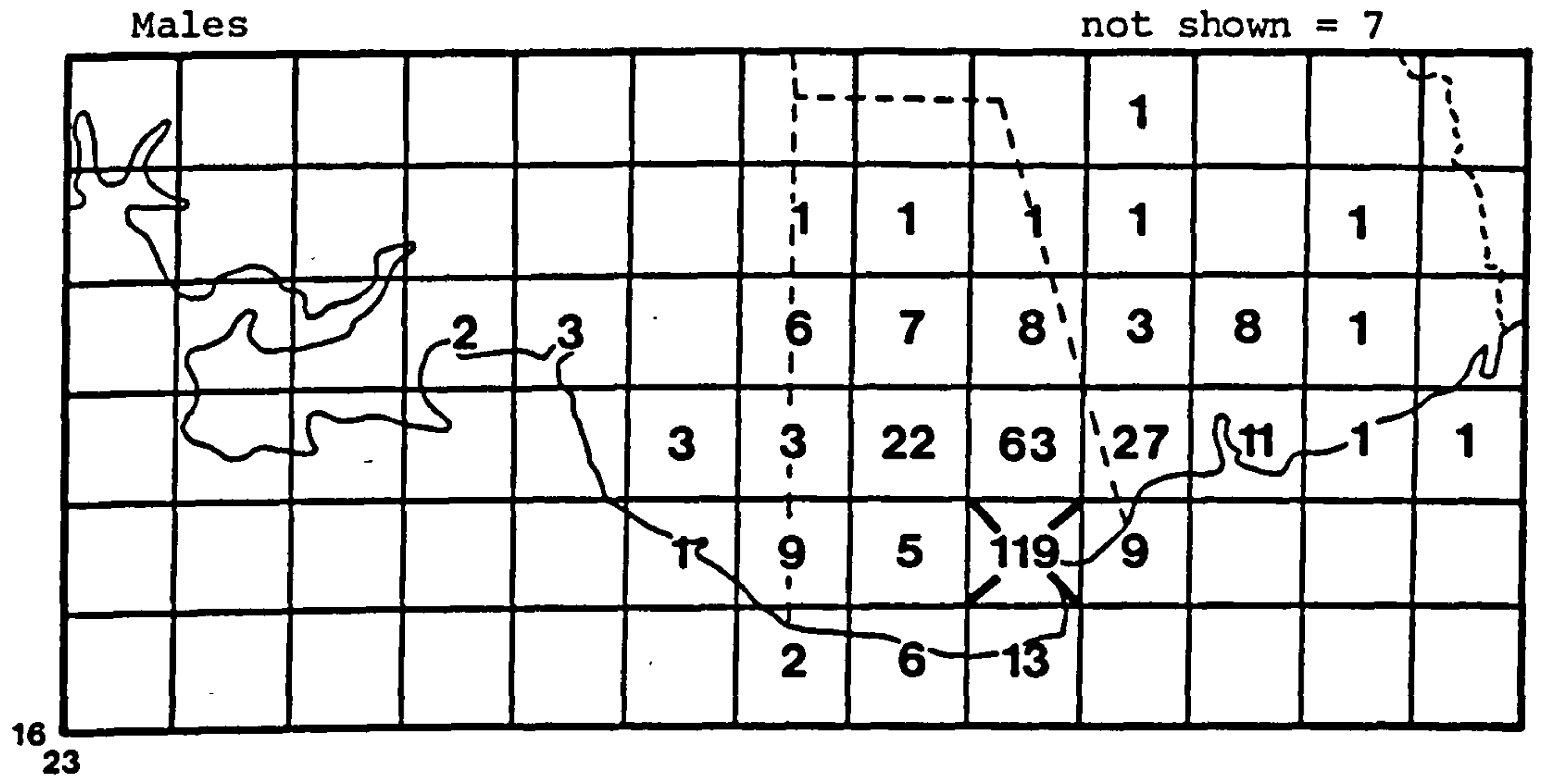


Fig. 9.3 Residential Distribution of Office Employees at Regional Headquarters, Wales Gas

HQ - Males (63.0%)



HQ - Females (79.3%)

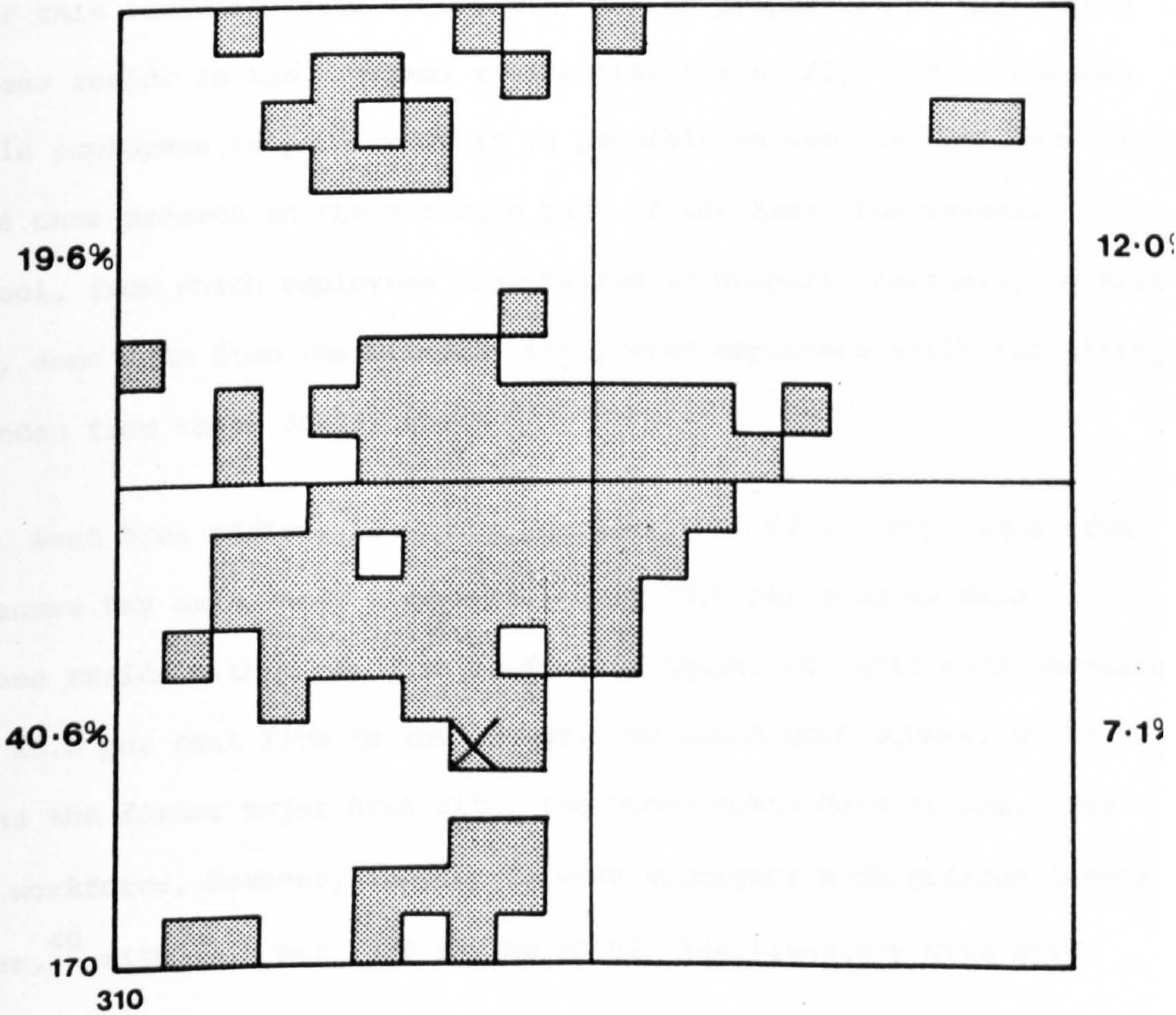


Fig. 9.4 Pattern of Residential Distribution of Office Employees at Regional Headquarters, Wales Gas

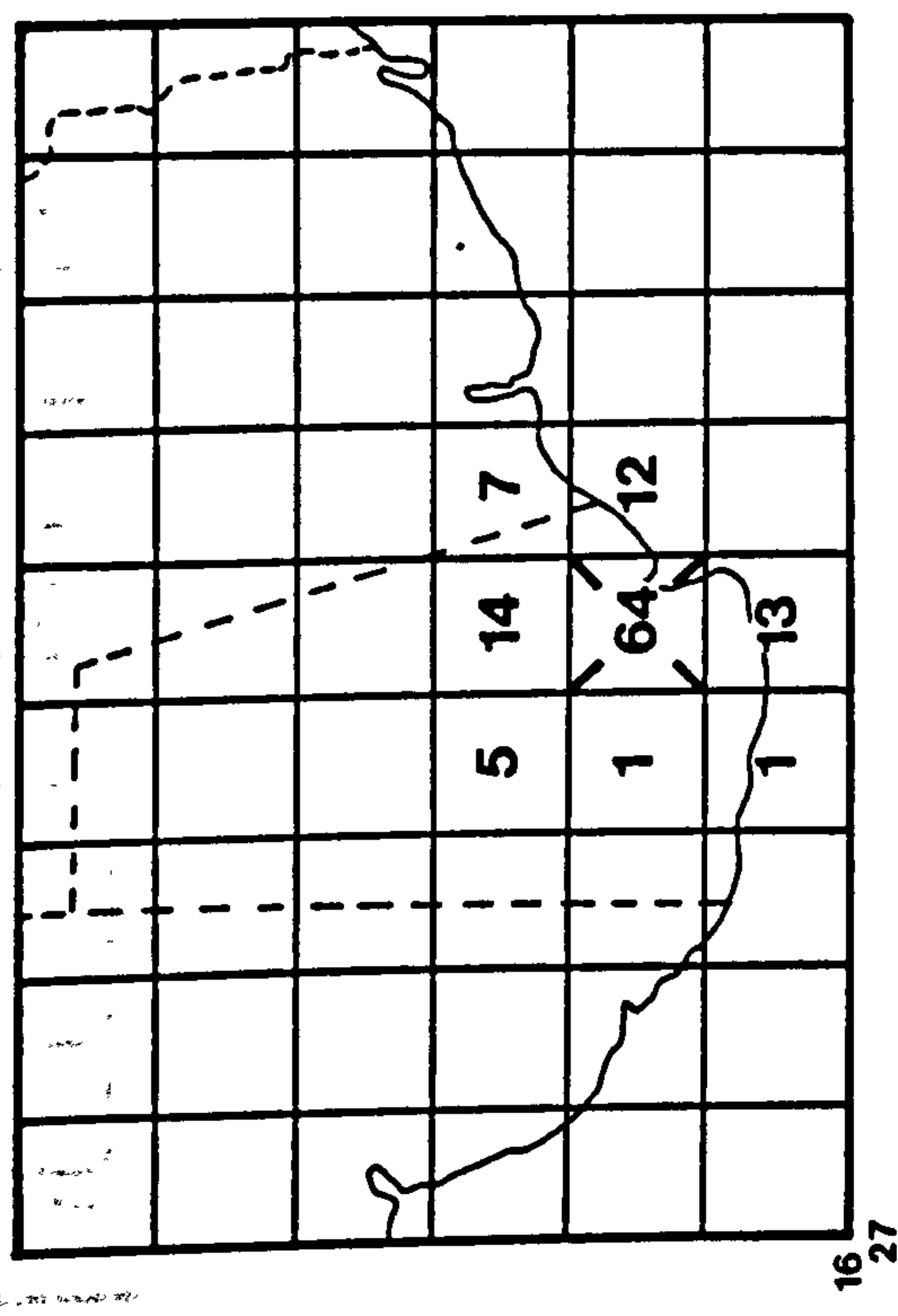
to the north of Cardiff.⁴⁸ In total it contains the residences of 55.7 per cent of all Snelling House complex employees, the number of males being only two-thirds the number of females, these representing 47.1 per cent of the male workforce and 63.8 per cent of the female workforce.

At Grangetown, the South Area office, the workforce is more localised, with some half of its employees residing within the same 10 Km grid square as the work location (49.1 per cent of males, 54.0 per cent of females). Fewer people travel a long distance to work in comparison with Regional Headquarters employees, and most reside within the Cardiff conurbation area (Fig. 9.5).

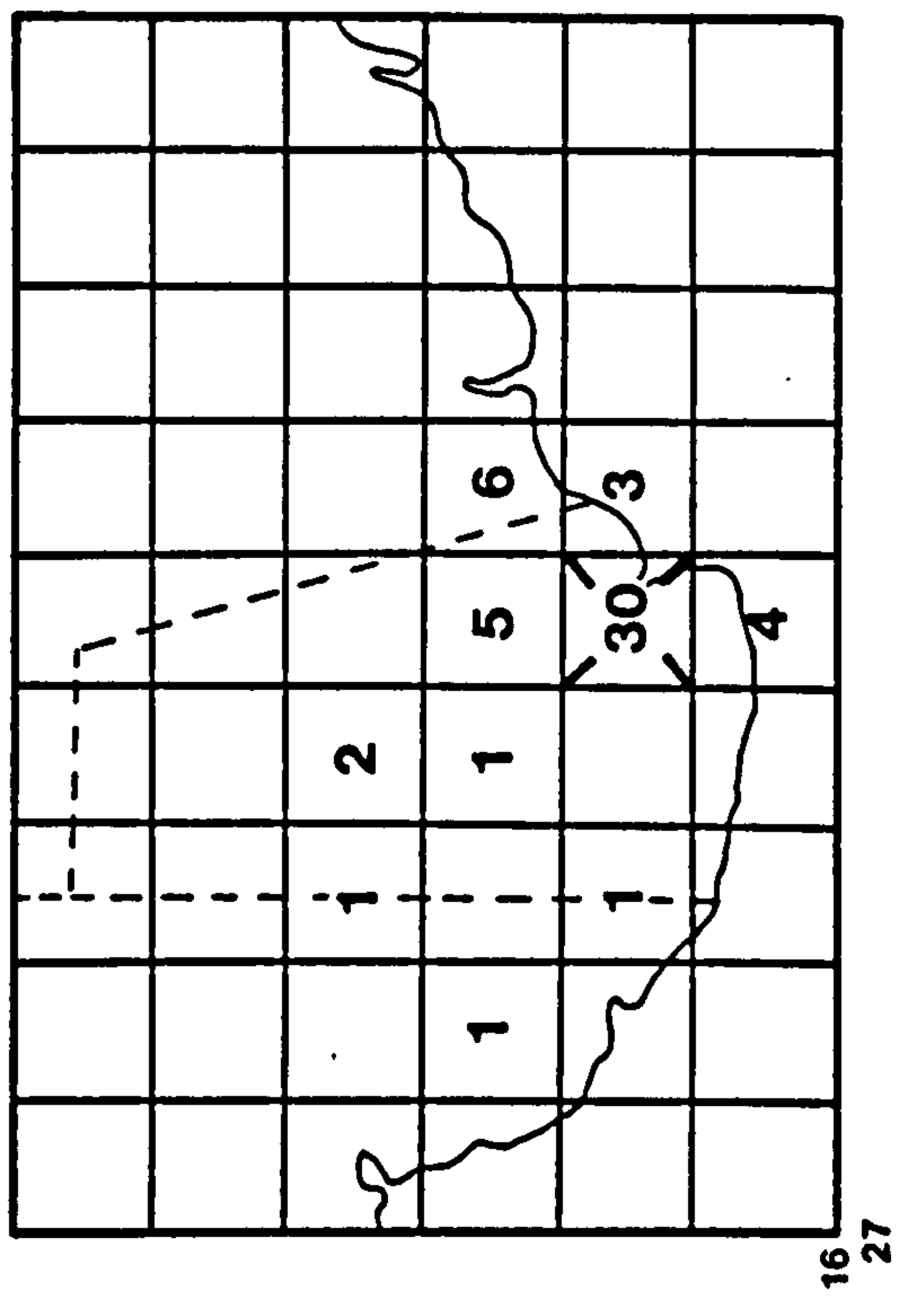
The Crindau office obtains most of its employees from within Gwent, but less than a third of the workforce live within the work site 10 Km grid square (30.8 per cent of males and 31.5 per cent of females). To a large degree this may be attributed to the industrial use to which much of this immediate area is devoted; a high proportion of the office employees reside in the proximal residential areas (Fig. 9.6). Amongst the male employees in particular it is possible to see the influence of offices once present in the northern part of the Area, for example Pontypool, from which employees transferred to Newport (initially to Mill Street, some 2 Km from the Crindau site), with employees still travelling to Crindau from these districts.

West Area office, Llandarcy, obtains most of its employees from the Swansea Bay area, West Glamorgan. Only 29.8 per cent of male employees reside within the same 10 Km grid square as their work location, whilst 28.8 per cent live in the westerly adjacent grid square, which contains the former major Area site, the Oystermouth Road office. The female workforce, however, appears to have undergone much greater labour turnover,⁴⁹ with 51.5 per cent living within the Llandarcy site grid

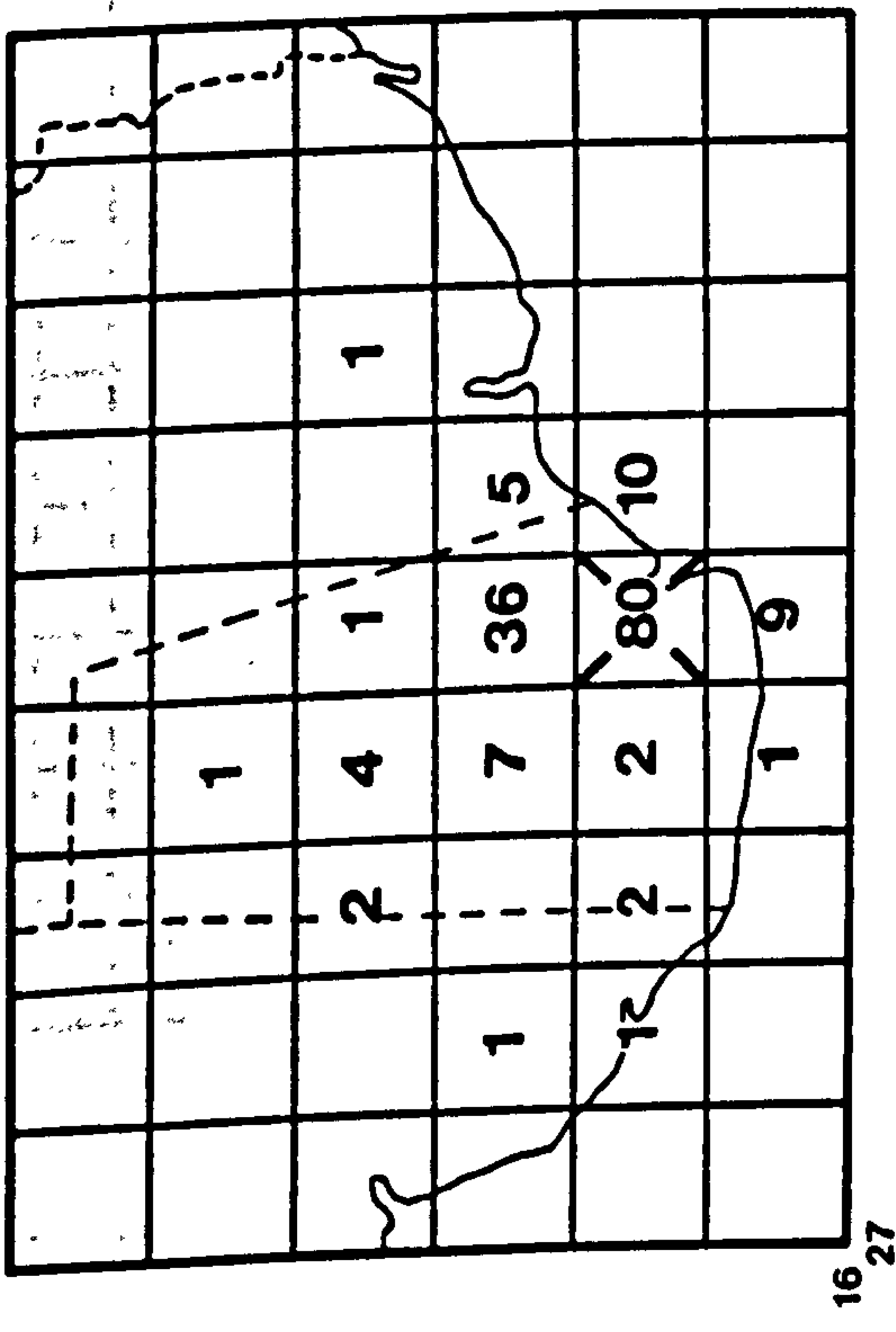
Married Females n.s. = 1



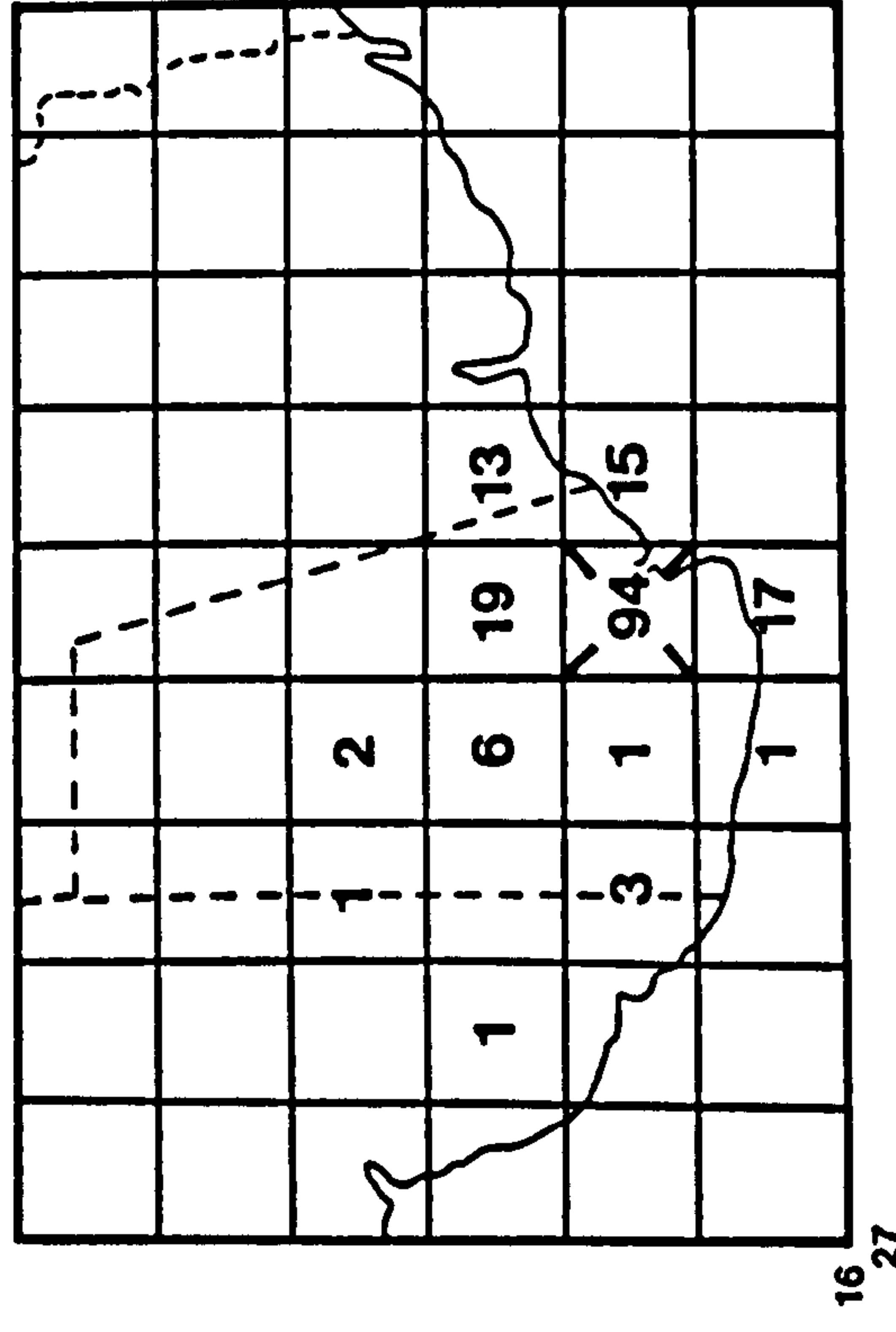
Single Females



Males



Females



n.s. = 1

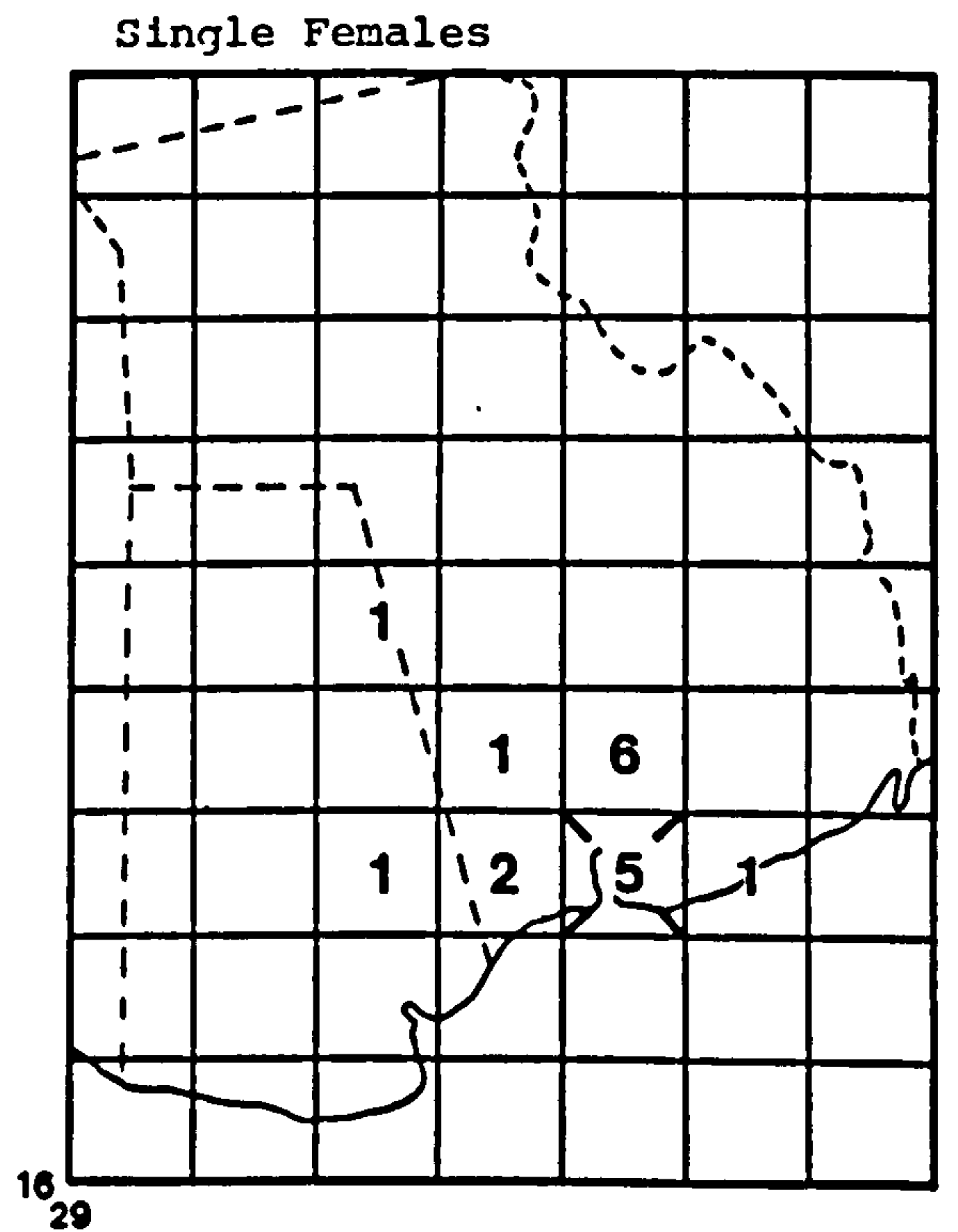
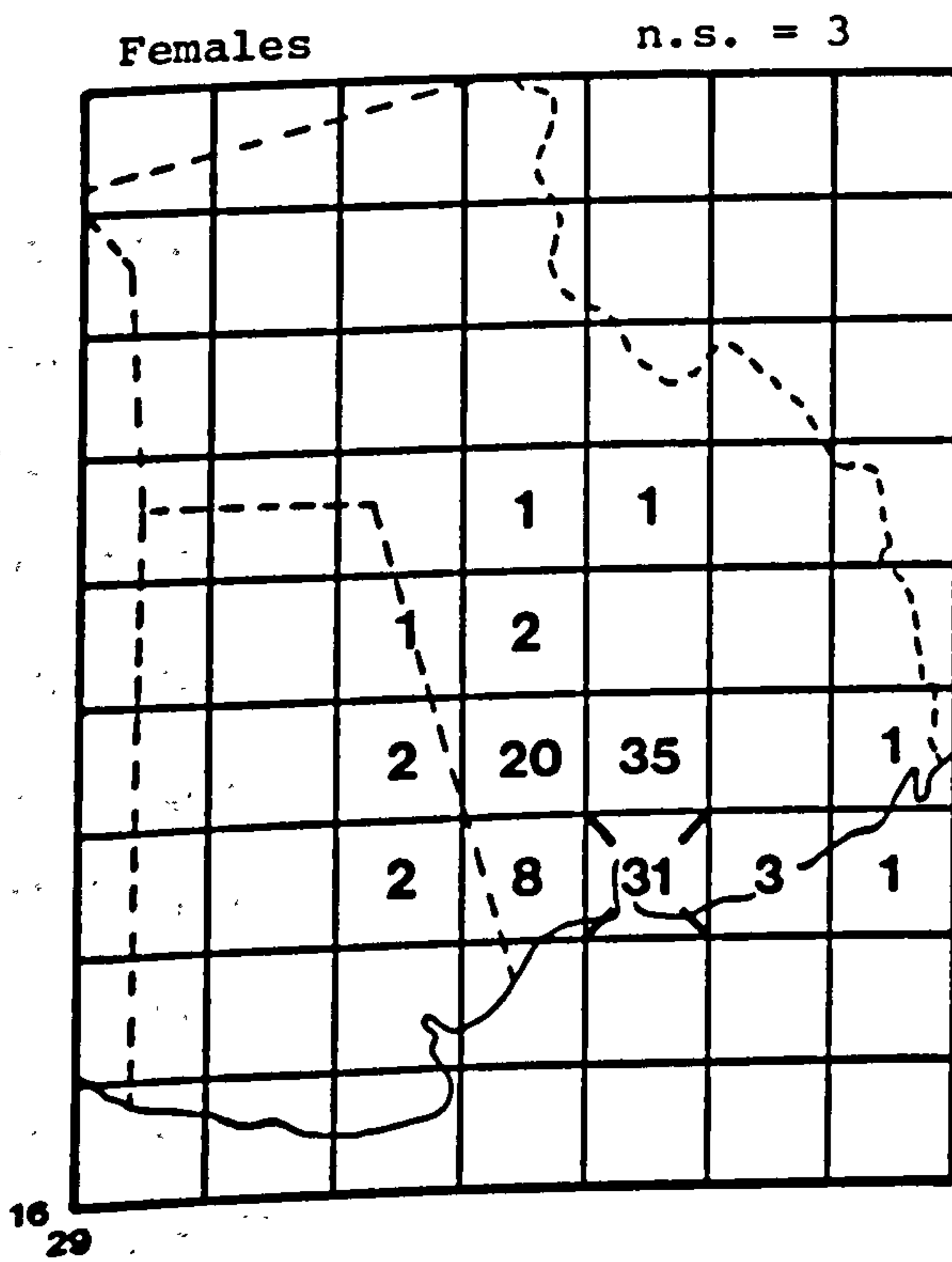
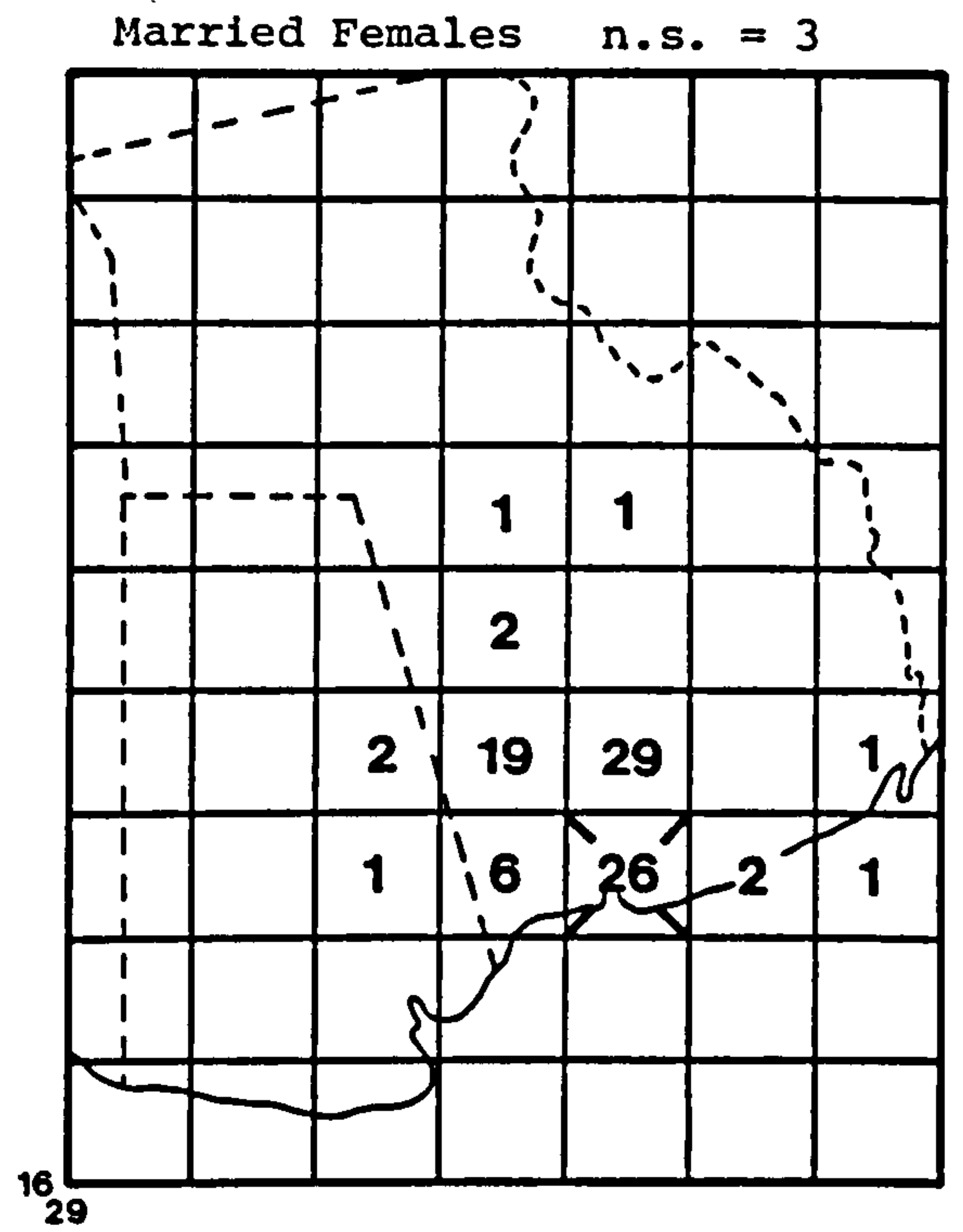
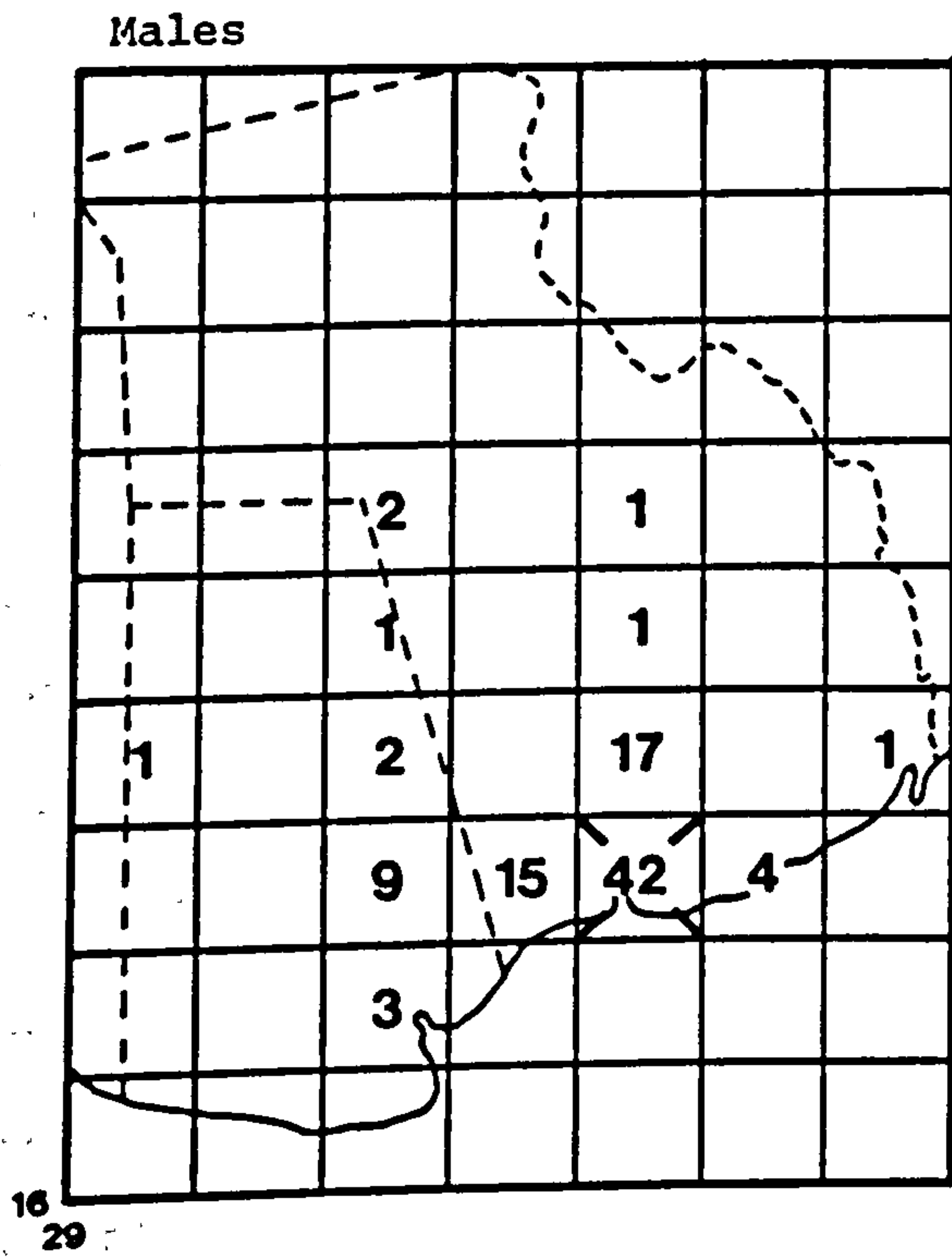


Fig. 9.6 Residential Distribution of Office Employees at East Area Office, Wales Gas

square and only 21.2 per cent in that of Oystermouth Road (Fig. 9.7).

Lastly, in the North Area, 39.1 per cent of males and 42.6 per cent of females reside within the Maelor 10 Km grid square, and most employees travel to work in a north-easterly direction from the main urban settlements (primarily Wrexham) (Fig. 9.8).

It is apparent that proximity of residential areas to the work site is a factor in the home location of office employees, shown in the comparatively small numbers of employees residing in the immediate vicinity of the Crindau office in comparison with those residing near the other Area offices of Wales Gas. Other factors noted are the influence of former office locations, primarily upon male office employees (identified in Swansea and Newport), and the affect of main transport routes. Further evidence of these influences is provided by other Regions.

In Eastern Gas, for example, amongst employees of the Colchester Area office the majority reside along the main axis of the east-west road routes, with 57.9 per cent of these employees living in the office 10 Km grid square and that immediately adjacent to the east (the office itself lies very close to the centre of the north-south axis of these grid squares, longitude 600). This area contains 46.4 per cent of the male employees and as much as 72.9 per cent of the female employees (Fig. 9.9). Amongst the male employees it is possible to identify a sub-centre of residence in the Ipswich area, occupying the same 10 Km grid square as the Ipswich office, and containing thirty-two men (17.5 per cent of the Colchester male workforce]. Undoubtedly these were employed at the Ipswich site until the transference of its Area functions to Colchester, and despite the distance of the move in work location (25.6 Km), they have chosen to maintain their residential location and

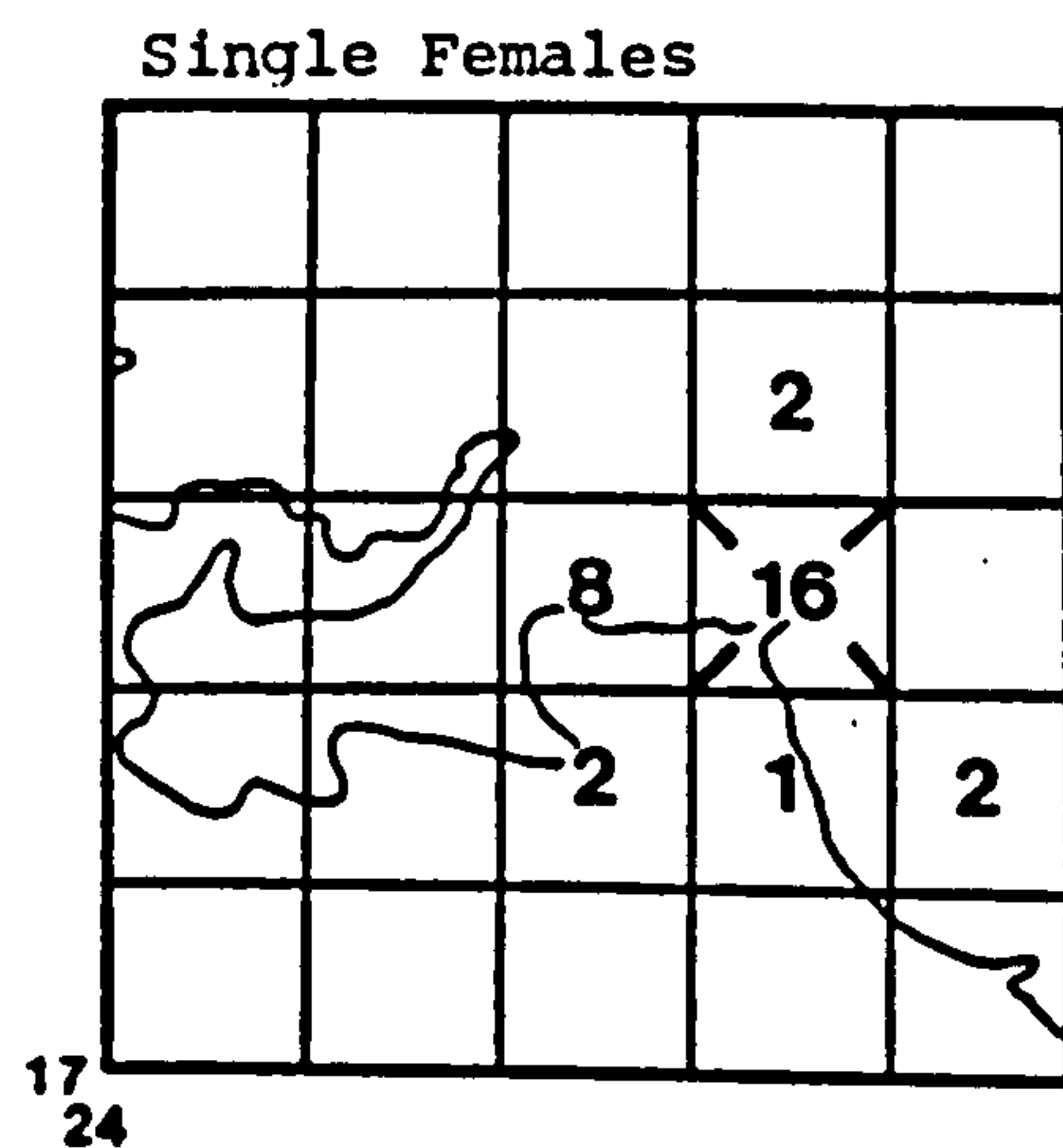
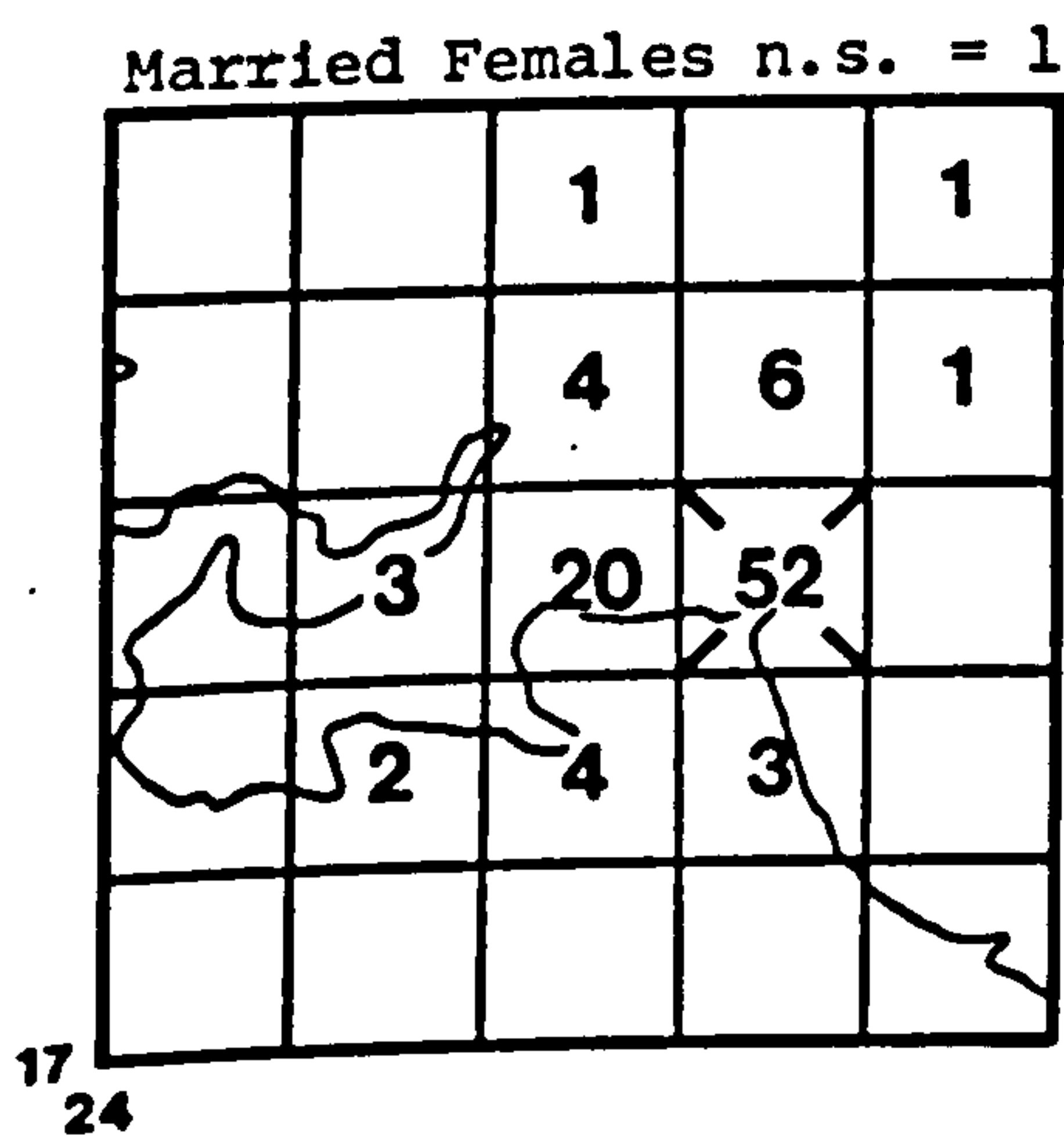
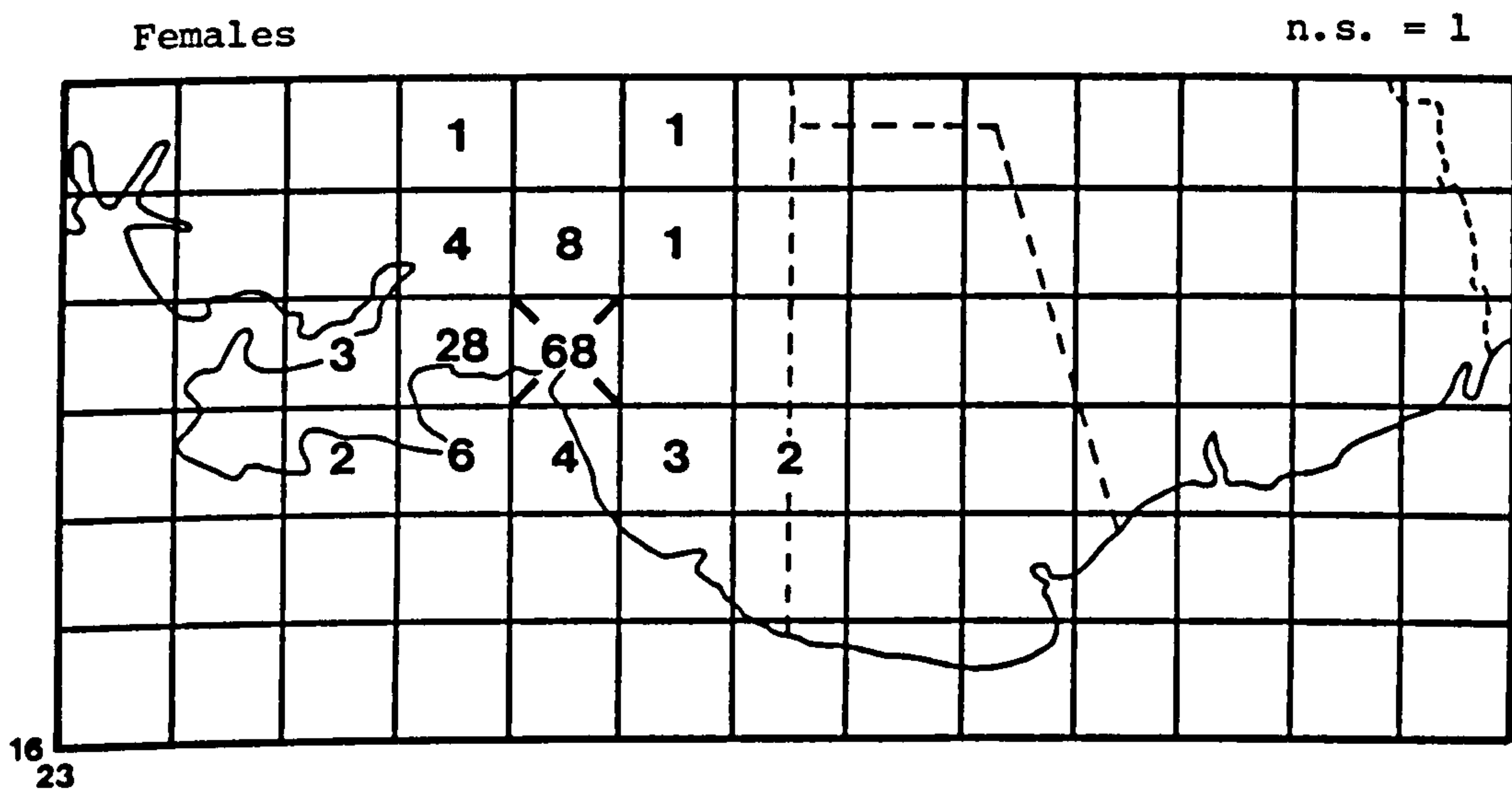
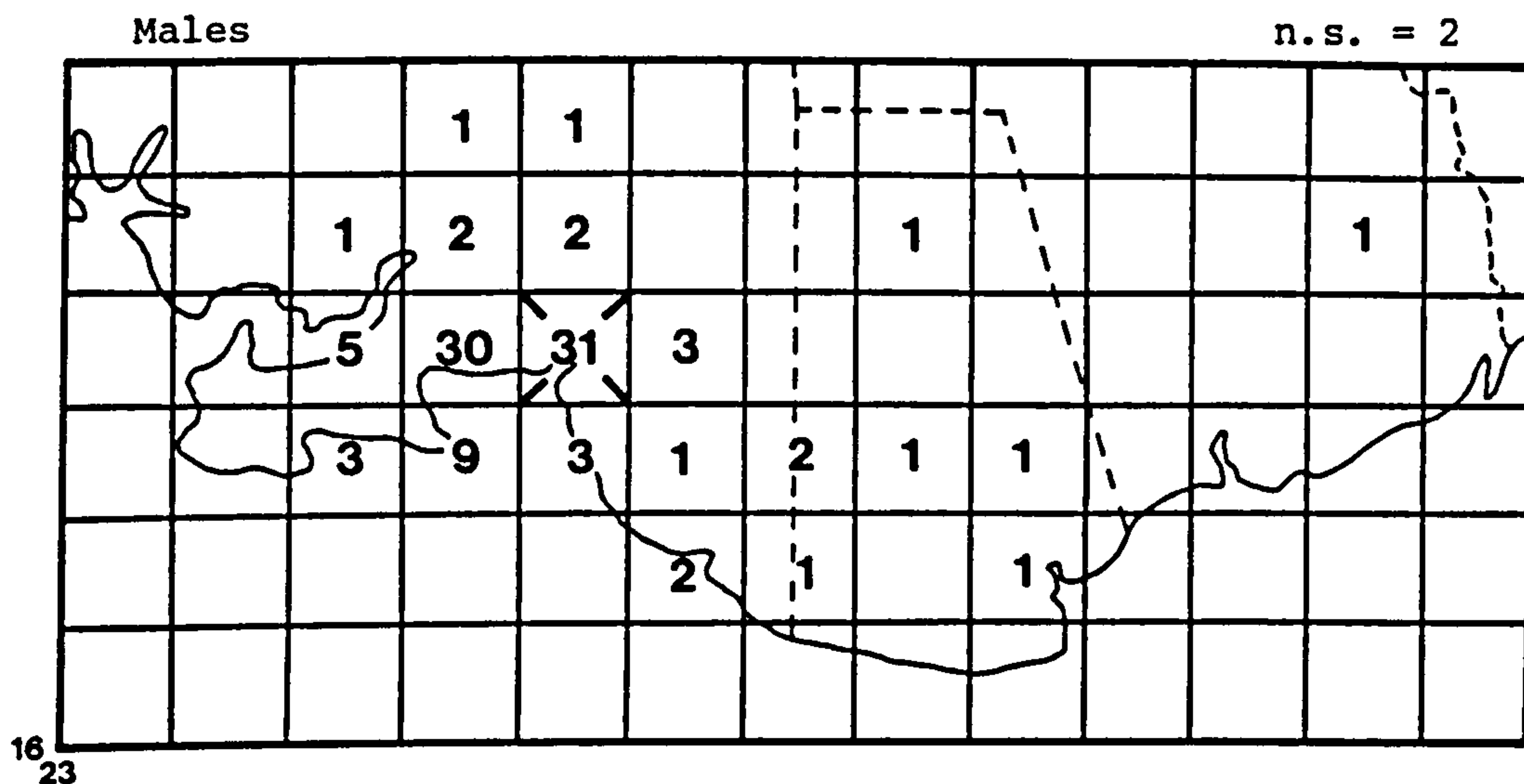


Fig. 9.7 Residential Distribution of Office Employees at West Area Office, Wales Gas

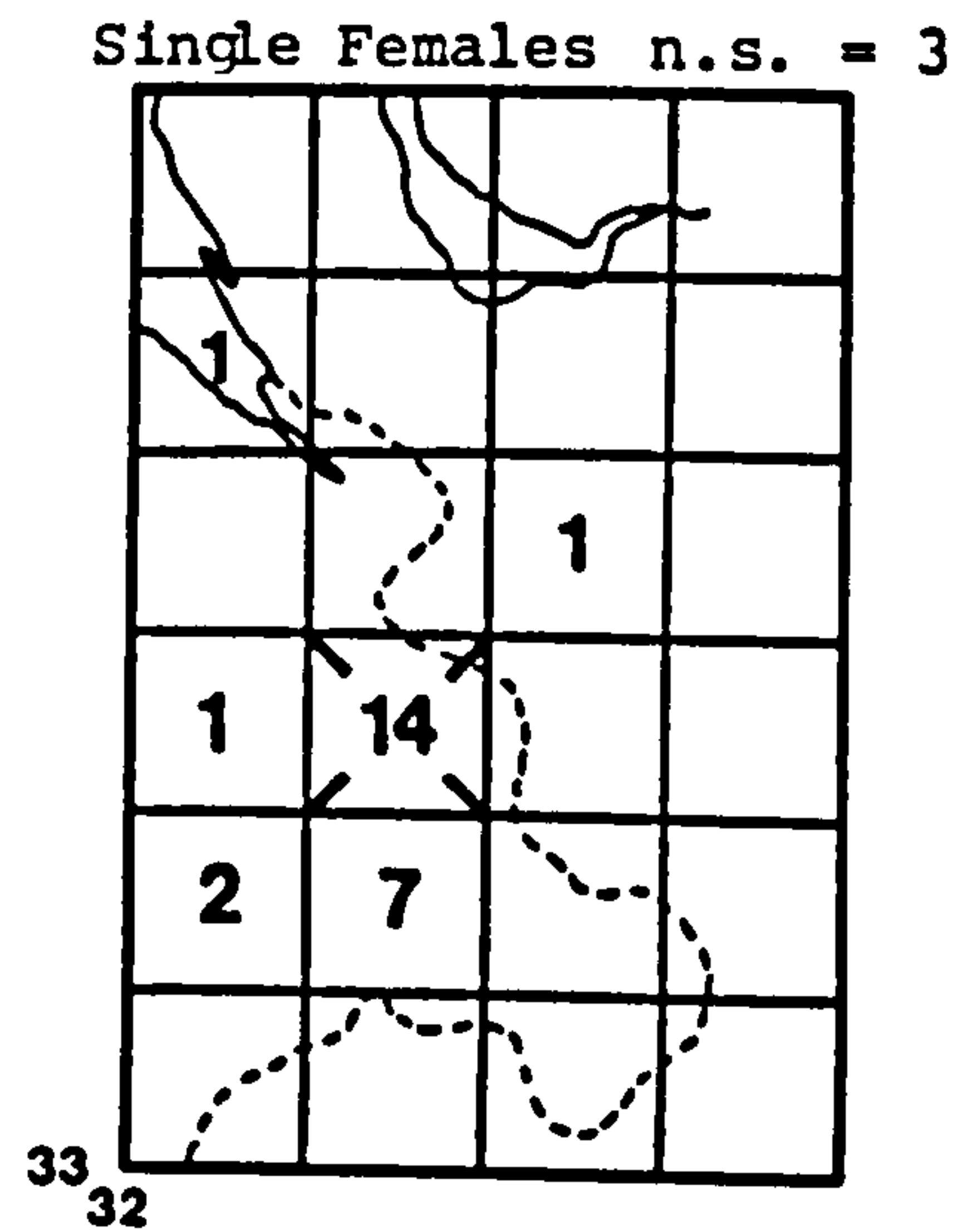
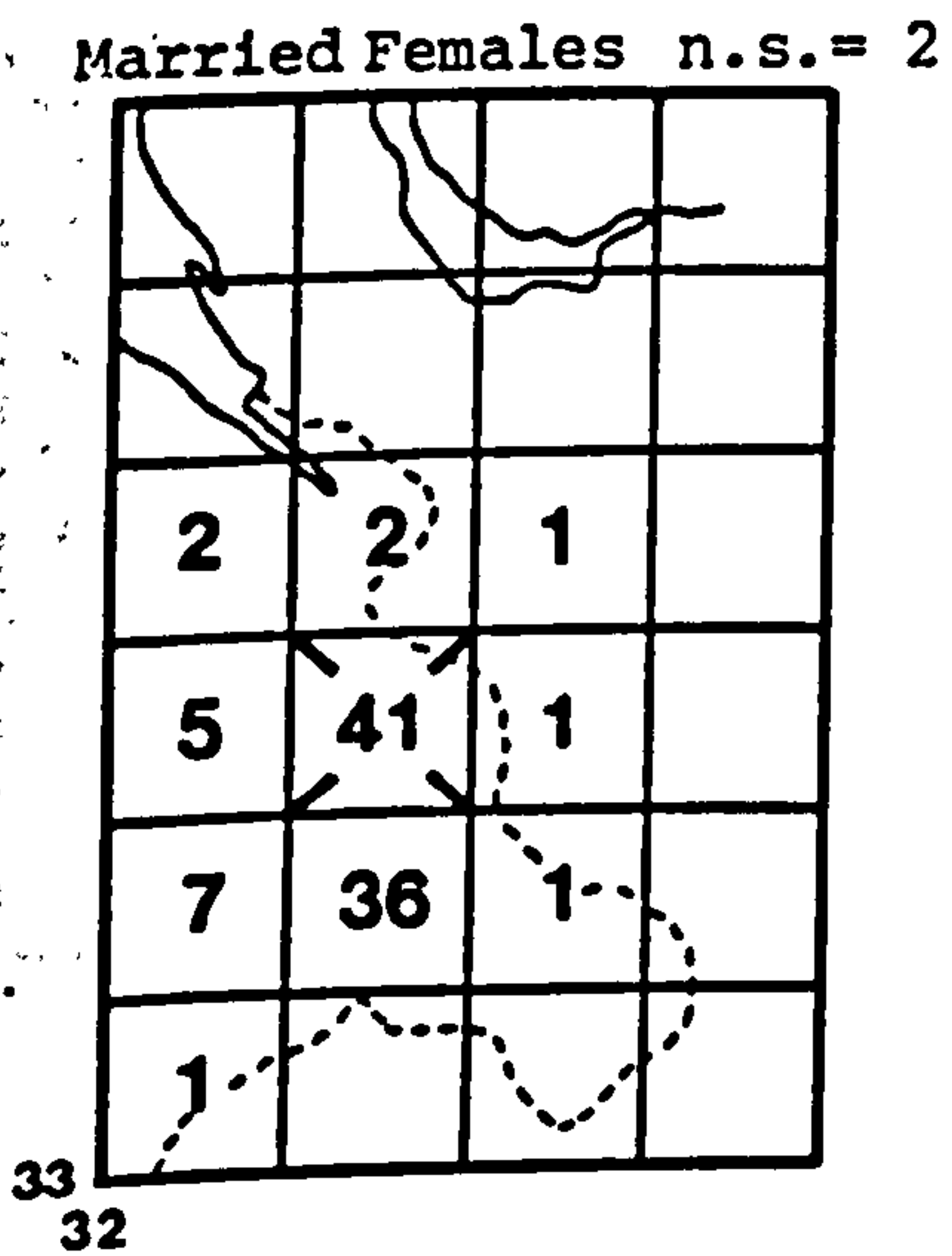
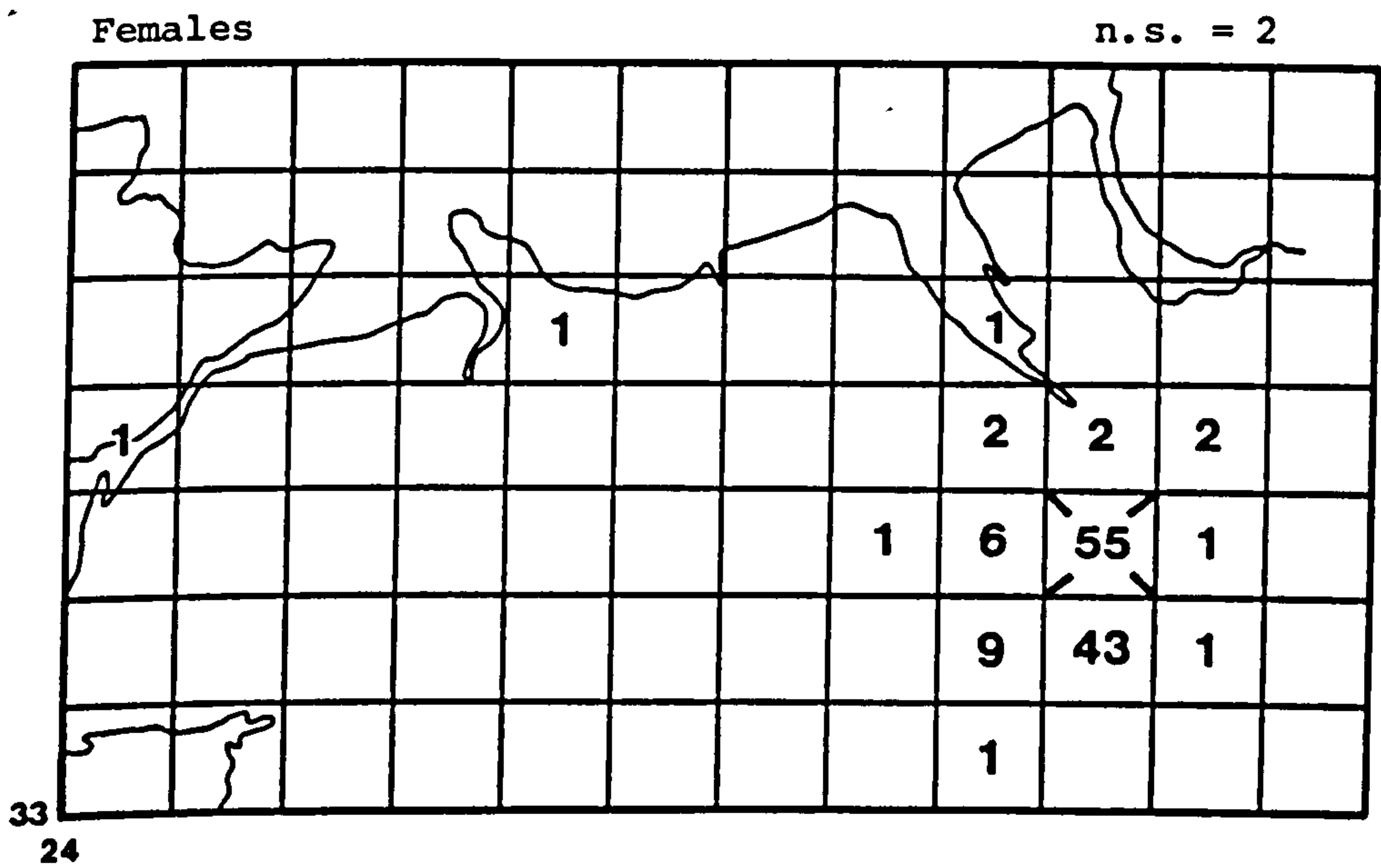
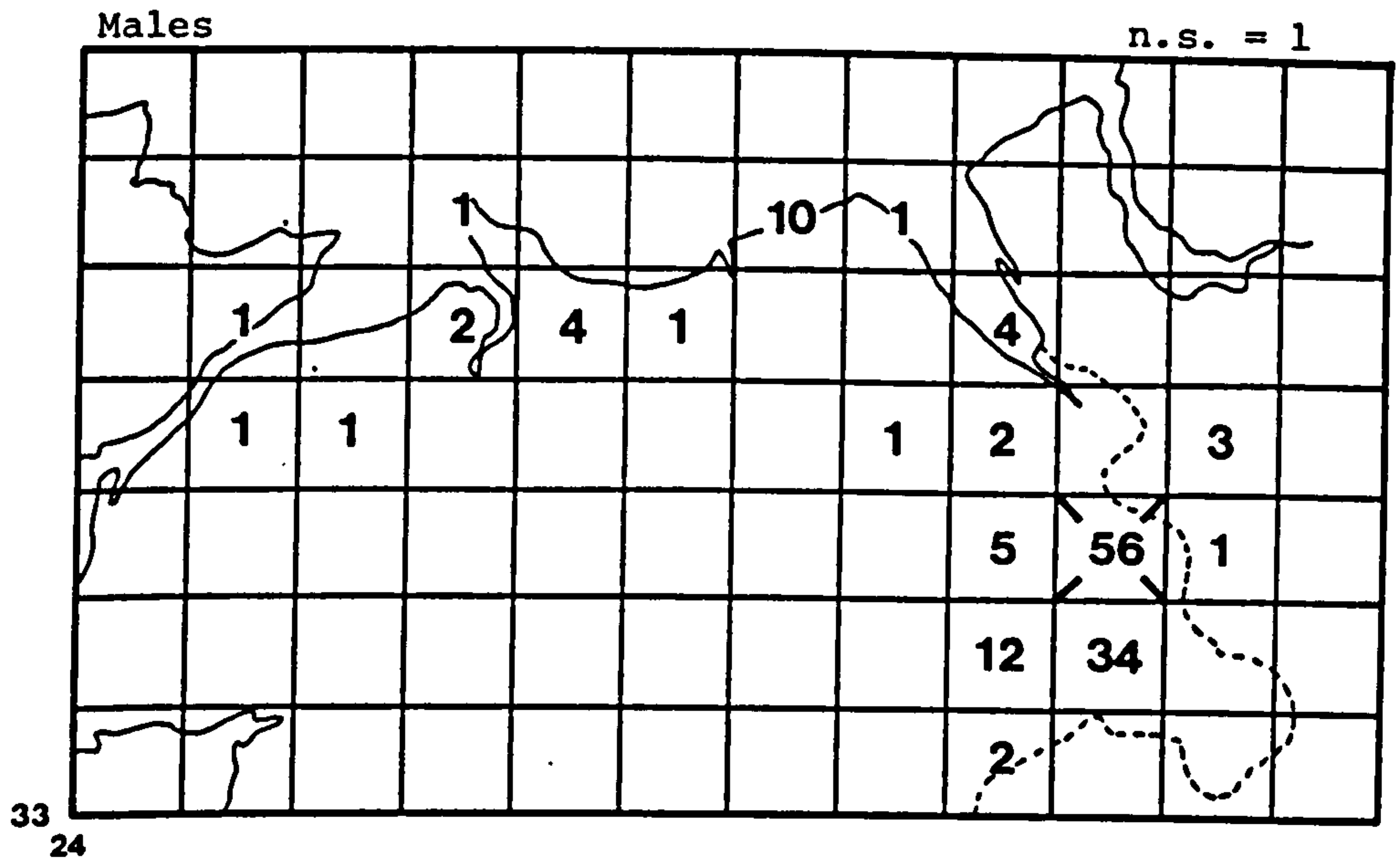


Fig. 9.8 Residential Distribution of Office Employees at North Area Office, Wales Gas

Males n.s. = 3

					1	
4	2	2	32	4		
3	1	3		1		
1	1	58	27	3	3	
1	3	1	6	19	3	
1						

20⁵⁷

Females n.s. = 3

3		3	3			
1		2	1		1	
		70	32	2	3	
	2	2	6	3	1	
1						

20⁵⁷

Males n.s. = 2

		3							
1	1	1	1	2					
		1	3	2					
1	4	8	17	26					
	1	4	53	62	2	1	1		
			2	6					1

18⁴⁹

Females

1	1	4	29	7					
		3	135	44					
			1	3					

18⁴⁹

Fig. 9.9 Residential Distribution of Office Employees at Colchester ASC, Eastern Gas

Fig. 9.10 Residential Distribution of Office Employees at Barnet ASC, Eastern Gas

now undertake considerably longer journeys to work. This decision has been taken by very few female employees, for only three at Colchester reside in close proximity to the Ipswich location, forming only 2.2 per cent of the total Colchester female workforce.

The Outer Metropolitan Area Service Centres, which are themselves 26.1 Km apart, have somewhat different residential distributions of employees (Figs. 9.10, 9.11). The Barnet office, which is located in a largely residential area, considerably closer to central London than Harlow, has 66.2 per cent of its employees resident in the Barnet/New Barnet/Enfield conurbation (54.5 per cent of males, 76.8 per cent of females), with a further 17.8 per cent in the northerly Potters Bar/Cheshunt district (20.4 per cent of males; 15.5 per cent of females). This rather centralised pattern results in relatively short journeys to work for most office employees and reflects the urbanised nature of much of the personnel catchment area. The Harlow office is comparatively small, but the large ratio of males ensures that only just over half of all its employees reside within Harlow itself (51.3 per cent of all employees reside within the office site 10 Km grid square, composed of only 36.0 per cent of the male workforce but as high as 78.6 per cent of the female workforce). The remaining employees' residences are scattered amongst the surrounding towns and villages, Bishop Stortford to the north having the greatest concentration with four male employees, whilst others travel from Hertford and Ware in the west, Hoddesdon and Nazeing to the south west, and Great Dunmow to the north east. None travel from the south east, despite possible access via the A414.

The Hemel Hempstead office, which is roughly the same distance from central London as the Harlow office, has similar proportions of male and female employees resident in the office site 10 Km grid square

Males

			1		
				1	
1	1		4	1	2
		8	18	1	
1		6	5		

20
51

Females

					1
			22	1	
		1	3		

Fig. 9.11 Residential Distribution of Office Employees at Harlow ASC, Eastern Gas

Males n.s. = 3

4	3	2		
		5	2	
12	47	16	5	1
	6	10	2	2

19
49

Females n.s. = 6

1	4	4		
1	3	1	5	1
	7	113	7	
		1	2	

19
48

Fig. 9.12 Residential Distribution of Office Employees at Hemel Hempstead ASC, Eastern Gas

Males n.s. = 6

	2		1		1
		4			
		3	2		
		3	1	4	
1	3	79	9	6	
	2	2	2		
			4	1	1

20
48

Females n.s. = 1

		3			
	1				
		12	1		
	4	127	15	1	
	1	1	1		
			2		

Fig. 9.13 Residential Distribution of Office Employees at Luton ASC, Eastern Gas

(39.2 per cent of males, 72.4 per cent of females), but since it employs rather more women than men the overall proportion living in the office grid square is much higher than at Harlow at 58.0 per cent. The remaining members of the office workforce have comparatively dispersed residences, but many are located along the main routeways to Luton to the north east and to Watford and St. Albans to the south east and south (Fig. 9.12).

Located further from central London, the Luton A.S.C. has as much as 67.1 per cent of its employees residing within the office grid square, again with this embracing a higher percentage of the female workforce (75.1 per cent) than the male workforce (57.7 per cent) (Fig. 9.13). As a more defined urban area than for example Barnet, this office draws most of its employees from the Luton/Dunstable urban area. These embrace 71.7 per cent of the workforce (58.4 per cent of the male workforce, 82.4 per cent of the female).

To further confirm this pattern, the employees of the Norwich office, the Eastern Region Area office located furthest from central London, have comparatively centralised residential locations in relation to their workplace, and it would appear that the majority of the workforce reside along a north-south axis, these adjacent 10 Km grid squares containing 70.2 per cent of all its employees, forming as much as 66.1 per cent of the male workforce and 79.5 per cent of the females (Fig. 9.14). However, a more detailed examination reveals a more widespread distribution about the office site, the apparent elongated distribution being due to the exact location of the office near to the latitude 310 line,⁵⁰ this distribution being primarily along the major road routes.

The distribution of office employee residences in Wales Gas indicated that Regional Headquarters employees have a somewhat less

Males n.s. = 4

1		1	1			
		1				
1	1	2	2	3	1	
4		13	49	5		1
	1	9	78	2		3
		2	2	1	3	1

28
59

Females n.s. = 2

	1			1		
1		3	29	1	1	
		2	37	3		
						1
				1		

28
59

Fig. 9.14 Residential Distribution of Office Employees at Norwich ASC, Eastern Gas

localised pattern. Eastern Gas and South West Gas offer the opportunity not only to compare the distributions of their headquarters employees, but also have dual-site headquarters: the Regional Headquarters themselves and the Regional computer centres.

For direct comparison, the distributions may be amalgamated, to give an overall proportion of those residing within the same grid square as their work location. Percentages of 47.1 per cent and 47.4 per cent in Eastern and South West Gas Regional Headquarters respectively are remarkably similar, and this similarity also exists between males and females (Table 9.18a). But these proportions are greater than the overall Wales Gas proportion of 37.6 per cent, mostly due to the differing female distribution of only 40.6 per cent resident in the workplace 10 Km grid square; the male proportion is similar in each Region. Explanation for this may be sought in the dual-site system, since computer centres have very different male : female ratios to other headquarters functions. The proportions of female employees residing within the same 10 Km grid squares as Star House and Riverside (Figs. 9.15, 9.16) are found to be not dissimilar to that of Snelling House (which is itself probably slightly reduced because of the inclusion of computer personnel than it would be otherwise), whilst the proportions at Tower Point and Sydney Wharf (Figs. 9.17, 9.18) where the ratios of female to male employees are much larger, are substantially different (Table 9.18b). Yet in both cases the catchment areas are 'shared' since the headquarters and computer offices are located only short distances apart, the distance between Potters Bar and Enfield offices being 8.6 Km and between Riverside and Sydney Wharf offices 10.4 Km.

This grid square mapping technique may be used further to assess the possible impact of office site relocations upon the journey to work. As an example, the proposed removal of the Radiant House, Liverpool

Males n.s. = 7

		2				1							
25			3		2								2
	1	1	1	6	1		1	1					
		9	8	13	3	2		2					
		4	15	6	4	2							
20	1	1	13	39	37	20	1						
		7	15	28	26	2							
		1	3	3	3								
			1		2								
16									1				
	48		50									60	

Females n.s. = 3

		1				1							
25													
		1	2	1	1								
		1	6	2									
20		1	9	76	15		1			1			
		1	5	19	8								
				2									
16													
	48		50									60	

Fig. 9.15 Residential Distribution of Office Employees at Star House, Regional Headquarters, Eastern Gas

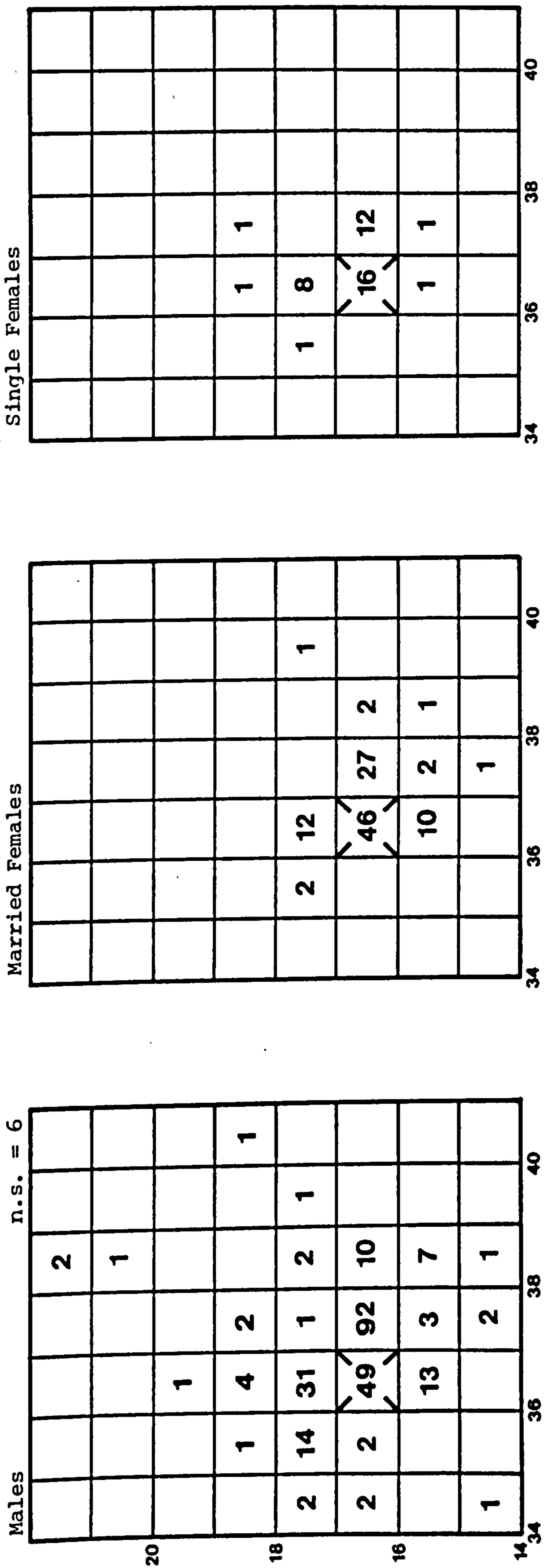


Fig. 9.16 Residential Distribution of Office Employees at Riverside, Regional Headquarters, South West Gas

Males n.s. = 2

						1						
	1											
								1				
25		1				1	2					
			2		1							
			3	3	5	2	2					1
		1		2	2	12	1					
		3		7	14	25	4					
20				3	19	162	3					
			1	2	11	7	1					
					1							
				1	2							
16	47				50							55

Females n.s. = 3

25												
					1							
		1		2	3	1		1				
					2	5	2					
		1		2	5	47	2					
20			1		12	255		1				
					2	5						
16	47											55

Fig. 9.17 Residential Distribution of Office Employees at Tower Point, Regional Computing Centre, Eastern Gas

Males

			1	1				
18		8	6		1	2		
16	1	1	6	90	9	1		
			9		3			
14				2				
	33	35	37		39	41		

Married Females

18			4		2			
16			5	94	9	1		
			9	1	1			
14				1				
	33	35	37		39	41		

Single Females

18					2			
16			1	49	5			
			3	1				
14								
	33	35	37		39	41		

Fig. 9.18 Residential Distribution of Office Employees at Sydney Wharf, Regional Computing Centre, South West Gas

TABLE 9.18

PROPORTIONS OF OFFICE EMPLOYEES RESIDING IN THE SAME
TEN KILOMETRE GRID SQUARE AS SELECTED OFFICE SITES OF
EASTERN, SOUTH WEST, NORTH WEST, AND WALES GAS

% in office 10 Km. grid square			
Eastern Gas			
	Star House	^b Tower Point	^a All HQ
All employees	24.7	62.5	47.1
Males	12.3	51.9	32.5
Females	48.4	71.8	64.6
Higher Management	5.7	13.8	
Senior Officers	17.2	40.0	
Staff	34.9	70.1	
South West Gas			
	Riverside	^b Sydney Wharf	^a All HQ
All employees	28.0	68.0	47.4
Males	19.5	63.8	35.5
Females	42.8	75.7	61.4
Married females	44.2	74.0	
Single females	39.0	79.0	
North West Gas			
	Radiant House	Linacre	Pocket Nook
All employees	19.5	15.8	48.5
Males	18.4	13.2	38.0
Females	20.5	20.0	59.7
Higher Management	-	-	
Senior Officers	15.4	12.9	
Staff	19.9	17.1	
Wales Gas Regional Headquarters			
All employees		37.6	
Males		34.4	
Females		40.6	

SOURCE: British Gas PMIS data - derived.

office of North West Gas to Linacre has been the subject of detailed study by North West Gas itself. The distribution of office personnel at present located at both sites indicates that these employees have rather widely scattered residences throughout much of the Liverpool conurbation (Figs. 9.19, 9.20) and both display comparatively low proportions residing within the same 10 Km grid square as their work location (although the Linacre proportion is reduced in part because of the position of the office on the dividing longitude between the grid squares, the adjacent grid square to the west of the office embraces a further 18.7 per cent of the male workforce and 41.8 per cent of its females : 27.4 per cent overall : combined with the westerly adjacent grid square, these together accommodate 43.2 per cent of the Linacre office employees). This very much approximates to the proportion generally found within the same 10 Km grid square as most large offices at the middle level of the office hierarchy; at Pocket Nook for example 48.5 per cent of all its office employees reside within the office grid square⁵¹ (Fig. 9.21). This widespread workforce of Radiant House is a distinct advantage in terms of their relocation, since 16.3 per cent already live within the same 10 Km grid square as Linacre office itself (15.0 per cent of males; 17.5 per cent of females). Thus, assuming the retention of the same office workforce, the numbers incurring a longer journey to work should be relatively small, although it should be noted that movement away from the city centre undoubtedly creates journey to work problems for some employees who travel by public transport in that they are more likely to need to change 'buses and/or trains than was necessary previously. The straight-line distance between the Radiant House, Liverpool and Linacre sites is 7.1 Km.

The differences in residential distributions of the various employee grades are illustrated very clearly using a grid square

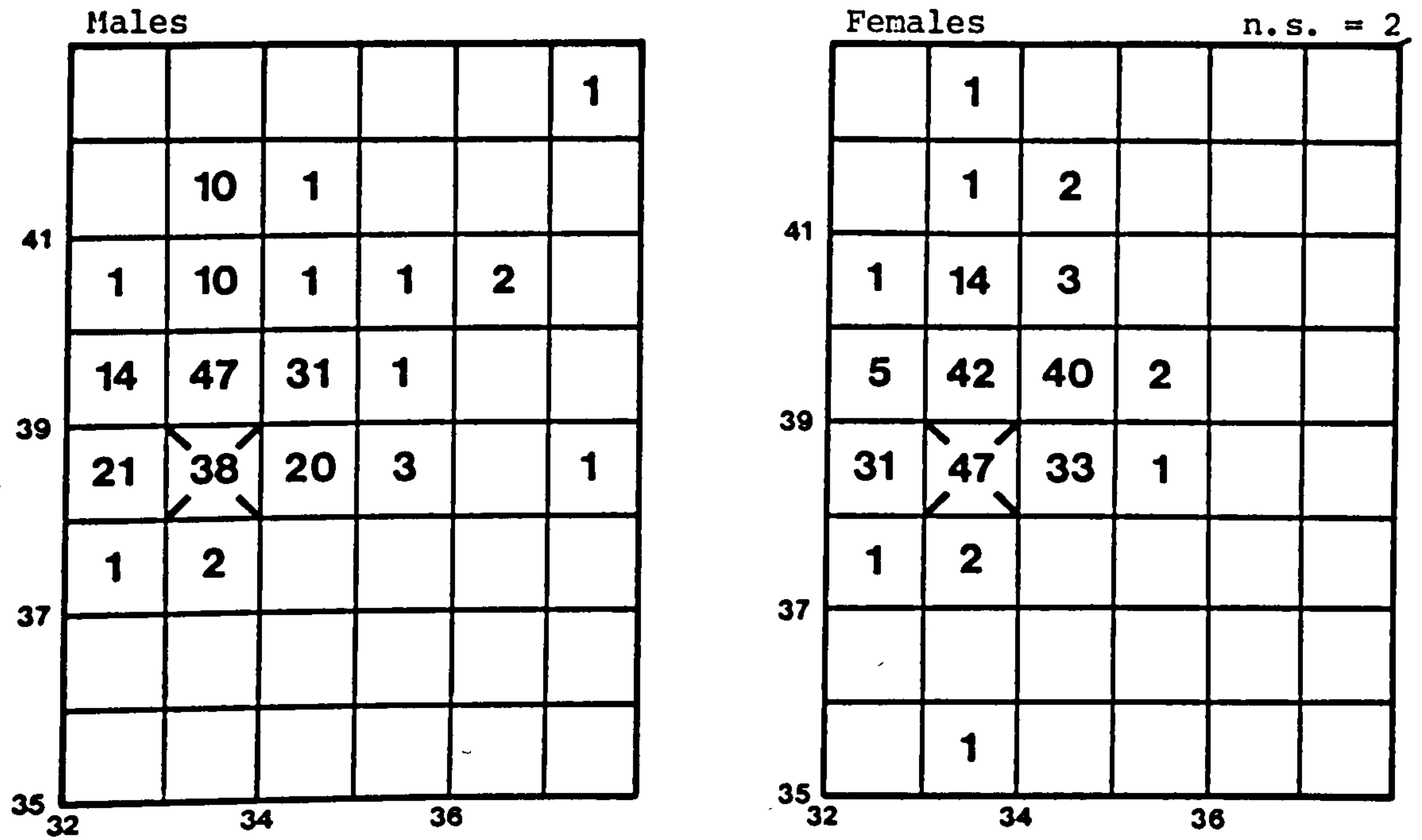


Fig. 9.19 Residential Distribution of Office Employees at Radiant House, Liverpool, North West Gas

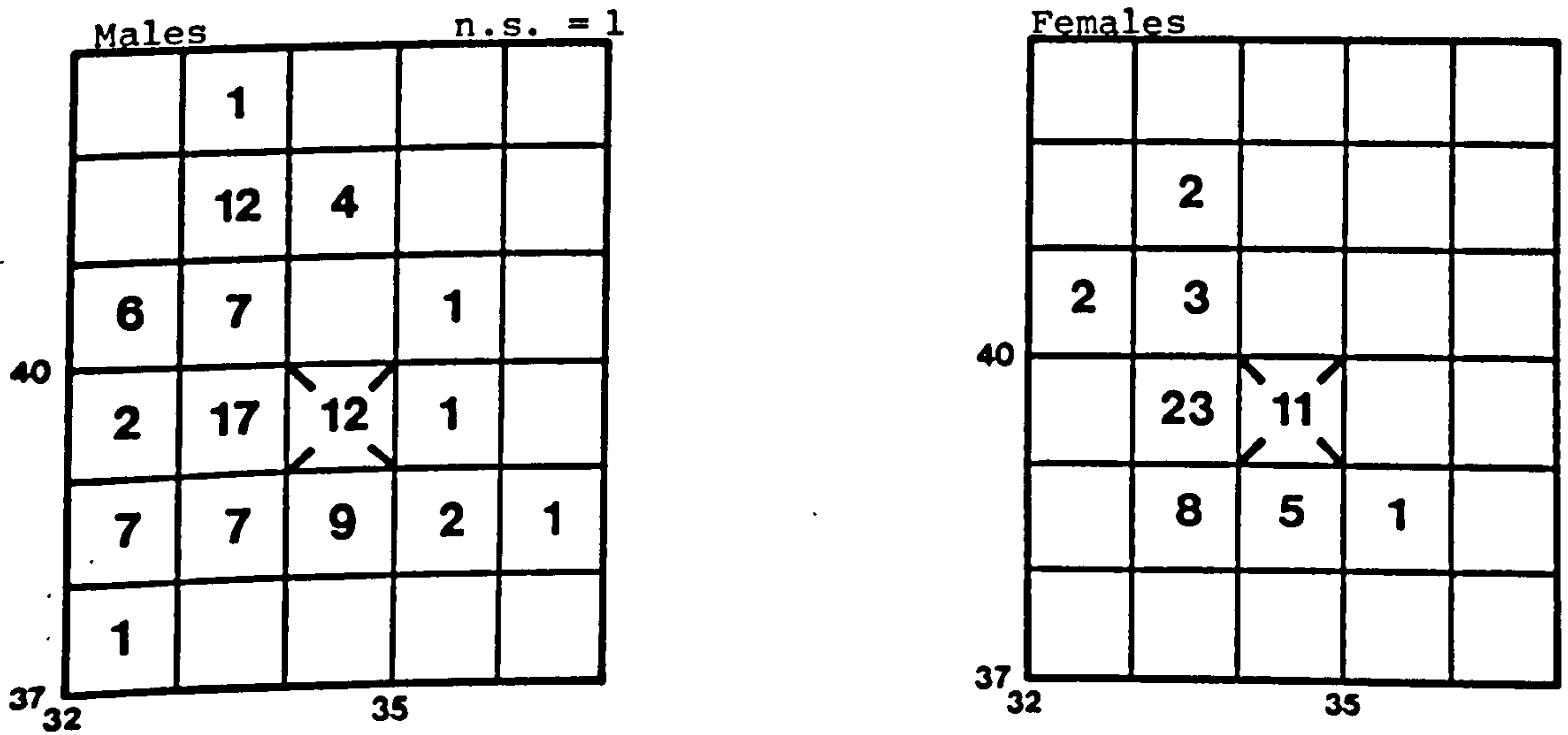


Fig. 9.20 Residential Distribution of Office Employees at Linacre, North West Gas

mapping technique, here presented for some of the offices considered above (Figs. 9.22-9.25). The overall spread of residences is similar for all three levels, whilst the smaller numbers of Higher Management often results in an apparently less widespread distribution than those of Senior Officers and Staff. However, if the approach is adopted again of examining the proportions residing in the same 10 Km grid square as the office location, it rapidly becomes clear that few Higher Management personnel live close to their work location, whereas the proportions of Staff are relatively high. Not surprisingly, the proportions of Senior Officers lie between these extremes.

As a further example of the use of such a grid square mapping technique used to define the proportions of office employees living in the same 10 Km grid square as their workplace it is pertinent to examine the distribution of personnel with differing lengths of service. Comparing two offices which do not have the same proportion of their workforce within the office 10 Km grid square, Wales Gas South and East Area offices, these nevertheless do display a similar pattern amongst their respective length of service groups.⁵² The number of female office employees who have more than 20 years service are too small to permit an accurate representation by this technique, but it is possible to map separately the areal distribution of homes of both sexes to reveal their differing patterns (Fig. 9.26).

The Residential And Work Site Locational
Patterns Of Regional Office Workforces:

Summary of Findings

The Residence-Work Distance Of British
Gas Regional Office Personnel

The majority of office employees within British Gas (as represented by the selected Regions) reside within 10 Kilometres of their

Higher Management n.s. = 1

25					1								
			1	1	1								
		3	2	3	1	1							
		3	12	3	1								
		7	16	5	4								
20		5	3	2	7	1							
			1	1									
17													
	48	50				55						60	

Senior Officers n.s. = 3

		1				1							
25			2		1								
	1	1		5			1	1					
		2	5	6	2				1				
		1	3	2	2	1							
	1	4	12	21	2	1							
20		1	9	13	7	1							
			2	3	1								
			1		1								
17	48	50				55						60	

Fig. 9.22 Residential Distribution of Office Employees by Grade at Star House, Regional Headquarters, Eastern Gas

Staff n.s. = 3

	1	1				1							
25			1		2								2
		1											
		5	3	5	1	1		1					
		1	6	3	1	1							
	1	3	20	87	29		1			1			
20		2	8	32	20								
		1		1	2								
					1								
17	48	50				55						60	

Fig. 9.22 - Continued

Higher Management

25									1			
						1						
						3			1			
		1		1	1	2						
				1	3	3						
20				1	5	4			1			
17												
47					50						55	

Senior Officers

n.s. = 2

							1					
	1											
25												
				2		1						
		1	1	2			1	1	1			1
				1	1	1	1					
		2		4	4	13	2					
20			1		8	44	2					
			1	1	4		1					
						1						
						2						
16												
47					50						55	

Fig. 9.23 Residential Distribution of Office Employees by Grade at Tower Point, Regional Computing Centre, Eastern Gas

Staff n.s. = 3

							1					
25		1										
					1		2					
			2	1	7	2	2					1
				3		16	4					
		1		2	14	57	1					
20				4	20	370						
					4	8						
				1								
16												
47			50									

Fig. 9.23 - Continued

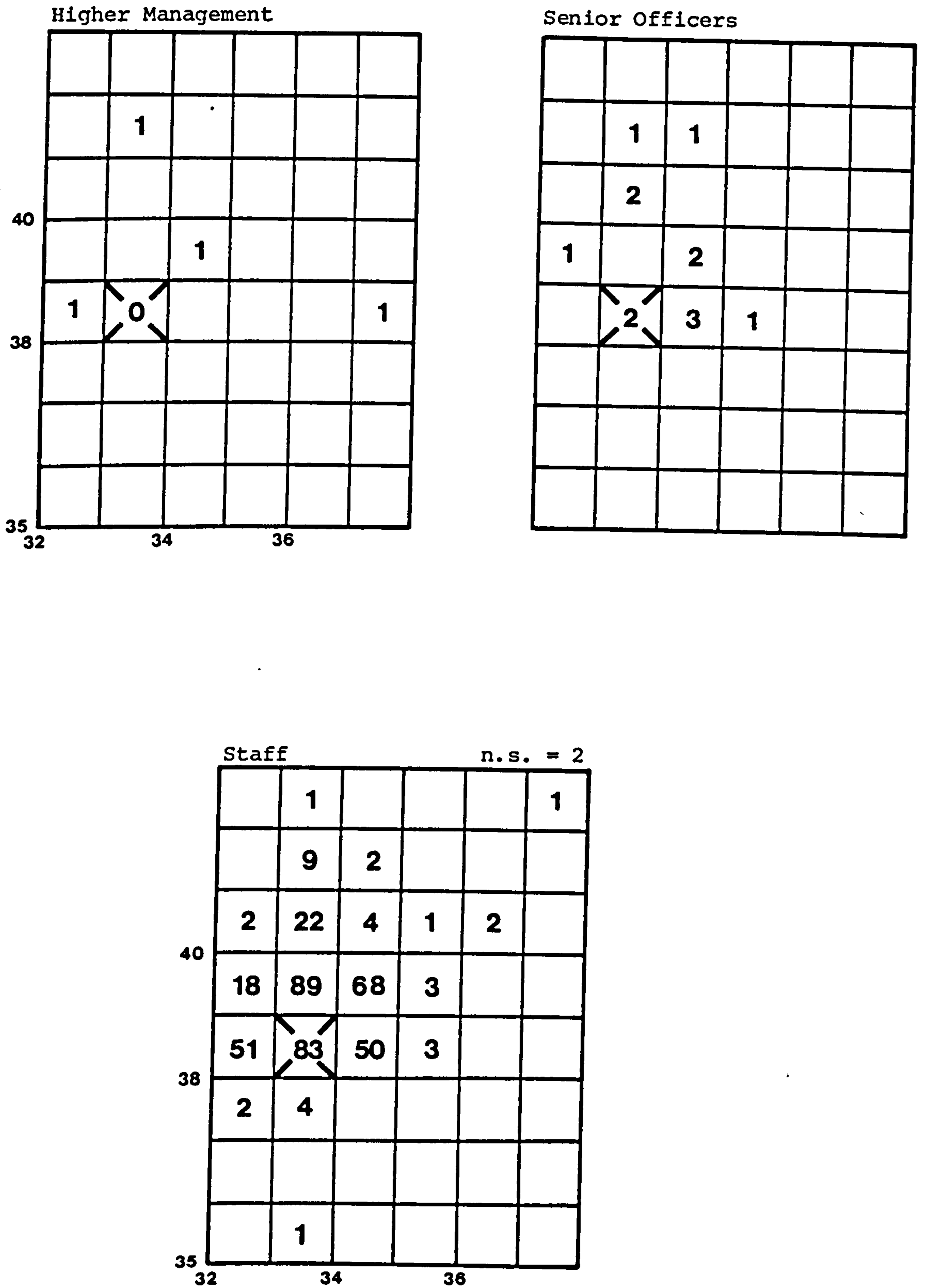


Fig. 9.24 Residential Distribution of Office Employees by Grade at Radiant House, Liverpool, North West Gas

Higher Management

	1			
40	1			
		0		
	1	1		
37				
32			35	

Senior Officers

	2	4		
40	5	2		1
	2	2	4	1
	1	1	5	1
37				
32			35	

Staff n.s. = 1

	1				
	11				
40	2	8			
	38	19			
	5	13	9	2	1
37	1				
32			35		

Fig. 9.25 Residential Distribution of Office Employees by Grade at Linacre, North West Gas

n.s. = 1

		2	4			
		3	4	1		1
			8	21		
		1			18	3
					3	

n.s. = 1

		1	5			
		2	6	1		
	1		7	16	4	
					21	2
					4	

n.s. = 1

			4			
		4	5	2		
		2	9	3		
		1			23	2
			1	4		

n.s. = 7

		2	2	3		
	1	1	6	20	6	
	1	1	1		34	3
		1		6		

16
18

15-19 yrs

10-14 yrs

5-9 yrs

0-4 yrs

			1	2	1	
					6	

		1				
	1			2	7	
					7	
						2

		2	1			
		2	8	6		
					41	6
	1	1				9

n.s. = 1

		1	2	1		
	1	1	5	11	9	
	2	1			60	10
		1				9

16
18

Females

Fig. 9.26 Residential Distribution of the Male and Female Workforces by Length of Service at South Area Office, Wales Gas

place of work, the proportion residing within this distance being greatest in those Regions with least concentration of employees, measured as the average number of employees at each office site. The proportions residing within this distance in relation to individual office sites also varies intra-Regionally as well as inter-Regionally.

A number of important influences have been observed which affect the pattern of employee residential locations in relation to their work locations. The centralisation of employees (employment concentration at large office sites, these sites themselves may be at decentralised locations), may be measured through the average number employed at each Regional site. The influence of this centralisation, which is a manifestation of the organisational structure adopted, is greatest at the Area level. This is evident in the average residence-work distances of employees. Hierarchical organisation and the position of offices within this structure is a more important influence upon the residence-work distance than the office size alone measured in terms of its total number of employees. This is the outcome of the combinations of other workforce variables associated with the various hierarchic levels. Thus, in addition to differences observed between the different types of Area organisation followed in the selected Regions, distinctive differences are evident between the residential distributions of headquarters personnel and employees of offices lower in the Regional hierarchy, although headquarters employees do not in themselves differ from Regional office employees as a whole in terms of their aggregate residence-work distance patterns.

A further contributory factor is the length of time over which an office site has been occupied, which encourages the creation of an efficient distribution of employee residential locations in relation to the worksite and the employees' daily journey to work, especially

when these offices are sited in or near urban centres. Thus, the long established pattern of office location in North West Gas, which consists of many locationally centralised sites, is associated with comparatively shorter average residence-work distances.

The influences of major workforce characteristics which contribute to the hierarchical differences are evident individually, most particularly the sex of employees and their work grade. Generally, females live nearer to their work location, that is, males have a more widespread distribution of residence in relation to workplace. Although employees of the different grades show similar overall residential distributive patterns, the densities of personnel vary, such that high densities of Staff in particular are found near to the work location. These densities are examined best using mapping techniques.

The Residential Distributions Of British Gas Regional Office Workforces

Drawn as distributive patterns based on a 10 Km grid square matrix, high Staff densities are observed especially within the office site 10 Km grid square: this is more precisely interpreted as a 5 Km radius catchment area about the office site, such that the non-central position of some offices in relation to the 10 Km grid is responsible for 'spreading' this density over adjacent grid squares (as evidenced at Norwich in Eastern Gas, for example).

At the aggregate distance level, as well as by mapping, influences of past relocations of offices may be identified, but predominantly only amongst male employees. The more recent example of the Ipswich office employees relocated at Colchester in Eastern Gas may be compared with the resiting by Wales Gas of its Oystermouth Road office employees at Llandarcy, still evidenced by male employee

residential locations. Evidence of a somewhat smaller degree is provided by the Crindau office which still employs a number of personnel previously employed at smaller offices within the Eastern Valleys of South Wales. In contrast, consideration of the Radiant House, Liverpool employees of North West Gas, in respect of their relocation at Linacre, has indicated that this move will have a comparatively minor aggregate effect on the residence-work distance. Nonetheless, undoubtedly some female office employee turnover will result from the move.

Comparisons made of the aggregate residence-work distances of Eastern Gas employees at each of its Area offices demonstrate the influence of catchment area characteristics upon the residential locations of office employees, which is seen also in other workforce characteristics of these offices. Detailed consideration of the distributive patterns of employees at selected offices both in Eastern Gas and other Regions illustrated catchment area patterns which cannot be distinguished by an examination of aggregate distances, introducing the additional factor of direction and the opportunity to compare mapped distributive patterns of employee home locations with other identifiable locational features. These include the distribution of both residential and industrial areas, and the main transportation routes.

The advantages of this type of mapping technique are developed further in the following chapter where the locational decisions of individual employees, as evidenced through their residential locations, are mapped in comparison with other features of their careers within British Gas. Thus the aggregate pattern may be reviewed in greatest fragmentation, and introducing the element of time.

NOTES

1. Pythagoras' Theorem : $h = \sqrt{a^2 + b^2}$
2. Mayer Hillman, Irwin Henderson and Anne Whalley, Transport Realities and Planning Policy : Studies of Friction and Freedom in Daily Travel, Political and Economic Planning, vol. 42, no. 567 (London : P.E.P., 1976).
3. See Chapter I.
4. J.H. Thompson, "Community Patterns of Manufacturing Employees", Industrial and Labour Relations Review 10 (1956), 71
5. J. Wabe, "Dispersal of Employment and the Journey to Work", Journal of Transport and Economics Policy 1 (1967), 345-61; P.W. Daniels, "Employment Decentralisation and the Journey to Work", Area 1 (1970), 47-51; P. Lanigan, "The Spatial Reorganisation of a Federal Government Department", in Restructuring Employment Opportunities in Australia, ed. G. Linge (Canberra : Australian National University, 1974), p.165; Joel L. Naroff and Bart David Ostro, "The Impact of Decentralisation on the Journey to Work and Pollution", Economic Geography 56 (1980), 63-72.
6. P.W. Daniels, "Transport Changes Generated by Decentralised Offices", Regional Studies 6 (1972), 273-89.
7. Ian Alexander, Office Location and Public Policy (London : Longman , 1979), p.242.
8. H.J. Brown, "Changes in Workplace and Residential Location", American Institute of Planners 41 (1975), 32-39. H.L. Kendig, "Why People Move", seminal paper, Urban Research Unit, Australian National University, 14 August 1978, cited by Alexander Office Location and Public Policy, p.243.
9. See, for example, models of the urban residential market, as presented by J.F. Kain, "The Journey to Work as a Determinant of Residential Location", Papers and Proceedings of the Regional Science Association 9 (1962), 137-60; W. Alonso, Location and Land-use : Toward a General Theory of Land Rent (Cambridge, Mass. : Harvard University Press, 1964).
10. J.B. Cullingworth, Housing and Labour Mobility (Paris : O.E.C.D., 1969), p.19.
11. H.S. Parnes, Research on Labour Mobility : An Appraisal of Research Findings in the United States (New York : Social Science Research Council, 1954), p.34.
12. A.M. Warnes, "Estimates of Journey to Work Distances from Census Statistics", Regional Studies 6 (1972), 315-16.
13. P.W. Daniels, "Some Changes in the Journey to Work of Decentralised Office Workers", Town Planning Review 44 (1973), 176.
14. Alexander, Office Location and Public Policy, p.242.

15. This has been demonstrated for London by P. Friedly, National Policy Responses to Urban Growth (Westmead, Lexington : Saxon House, Lexington House, 1974); in particular, see p.53.
16. Alexander, Office Location and Public Policy, p.243.
17. Hillman, Henderson and Whalley, Transport Realities and Planning Policy. Daniels, Transport Changes Generated by Decentralised Offices. There are, of course, other factors encouraging this, including the non-careerist nature of much female employment, and the subservience of married women's careers to those of their husbands and to the family. See S. Sutherland, "The Unambitious Female : Women's Low Professional Aspirations", Signs 3 (1978), 774-94.
18. G. Humphrys, "The Journey to Work in Industrial South Wales", Transactions of the Institute of British Geographers 36 (1965), 85-96.
19. M.E. Beesley, "The Value of Time Spent in Travelling", Economica 32 (1965), 184.
20. Thompson, Commuting Patterns of Manufacturing Employees, p.71.
21. Cullingworth, Housing and Labour Mobility, p.15.
22. P. Rossi, Why Families Move : A Study in the Social Psychology of Urban Residential Mobility (Illinois : Free Press, 1955). Parnes, Research on Labour Mobility, pp. 41-42.
23. The use of employee concentration is less correct, since the centralisation is a result of employee concentration at some large sites, not all sites and not necessarily a general increase in site size (although it would appear that this does generally result).
24. See Fig. 2.1.
25. See Appendix B, Table B.1.
26. See Chapters III and VI.
27. See Chapter V.
28. See Chapter V.
29. These data were supplied by the Management Services Department of South Eastern Electricity Board.
30. South East Gas data were provided by the South East Gas Personnel and Computer Departments, derived from the Region's P.M.I.S.
31. Wales Gas addresses have been coded very accurately, to house/ street level where possible. However, this is a very lengthy process. All other addresses have been coded to district level.

32. This occurs because residential location is based on the employee address file : it does not take account of temporary accommodation.
33. For example, Wales Gas, $\chi^2 = 10.6$ (significant at 0.01 level).
34. Electricity Boards operate many combined service depots and showrooms, designed to serve similar consumer catchment areas. This arises because they do not have old production sites available for conversion to depots.
35. P.W. Daniels, "Office Dispersal and the Journey to Work in Greater London : A Follow Up Study", in Spatial Patterns of Office Growth and Location (New York : Wiley, 1979), pp.373-400.
36. See Chapter VIII.
37. This may, of course, be an outcome of the incompleteness of the North West data set.
38. Daniels, Some Changes in the Journey to Work of Decentralised Workers, pp. 167-88.
39. Daniels, Office Dispersal and the Journey to Work in Greater London.
40. See Chapter X.
41. See Table 8.5.
42. See Appendix B, Table B.10.
43. Thus emphasising the generally shorter journey to work of females.
44. Warnes, Estimates of Journey to Work Distances from Census Statistics.
45. See A.M. Guest, "Occupation and the Journey to Work", Social Forces 55 (1976), 116-81.
46. Skewness : males = 20.30, married females = 9.00, single females = 16.07.
47. The distribution of the majority of Wales Gas office employees are shown on Figs. 9.3 - 9.8.
48. Colin Buchanan and Partners, in association with W.S. Atkins and Partners and Economic Consultants Ltd., Cardiff Development and Transportation Study - Main Study Report, April 1978, Fig. 6, Land use 1966, land primarily in residential use.
49. As evidenced by length of employment, see Chapter III.
50. Norwich, Rowtree Way, grid reference 623,309.
51. In absolute straight-line distance terms this was represented by the 40.8 per cent of all North West office employees under consideration who travel less than 5 Km. to work. Of course,

the majority of employees at such office sites are at lower work levels.

52. Appendix B, Table B.13.

CHAPTER X

WALES GAS : A DETAILED STUDY OF THE REGIONAL
OFFICE WORKFORCEThe Availability And Purpose Of Further British
Gas Personnel DataThe Purpose Of Obtaining Further
Personnel Data

Despite considerable detail known about each individual provided by the P.M.I.S. data¹ such that the aggregate information yielded concerning the Regional office workforce is very large, little is revealed about the progression of each individual within the organisation. This creates a major handicap in assessing the effects of changes in British Gas organisation and technology over time. As yet such temporal information is not available via the Industry's computerised records accessed as the data sources. Computerisation of personnel records results in the regular revision and updating of material, with subsequent loss of previous information; previous address, for example, is deleted when overwritten by a new address. There is thus a need for material which represents the "personnel history" of individuals : a "personnel history" being defined as an employee's previous employment, his successive work levels, employment locations, residential locations and related circumstances, available in such a manner that these may be related both spatially and temporally, one with another. Such data are available in the hand-maintained hard copy personnel records which continue to be kept for each British

Gas employee.

This approach is based loosely upon Hägerstrand's 'time-geography', first introduced in 1962 when he discussed "the web of time-space trajectories described by individuals in the course of their lifetimes," and introduced the "station" concept.² The essence of this approach is that time and space are seen as inseparable.

Thus:

Time-geography is chiefly an endeavour to consider conditions over time and in space simultaneously. Close attention is paid to the sequential courses of events at both an individual and an aggregated level.³

Here two main aspects of "personnel history" have been singled out for examination as inter-related sequential events : residential movements and changes in employment location. Through examination of these not only are the development characteristics of the Regional workforce illustrated, but they may be compared with those patterns identified in other studies.

Previous research has shown, for example, that residential movement generally follows a continuous and well-defined cycle.⁴ This begins when young adults first leave their nuclear family home, reaches a peak amongst families with young children making increasing demands upon space, and declines with increasing age beyond middle-age. Studies have recognised three types of factors involved in 'attachment to place', alternatively described as forces which counteract residential movement. These are psychological, social, and economic. However, other factors which also may be classed as psychological, social or economic may encourage residential movement. Thus Gerson et al suggested that decisions whether or not to move are subject to socio-economic considerations, and are affected by the individual's life-cycle (in this context his age, and family

structure), and present residential location.⁵

However, attachment to place does not imply a favourable perception of the area. Hunter, for example, found that people who reported "feeling attached" to their areas of residence ('neighbourhoods') often did not like them particularly, and vice versa. He also found that the longer people had resided in an area, the more likely they were to report a feeling of attachment, even though they were no more likely to evaluate the area favourably. Several other studies, including those of Kasarda and Janowitz, and Nathanson, have indicated that the longer a person resides in a neighbourhood the more likely he is to be satisfied with the area of residence. In their attempt to explain this, Gerson et al concluded that the longer a person resides in a particular area, if all else is held equal, the greater will be the increase in both the general benefits of remaining and the burdens of leaving.⁶ Employment can be a major factor in breaking down this inertia, whether through a change in job status,⁷ in work location, or both.

In a survey of both office and manual employees resident in the Nottingham - Derby district, Rankin found that the main reasons given for residential movement were marriage, house purchase, and transfer from private rented to public housing. He found that movements based upon a conscious desire to move either nearer to or further from the work location were relatively few. However, Humphrys, from his work based upon South Wales, suggested that some employees consciously seek to reside further away from their workplace and are willing to travel considerable distances as a result.⁸

In relation to these main findings and those of other previous studies both the aggregate and individual patterns of residential and

employment movements of a sample of Wales Gas office employees are examined below. Firstly however the representativeness of the sample itself and the hand-kept records accessed as the data source are considered in some detail.

The Data Available

Problems arising from the continuous updating of computer-held personnel files have been indicated above. But, hard-copy and hand kept personnel files continue to be maintained by the Industry for each employee and contain much information no longer retained, or in some cases never kept, on computer file. Within Wales Gas these files are stored and maintained by the relevant Area Personnel department or Headquarters Personnel department. The files of the most senior employees and those of Personnel members are held separately by the Senior Regional Personnel Manager. For the purposes of this study all records were made available for inspection.

Handicaps encountered using such personnel records are that they are not generally readily accessible and do not possess the uniformity of data presentation as available via the computer records. Use of this information they contain requires the abstraction of such data from individual files. As a result of these difficulties and the considerable time taken in collating required data, the decision was taken to inspect only a portion of the Wales Gas office personnel files.

An initial detailed inspection of a selection of these files, taken at random from those held at Regional Headquarters, revealed that each contains some of all of the following:

- a) Personnel Change Form (P.C.F.). These give the employee's man

number, surname, forenames, job designation, including whether employment is full or part-time and permanent or temporary, function, work site, and the effective date of post commencement. These forms are the basis of computer data entry, from which the computer personnel files are updated at regular intervals, as required by personnel changes.

- b) Personnel Record Cards. These record cards are remnants of the former totally hand-maintained system of personnel records. They effectively contain the employee's employment history with the Industry.
- c) Job application forms. These have been completed by the employees themselves and contain details of name, nationality, marital status, number of children, education, previous employment and permanent address.
- d) Terms of employment. These are drawn up as required by the Contracts of Employment Act, 1963.⁹ They contain details of name, job designation, sex, and location of work, amongst other details.

Once the type of information available had been established,¹⁰ as much as possible was abstracted from a small random sample of personnel files to establish the basis of a comparable and reliable data base from which the requirements of the full sample were finalised in both content and form.

Data Abstraction From Wales Gas Personnel Files

The initial sample of personnel records revealed some potentially useful information concerning marital status, family size, car ownership, possession of driving licence, all education

establishments attended from the age of 11 years and all examinations taken, plus further information of this type to be found in letters of application and the variety of forms contained in the personnel files. However, such information is far from comprehensive and impossible to standardise. It was decided therefore to abstract only information which is directly comparable with the computer-held personnel records or is directly related and reliably present in every personnel file.

To preserve data comparability and to facilitate the compilation of a further computer file of all data relating to the sample, forms were designed and used to record the required information from the permanent files held by Wales Gas.¹¹ These were of three types, used to record the following information (in addition to the case number used within this study).

The first, general personnel details form carried the individual's surname, initials, title and man number (all of which were used to verify that the correct records were inspected); the employee's present job title, present address, and details of formal qualifications plus the last school attended.

The second form charted the individual's "employment history". For each previous post an attempt was made to identify the following: employer, employer's address/location of employment, the nature of the post held and its starting and finishing dates, and whether it was full or part-time, permanent or temporary.

The third form, "previous addresses", was simply a listing of all previous addresses, together with the date of notification of each change. Obviously, such information is available only for changes in residence which have occurred during the period of

employment by Wales Gas.

Using these forms an information schedule consisting of the first form plus as many second and third forms as necessary was compiled for each office employee selected to constitute the "personnel history" sample. Once the schedules had been completed some data were recoded, primarily in locational format. The present post and address were compared with those given on the computer file print-out, and either the same codes were entered if these were unchanged or the correct new code was entered, plus the correct employment type and work level codes. A listing of the schools given was drawn up and each coded according to location using a six-figure grid reference compatible with other address codes. Qualifications were coded directly within various categories. The location of each post held was coded as a six-figure grid reference, plus the work level and type. Employer was coded as Wales Gas or other. Each previous address was given a six-figure grid reference and the dates of new address notification, each post commencement and completion, were reduced to month and year.

The Wales Gas Personnel Sample

Sample Selection

The sample taken was based upon the Wales Gas office employee data set, as supplied from computer records, containing entries for 2674 individuals. This was stratified into the four Areas and Regional Headquarters, with the latter including Regional Stores, and from these five sub-divisions the sample was drawn using a random sampling method.¹² The proportions drawn from each stratum were based upon its relative importance in the organisation (Table 10.1). A total sample of 326 office employees was drawn from the computer

TABLE 10.1

SIZE OF THE SAMPLE DRAWN FOR PERSONNEL FILES
INSPECTION FROM THE WALES GAS OFFICE WORKFORCE

	Sample		Wales Gas	
	No.	%	No.	%
South	66	20.2	649	24.3
North	60	18.4	354	13.2
East	60	18.4	448	16.8
West	60	18.4	431	16.1
HQ	80	24.5	792	29.6
Totals	326	100.0	2674	100.0

TABLE 10.2

COMPARISON OF THE MAIN FEATURES OF THE PERSONNEL
SAMPLE WITH THE TOTAL OFFICE WORKFORCE OF WALES
GAS

	Sample		Wales Gas	
	No.	%	No.	%
^a Sex and female marital status				
Males	198	60.7	1587	59.3
Females	128	39.3	1087	40.7
Married Females	93	28.5	761	28.5
Single Females	35	10.7	326	12.2
^b Employment type				
Managerial	40	12.3	255	9.5
Technical	50	15.3	434	16.2
Supervisory	41	12.6	350	13.1
Clerical	195	59.8	1635	61.2
^c Work level				
Directorate	0	-	10	0.4
Regional	3	0.9	26	1.0
Higher Management	21	6.4	130	4.9
Senior Officers	44	13.5	313	11.7
Supervisory	64	19.6	590	22.1
Senior Clerical	54	16.6	469	17.5
Clerical	140	42.9	1136	42.6

SOURCE: Regional personnel records and PMIS data.

listing of April 1979. These employees work at thirty-two separate sites.

Although data relating to each of the sample members were not collected from the personnel records until some months later, less than 1 per cent of the sample proved to have left the Industry, and since hard copy records are not destroyed for some time it was possible to access the records even of these former employees.¹³

General Description Of The Wales

Gas Sample

It is clearly important to establish the representativeness of the personnel records sample compared with all office employees of Wales Gas. Any unusual deviations from the main data set may be responsible for features in the subsequent analysis, and would, of course, invalidate any conclusions based on such data in terms of the total office workforce.

In general terms the sample is similar to the Regional universe from which it was drawn (Table 10.2). For example, the sample contains male and female employees roughly in the ratio of 3:2, which is representative of the entire data set : the sex ratio¹⁴ of the sample is 65 compared with 69 for the whole data set. Of the differences which do exist, for example the slight over-representation of the managerial group (Table 10.2b) and the small differences in the proportional representation of the various work levels (Table 10.2c), it is doubtful whether these are significantly large to render unrepresentative the results of studies of these sample personnel, particularly at disaggregate levels.

Personnel Histories: Some General
Characteristics

Introduction : The Results of Related
Research

The major characteristics of the office workforce discussed are the number of residential relocations which have occurred and the number of posts held, with a further consideration of the successive locations of these in relation to each other. Obviously, the total numbers of both are likely to be greater among older age groups compared with younger, and to increase with the average age of the employees sampled. However, various studies, including those of Rossi, Thompson, Lansing and Mueller, and Simmons, have suggested that the propensity to change residence is much greater for the individual in his mid-twenties-early thirties than later in life.¹⁵ Once middle-aged he is less likely to move, particularly if he has exhibited little movement prior to this period. Similarly, amongst those employees destined to become managerial in status and function, change of work location usually occurs with most frequency early in their careers, and is particularly noticeable for the less well educated future manager : the higher the educational attainment of the future manager the more immobile he is likely to be.¹⁶ This may be explained by the tendency for higher qualified personnel to begin work at an organisationally high level, which is frequently that of the headquarters office, whilst less educationally qualified employees may compensate for their lack of formal qualifications through a wide range of work-related experience.

Studies of career progression, particularly by sociologists, have tended to emphasise the differences between "spiralists" and "locals". Those classed as "spiralists" provide evidence that

"managerial effectiveness is based upon mobility",¹⁷ they are managers or potential managers who through spatial mobility are able to achieve increase in social status and career progression. The main features of their life style are subordinated to their career development.¹⁸ The term "locals" is applied to employees who seek to remain within their "home area"¹⁹ when exercising both their employment and residential choices. Such activities may be identified in relation to Wales Gas office employees : there is evidence that those of higher grade are more likely to change post than those at lower levels, and that these are usually professional and/or skilled management personnel. This is partly a result of higher work commitment and greater importance placed upon the value of work amongst members of higher skill and socio-economic status groups.²⁰ Likewise, amongst many clerical staff, particularly the older members, there is evidence of a reluctance to move away from the established home area, although residential relocation may occur within this area, and employment continues to be sought at the nearest suitable office site within the Wales Gas structure.

Residential Movements

More than half the office employees sampled have never moved during their period of employment with Wales Gas, leaving 42.6 per cent who have had one or more previous residential locations (Table 10.3). This permits the examination of employee characteristics which encourage residential relocation and those which discourage it.

Studies of decentralisation processes have frequently concentrated upon the characteristics of those employees who participate in the move, and thereby have highlighted the importance of changes in work location upon changes in residential location, but also have highlighted the characteristics of those employees who are reluctant to move.²¹ The Wales Gas sample data offer the opportunity to examine the effects of such

TABLE 10.3
NUMBER OF RESIDENCES RECORDED FOR THE
PERSONNEL SAMPLE, WALES GAS

No. of residences	Employees		Cumulative Frequency
	No.	%	
1	187	57.4	326
2	111	34.1	139
3	24	7.4	28
4	4	1.2	4

SOURCE: Regional personnel records.

TABLE 10.4
DISTANCES MOVED BETWEEN SUCCESSIVE RESIDENCES
BY WALES GAS SAMPLE PERSONNEL WHO HAVE HELD
PREVIOUS POSITIONS

Distance in kilometres	Last position		No. of employees
	Internal	External	
0 < 1*	120	3	123
1 < 5	7	24	31
5 < 10	26	15	41
10 < 15	10	5	15
15 < 20	9	9	18
20 < 25	6	2	8
25 < 30	1	1	2
30 < 40	5	1	6
40 < 50	5	1	6
50+	9	9	18
Totals	198	70	268

SOURCE: Regional personnel records - derived.

* Includes those who have not changed residence.

characteristics upon movements, some of which have been enforced, as under the Reorganisation programme, and some of which have been undertaken voluntarily, usually in order to increase status and remuneration.

Amongst the 268 employees in the sample who have held previous posts, as many as 45.9 per cent have not changed residence or have moved less than one kilometre. Of those who have changed residence, 57.5 per cent have moved less than 5 Km and only 17.2 per cent have moved more than 20 Km. However, a distinction is evident between those whose previous positions were within Wales Gas and those who worked for another employer (Table 10.4). In total, 198 employees have held previous posts with Wales Gas, and 60.6 per cent of these have not changed residence or have moved less than one kilometre : that is, they have remained within a closely defined "home area". Of the 70 employees previously employed outside the Industry only 4.3 per cent have not changed residence or have moved less than one kilometre; 38.6 per cent have moved less than 5 Km contrasted with 64.1 per cent of previous Wales Gas employees. Thus, even with a somewhat wider (5 Km) definition of home area, continuing Wales Gas employees are shown to be more immobile. Similarly, the proportions moving a significantly long distance (that is, more than 50 Km) were only 4.6 per cent of previous Wales Gas employees, of whom 22.2 per cent moved more than 100 Km, while of those previously employed outside the Region 20.0 per cent moved more than 50 Km, 88.9 per cent of whom moved more than 100 Km.

It would appear that by remaining within the employ of Wales Gas employees are not likely to be forced to move considerable distances, and they are much less likely to do so than persons not previously employed by the Region. However those successful employees who achieve increase in status by obtaining employment elsewhere

within British Gas are required to relocate both residential and work sites sometimes over considerable distances, of course.²²

Length of Residence

The period of time spent at each residential location may be calculated for those addresses where the date of notification for change of residence is available. The sample contains 139 such notifications, with dates available for 126 of these changes (90.6 per cent of all reported incidents). It is from these 126 notifications that calculation of the length of residence at each home address has been possible (Table 10.5). Obviously, the data cannot fully indicate the length of time non-movers have remained at their residences, these non-movers forming 57.4 per cent of the sample. More than half the movers (54.7 per cent) have remained at each residence for less than 3 years, whilst more than three-quarters (75.3 per cent) have remained at each residence for less than 6 years. Only 4.0 per cent have moved after residing for more than 10 years at a previous location. It is apparent that, as length of residence increases, the propensity to move decreases, confirming the results of other studies concerned with length of residence and neighbourhood ties.²³

Changes in Employment

The frequency of changing employment position is apparently much greater than that of residence : only 17.8 per cent are in their first employment (Table 10.6). Yet two considerations must be noted in this comparison. Firstly, the employment data include previous positions held outside the Industry, while the total number of residences occupied refers only to those occupied when in the employ of British Gas (with the addition of residences occupied immediately prior to taking up first employment with the Industry where change

TABLE 10.5

LENGTH OF RESIDENCE AT EACH ADDRESS FOR THE
PERSONNEL SAMPLE WHILST IN THE EMPLOY OF
WALES GAS

Length of residence (years)	No. remaining for length of time before:			
	First move	Second move	Third move	All moves
1	22	4	1	27
2	23	4	-	27
3	11	3	-	15
4	13	-	1	14
5	11	1	1	12
6	2	3	-	3
7	6	2	1	10
8	4	-	-	6
9	2	-	-	2
10	2	-	-	2
11	1	-	-	1
12	-	-	-	-
13	-	-	-	-
14	1	-	-	1
15	1	-	-	1
16	-	-	-	-
17	1	-	-	1
22	1	-	-	1
Unknown	10	1	-	11
Totals	108	18	4	130

SOURCE: Regional personnel records.

TABLE 10.6

NUMBER OF POSITIONS HELD BY THE PERSONNEL SAMPLE, WALES
GAS

No. of positions	Employees		
	No.	%	cum. total
1	58	17.8	326
2	113	34.7	268
3	65	19.9	155
4	90	27.6	90

SOURCE: Regional personnel records.

in residence occurred approximately simultaneously). Secondly, many changes in job title (that is, a positional change) incur no relocation, for the post may be taken up at the same office site. Employment changes which require a change in work site obviously require greater commitment from the employee, since the impact of such change extends beyond the hours worked, certainly through altering the journey to work and possibly by necessitating a residential relocation. Nonetheless, any change of employment which increases work status and remuneration is likely to influence life style, and may facilitate (though not require) a residential relocation, and encourage changes in mode of travel such as a change from public to private transport.²⁴

Changes in Work Level/Grade

It is to be expected that most employees will have improved, or at least sustained, their work level through successive positional changes. The data offers evidence suggesting that sustained levels are associated with married female employment and improvement in work level with male employment. This pattern verifies the general view that women tend to perform clerical tasks which are "less interesting, less prestigious, and bring lower remuneration" and that these are "carried out by women with reduced aspirations."²⁵

A simple examination of the numbers at each work level for each successive post reveals the general pattern (Table 10.7a). The percentage occupying positions at officer level or above generally increases, from 8.2 per cent at Job D, through 10.2 per cent at Job C and 12.0 per cent at Job B to 20.8 per cent of the present posts. At the same time, the percentages at the lowest clerical level generally declines. Exceptions to this trend, marked at Job C in particular, may be explained by those entering British Gas for the first

TABLE 10.7
CHANGES IN WORK LEVEL AND EMPLOYMENT TYPE BY THE
PERSONNEL SAMPLE, WALES GAS

	Job A		Job B		Job C		Job D	
	No.	%	No.	%	No.	%	No.	%
^a Work level								
Regional	3	0.9	0	-	0	-	0	-
Higher Management Officers	21	6.4	3	1.2	4	2.9	1	1.4
Supervisory	44	13.5	27	10.8	10	7.3	5	6.8
Senior Clerical	64	19.6	42	16.7	28	20.3	12	16.2
Clerical	54	16.6	54	21.5	30	21.7	18	24.3
Unknown/manual	140	42.9	125	49.8	66	47.8	38	51.3
	0		17		17		16	
^b Employment type								
Managerial	40	12.3	16	6.4	10	7.2	3	4.1
Technical	50	15.4	52	20.7	28	20.3	14	18.9
Supervisory	41	12.6	16	6.4	9	6.5	5	6.8
Clerical	195	59.7	167	66.5	91	65.9	52	70.3
Unknown/manual	0		17		17		16	

SOURCE: Regional personnel records.

Frequencies are adjusted. Time sequence for positions held varies for each employee.

TABLE 10.8
COMPARISON BETWEEN WORK LEVELS ATTAINED AND QUALIFICATIONS
HELD BY THE PERSONNEL SAMPLE, WALES GAS

Work level	School	No. with qualification			% of level with qualification
		External	Any		
Regional	1	2	2	66.7	
Higher Management Officers	5	3	6	28.6	
Supervisory	15	9	18	49.9	
Senior Clerical	15	5	10	15.6	
Clerical	5	6	10	18.5	
	5	7	9	6.4	
Totals	46	32	55	16.9	

SOURCE: Regional personnel records.

time from alternative employment, initially at a lower level to that held outside, but subsequent positional changes following some experience with British Gas tend to rectify these superficially retrograde moves, to the benefit of the employee (these usually have occurred amongst those in the sample, hence the focus of this anomaly at Job C).

The distinction held between work level and employment type is exemplified through an examination of the changes in employment type with successive positions. Divisions of employees by type of work performed does not give a progressive scale : nevertheless, there is evidence of a decrease in the number of clerical employees almost equalled by the coincident increase in supervisory and managerial personnel, whilst some technical personnel have become managerial (Table 10.7b).

Educational Features : School Location as an Indicator of Home Area; and the Possession of Formal Qualifications.

The identification of the last school attended may be used in locational terms as an indicator of the individual's original "home area": the area with which the individual has been familiar since childhood/adolescence, and with which he might be expected to experience some form of emotional ties, including various friendship and family relationships. Previous studies identify attachment to place as a multi-faceted result of the individual's and household's social involvement and subjective attitudes.²⁶ Empirical results have indicated that the ties which such home areas exert may represent a barrier to movement, whether of residence or work location, by delineating the employment search area.²⁷ Amongst those for whom attachment to place is strong these encourage movement inertia.

Data relating to qualifications were collected as the exact qualifications obtained, as declared in the personnel records. However, so few of the sample proved to possess recognised formal qualifications that the only breakdown given is into those qualifications most likely to have been obtained whilst in full-time education (for example, 'O' levels, and C.S.E.'s) referred to as 'school' qualifications, and those 'other' qualifications generally obtained after this period (H.N.C.'s, O.N.D.'s and various engineering qualifications for example), although it is acknowledged that these too often require full-time course attendance. In the sample fifty-five employees have some form of qualification (16.9 per cent); forty-six have 'school' qualifications (14.1 per cent) and thirty-two have 'other' qualifications (9.8 per cent).

Previous work, such as that of Clements, Clark, and the Institute of Directors, has indicated the growing importance of qualifications in the career progression of managers. Thus in a study of a sample of managers working in public and private enterprises in the greater Manchester conurbation, including the CEGB North West Division and North Western Gas, Clark found that although over a quarter of managers began their careers in a clerical capacity, more than a third were university graduates, and that amongst younger graduates this latter proportion is even higher.²⁸ These results led him to conclude that:

There is no doubt that the greatest change among managers has been in relation to their education. Comparison with other earlier studies and between the younger and older managers show a great change in educational backgrounds.²⁹

This has the additional implication that the proportion of managers beginning their careers in technical and scientific fields is increasing.³⁰

With the expectation that the possession of qualifications increases the likelihood of an employee attaining a higher work level, these variables may be cross-tabulated (Table 10.8). Such comparison does reveal that those employees at Regional management level are most often qualified (66.7 per cent have some form of qualification), whilst those at clerical level have the least incidence of formal qualifications possession (only 9.8 per cent). Thus qualifications would appear to have a significant effect upon promotion prospects for office employees : notably only 6.4 per cent of those at the lowest clerical level have any qualifications, compared with 18.5 per cent of senior clerical staff. Calculation of the Spearman rank correlation co-efficient between the numbers at each descending work level and the numbers holding one or more qualifications gives statistical support to these conclusions, as it indicates a substantial negative association ($r_s = -0.44$).

The Present Residence-Work Distance

The overall pattern of residence-work distances displayed by the sample are not identical with that of the Region as a whole (Table 10.9a), such that the average distance displayed by females in the sample is greater than that of males, an outcome of the large mean distance calculated for married females, and the low average distance for males in comparison with the Region as a whole. The median distances for both males and females are very similar between the Region and the sample however, suggesting that, though the journey to work patterns displayed in the sample are generally representative, relatively long residence-work distances are over-represented amongst married females, and under-represented amongst males. Nonetheless, it remains clear that a higher proportion of female employees reside within a short distance of their place of work in comparison with male

TABLE 10.9

PATTERN OF AVERAGE RESIDENCE-WORK DISTANCES
FOR THE PERSONNEL SAMPLE AND TOTAL OFFICE
WORKFORCE OF WALES GAS

	^a Mean		Median		Mode	
	Sample	Wales Gas	Sample	Wales Gas	Sample	Wales Gas
All Employees	11.2	12.0	6.4		2.2	
Males	10.7	13.4	7.2	7.1	10.7	0.5
Females	12.0	10.0	5.6	5.6	2.2	
Married females	11.6	8.8	5.8		2.2	2.2
Single females	13.1	13.0	5.4		3.2	6.5
Higher Management	12.7		11.0		2.2	
Senior Officers	14.8		7.7		3.2	
Staff	8.8		5.6		2.2	

SOURCES: Regional personnel records and PMIS data - derived.

TABLE 10.10

POTENTIAL OFFICE EMPLOYEE CATCHMENT AREA FOR
VARIOUS RECOGNISED SUB-GROUPS, DEFINED FROM
THE PERSONNEL SAMPLE DATA, WALES GAS

	Distance in Kilometres
All office employees	13.3
Males	15.2
Females	10.4
Married females	10.4
Single females	7.2
Higher Management	18.7
Senior Officers	17.1
Staff	10.8

SOURCE: Regional personnel records - derived.

employees.

Previous studies concerned with the journey to work indicate conflicting results on the influence of marriage on the journey to work distance. Thus Thompson found that the average commuting distance is "substantially larger" for males than females, a generally accepted phenomenon (and true of Wales Gas employees) and also found that married workers tend to commute longer distances than those who are single. But Rankin found no significant difference in the trip lengths of married and single employees in a survey of Nottingham-based employees.³¹ Explanation for these differences probably lies in the male : female ratios, since the influence of sex upon journey to work distances is considerably greater than that of marital status, and the influence of marital status itself is greater upon females than males.

Also susceptible to differing residence-work distances is employee work level. The pattern of distances for the three main grades displays the longer distances undertaken by certain members of Higher Management (Table 10.9b), for this group has the largest median distance, but the same modal distance as that of Staff. More notable is the large mean distance displayed by Senior Officers, which combined with a relatively long modal distance suggests that as a group Senior Officers tend not to reside very long distances from their workplace, unlike some members of Higher Management. Neither do they reside very close to their workplace, unlike the majority of staff and many other members of Higher Management.³²

The residence-work distances for each individual may be combined to suggest generally acceptable limits to this residence-work distance. Assuming that some employees will be prepared to travel

distances which are unacceptable to the majority of employers, it would be unreasonable to suggest that the natural labour catchment area for an office is defined by the distribution of residences of individuals employed therein. Replacement personnel at established office sites tend to travel shorter distances to work than those subject to initial relocation at the 'new' office, hence the average journey to work distance is expected to decline during the period of original workforce turnover. Daniels, for example, in his follow-up study of office relocation in Greater London found that; "The increase in the proportion of local recruits...clearly reduced the extent of the catchment areas at most suburban locations."³³ Consequently, the journey to work acceptability distance for the purpose of defining normal potential catchment area has been defined as that radial distance from the work site which embraces 75 per cent of the present workforce residences. Using the sample data these give an overall acceptable distance of 13.3 Km. However, comparisons of the different work force sub-groups reveal, as expected, a different potential catchment area for each sub-group (Table 10.10). Thus male employees will travel further than females; Higher Management and Senior Officers considerably further than Staff.

Individual Case Histories Drawn From The
Wales Gas Personnel Sample

The Purpose And Methodology Of
Selected Case History Presentation

One of the problems arising from general analyses is that the presentation of averages tends to obscure small but important irregularities in the data. These are worthy of greater attention. The purpose of this section is to identify and examine sub-groups which contribute to the general pattern. In order to distract as little

as possible from the fact that these are individuals under discussion, but at the same time to preserve individuals' anonymity, each office employee referred to in this section has been given a pseudonym in addition to the case number by which he or she is identified within the data set.

The accounts below illustrate in both spatial and temporal terms inter-relationships between residential movements, job changes, and job relocations. In addition, some of these personnel histories are illustrated diagrammatically and the various journey paths expressed as straight-line distances. Where possible, the location of the last school attended is shown as a probable focal point of the employee's initial "home area". Emphasis has been given to those who display the essential features of the various sub-groups recognised within the data set, most particularly those who display considerable residential and/or employment mobility.

Characteristics Of Technical Employees

Technical personnel are generally male, are the most likely group to have relevant qualifications, and sometimes have outside experience in a related field. Also, they frequently have acquired managerial positions at later stages in their careers, which is again often dependent upon their qualifications. The majority of Wales Gas technical employees are engineers. Amongst the older employees this is partly a result of redeployment following the organisational and structural changes in the Industry associated with the adoption of natural gas. Although engineering skills remain a basic requirement of the Industry, the large numbers of practical engineers required in gas manufacture have been redeployed as management and many of the engineering skills now required are technical rather than practical.

One result of this has been the centralisation of engineering personnel in comparison with their work site distribution in the pre-natural gas period.

For example, Mr. Rhys (case no. 0562; Fig. 10.1) is a technical employee at Higher Management level in the Engineering department. A graduate of Glamorgan College of Technology with a college scholarship in chemical engineering, this facilitated his initial appointment as a technical assistant with Wales Gas in December 1966. From this position he has progressed in status within the Engineering function. His length of service in each post has progressively increased, such that he remained 6 months in his first post, 4 years 7 months in his second, and 8 years 3 months in his third. He has occupied his present post since April 1979. Until obtaining this post he was employed at Grangetown, but now works within his home area, where he has occupied two residences. Aged 36 years, the employment record of Mr. Rhys suggests that he will be in his mid-forties before gaining further promotion. If a new post is to give him appreciable advancement, financially and in status, it will necessitate a move to Regional Headquarters or possibly a return to an Area office.

Mr. Evans (case no. 0248) is also a technical member of management in the Engineering department, an assistant distribution engineer. He is older (40 years), gaining his experience within the Wales Gas Engineering function, firstly in the Grangetown office, and latterly at Llandarcy. This represents a return to a familiar area, for he attended Swansea Technical College where he gained a National Certificate in mechanical engineering. His latest appointment, which necessitated a change in work location, was combined with a change in residence.

LEGEND - Fig. 10.1 et seq.

□ LOCATION OF WORK SITE

△ LOCATION OF RESIDENCE

+ LOCATION OF LAST SCHOOL ATTENDED

RA PRESENT RESIDENTIAL LOCATION

RB FIRST PREVIOUS RESIDENTIAL LOCATION

RC SECOND PREVIOUS RESIDENTIAL LOCATION

WA PRESENT WORK SITE

WB FIRST PREVIOUS WORK SITE

WC SECOND PREVIOUS WORK SITE

— PRESENT STRAIGHT-LINE JOURNEY TO WORK

-- PREVIOUS STRAIGHT-LINE JOURNEY TO WORK

2/4 LENGTH OF TIME JOURNEY UNDERTAKEN
- YEARS/MONTHS

0562

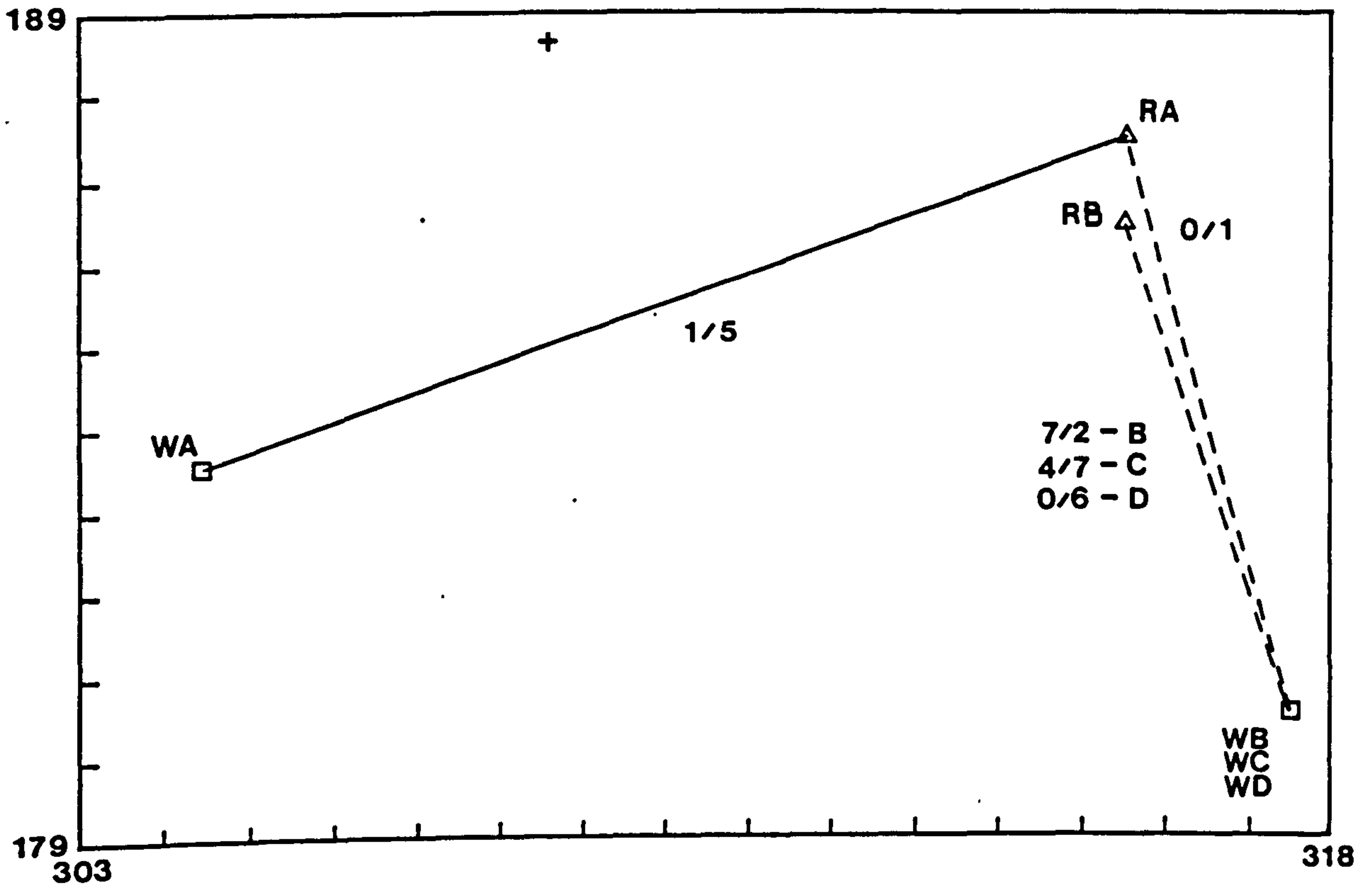


Fig. 10.1 Office Employee Residence-Work Patterns : Case No. 0562

2100

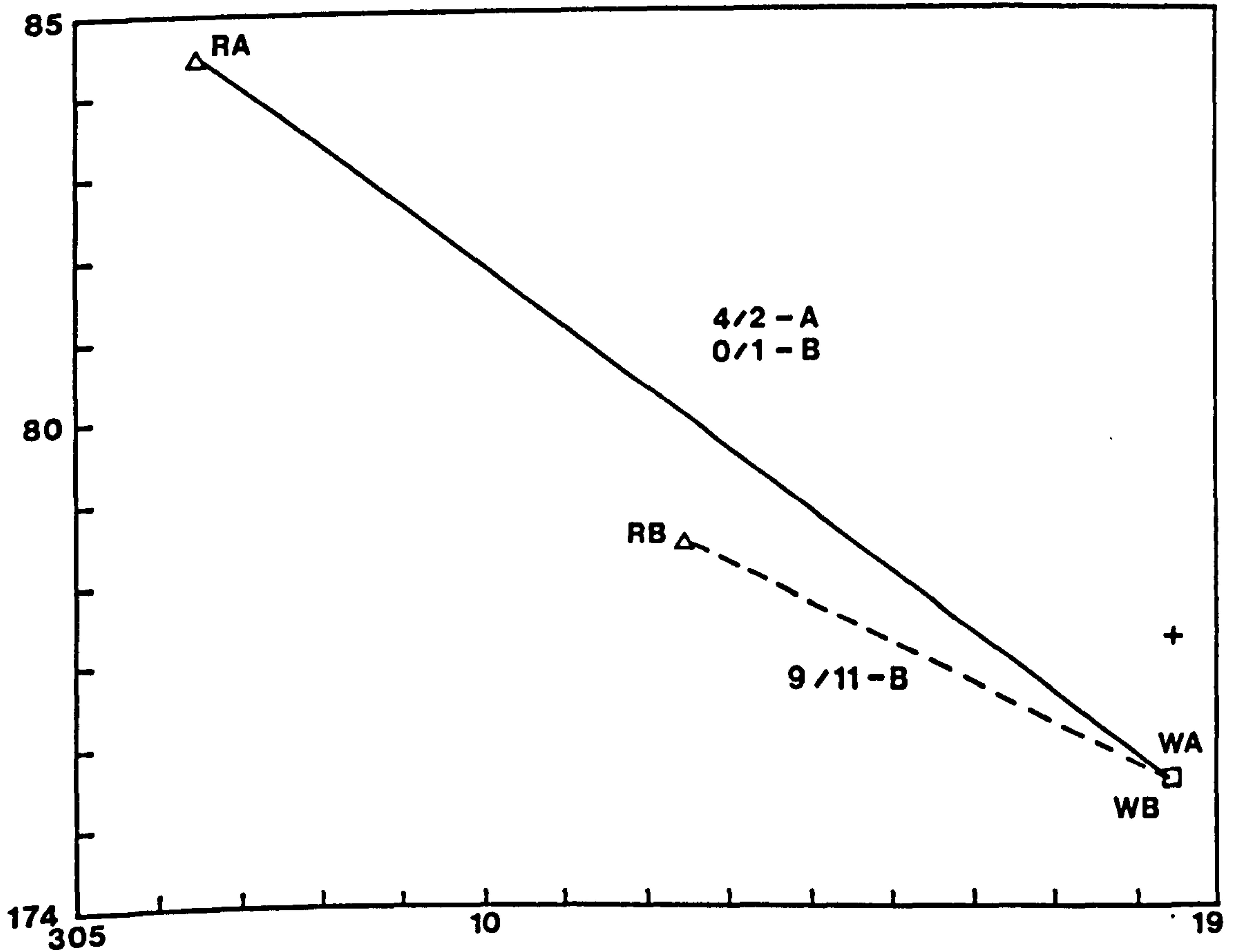


Fig. 10.2 Office Employee Residence-Work Patterns : Case No. 2100

Unless any future positional changes require a return to Cardiff, possibly to Regional Headquarters, Mr. Evans is likely to obtain further advancement within the same Area office : advantages of this type accrue to all personnel whose home area coincides with a major office location.

Long Distance Relocation : Employees

From Other Gas Regions

Inter-Regional movement of British Gas employees is predominantly associated with males who relocate in order to improve their work status. However, sometimes this type of work relocation is combined with a return to the individual's home area, most noticeably amongst men of middle age, who are presumably fulfilling a desire to return to (and possibly anticipate retirement in) this area.

Thus Mr. Henry (case no. 2239), a construction engineer with Wales Gas, was employed originally by North East Gas at Hartlepool, from June 1949 to August 1950. Hartlepool was apparently his home area, where he attended grammar school. Since joining Wales Gas he has worked continuously at the Bute Terrace Headquarters site. As a member of the technical personnel his qualifications include a H.N.C. and Certificate of Engineering. His previous position was an assistant engineer with the Region, from June 1955 to July 1969, and before that, from August 1950, a draughtsman within the Engineering department. Following his move to South Wales, and until September 1958, Mr. Henry lived in an area of Cardiff associated with short term residence and private rented accommodation. Since then he has resided in a better quality housing area of Cardiff.

Although originating from Birmingham, Mr. Wright (case no. 2546) obtained first employment in London when 21 years of age. He

first entered the employ of British Gas in West Midlands Region, thereby returning to his home area 5 years later, and where for nearly 10 years (until June 1969) he was employed as a publicity officer. He then transferred to Wales Gas, and within 2 years has gained promotion to his present post of marketing services manager at Regional Headquarters, assisted in this by a relevant qualification from the Institute of Marketing.

Mr. Green (case no. 1393) is a member of the supervisory personnel within the Sales department (a group sales officer). He initially entered the Industry in August 1970 when he joined North Thames Gas, his local Gas Board, as a salesman. His move to Wales, and a similar post within Wales Gas, occurred in June 1975. Some 3 years later (October 1978) he was promoted to his present position. His inter-Regional movement certainly increased the likelihood of this promotion, but other unidentified life cycle factors are likely to have influenced his decision to move to Wales when aged 31 years.

Long Distance Relocation : Initial
Recruitment To Wales Gas From
Alternative Employment

Employees who may be described thus are not very common within the Region, a situation which may be at least partially explained by its relatively small size in relation to other British Gas Regions : higher status personnel are more likely to be attracted to the Industry by posts available at British Gas Headquarters or one of the larger Regions. These offer better prospects of promotion and are within easy reach of the 'home areas' of many more people, in addition to offering better rates of remuneration (largely as a result of greater areas of responsibility). Also discouraging long distance relocation from outside British Gas is the tendency for long service: many of

the senior positions are destined to be filled by promotion from within.

Nevertheless, a small number of such employees may be identified within the Regional office workforce, for example Mr. Smith (case no. 1095) came from outside the Principality, but has had close contacts with the Region, having been educated at Bristol College of Advanced Technology where he obtained a H.N.D. Now 48 years of age, he did not join Wales Gas until December 1962, at the age of 31 years.³⁴ His first position was as a technical assistant at Regional Headquarters, but he then moved out into the Areas to gain experience, firstly at Newport where he became an assistant group engineer in August 1967, in what became East Area, and latterly at Llandarcy, West Area, where from September 1972 to June 1975 he was employed as assistant Area distribution engineer, then being promoted to Area distribution engineer.

Obviously, some personnel undertake a change in employer resulting in relocation in Wales for similar reasons as employees from other Gas Regions, namely to obtain advancement and/or to return to their home area. For example, Mr. Phillips (case no. 1022) was employed in Southampton as a cartographic draughtsman by Ordnance Survey from October 1968 to December 1972, but his home area is Carmarthen. In January 1973 he took up employment with Wales Gas, being appointed as mains record assistant at Swansea. This position was at the nearest employment location to his home area within British Gas requiring his cartographic skills. This appears to be a fairly clear example of a return to the employee's home area with a view towards settling down prior to retirement, for Mr. Phillips is aged 57 years.

The Influence Of The Individual's WorkLevel : Higher Management

Members of Higher Management are again usually male and tend to have some form of recognised qualification, although this is not necessarily management-related. They often have considerable experience within the Gas Industry. However, a frequent key to success in addition to the possession of formal qualifications has been a willingness to move within the Region in order to obtain a wide degree of job experience.

Thus Mr. Williams (case no. 1037), having advanced within Wales Gas in his home area of South West Wales, finally found it necessary at the age of 41 years to move from the West Area Llandarcy office to East Area to obtain advancement into Higher Management. He first joined Wales Gas as a clerk in Carmarthen at the age of 22 years. Initially qualified to 'O' level standard, with additional City and Guilds qualifications, he succeeded in reaching a Senior Officer position in 1971 when he moved to the Swansea office as a customer service officer, having been employed from January 1966 to January 1971 as a clerk at Llanelli. His final move to date occurred in October 1979 when he was appointed customer service manager at Crindau. Each of these changes in work location has necessitated change in residence, demonstrating the occurrence of personnel moving away from their home areas in order to attain increases in work status.

Mr. Davies (case no. 2100; Fig. 10.2) is a member of Regional Headquarters management attached to the computer department. His qualifications for this post include a H.N.C. and previous employment as a computer operator for Wales Gas for 10 years, from February 1965 to February 1975. Although his home area is central Cardiff, for he attended Cathays High School, not far from his present work

location, Snelling House (and also attended the Polytechnic of Wales), his residence has moved progressively away from Cardiff centre. Such outward movement from the urban core is frequently associated with increasing work status and affluence, thus creating a longer journey to work compensated by a perceived improvement in residential environment.³⁵ Since he is only 31 years of age, future changes in employment are highly probable, with perhaps a move to one of the Area offices in order to gain wider experience.

Former Manual Employees

A number of the present office workforce are former manual employees, more often within than outside the Industry. Those within the Industry either have been promoted to clerical, technical or supervisory positions, or initially attained this status through a reassignment of their posts from manual to Staff.³⁶ Since male white-collar workers generally are expected to have longer average journey to work distances than manual workers (Johnston for example noted that the observed clustering of homes about place of employment "is particularly true of most blue-collar and poorly paid workers, and also of female employees"³⁷), then evidence of this is to be expected amongst Wales Gas office employees.

For example, Mr. Griffiths (case no. 0384) has been employed by Wales Gas since November 1967, and although he changed employment in 1970, he remained a member of the manual workforce until September 1974. Following further promotion, he entered his present position in April 1978. He has remained within the same (Distribution Engineering) department, however, and although his journey to work has increased (for his residence-work distance has increased from less than one kilometre to 4.5 Km), he continues to work relatively locally.

Mr. Llewellyn (case no. 0332) joined the Region at Grangetown as a fitter, finishing his apprenticeship in August 1959, and continuing in this capacity until 1972. In April 1978 he began his present post as a supervisor and became an office employee. As not infrequently occurs, an improvement of work status has been followed by residential movement. This has increased his residence-work distance from 1.4 Km to 11.7 Km. Nevertheless, his present residence is only 2.2 Km from his school location : he has remained very much in the locality of his home area.

Mr. Lewis (case no. 0596) has been employed by the Region since 1961, initially as a manual worker at Grangetown. He has since become a specialist engineer within the same (Heating Engineering) department. Mr. Lewis has lived continuously in the same area, from which he travelled 14.0 Km (straight-line distance) to work until 1970, since when he has worked within one kilometre of his residence. It is typical for the journey to work of employees at a minor location to be relatively short, but at 36 years of age he is likely to seek further promotion. To do this he will need to transfer to a larger site; this in turn will necessitate a longer journey to work.

The last employment undertaken by Mr. Rowlands (case no. 1019; Fig. 10.3) prior to joining the Industry was of a manual type, located within Swansea. In January 1975, aged 21, he joined Wales Gas at Llandarcy, again in a manual capacity. In November 1977 he was promoted to his present administrative post and became a member of the clerical labour force, shortly before which, in September, he had moved from Port Tennant, Swansea to Skewen, Neath.

1019

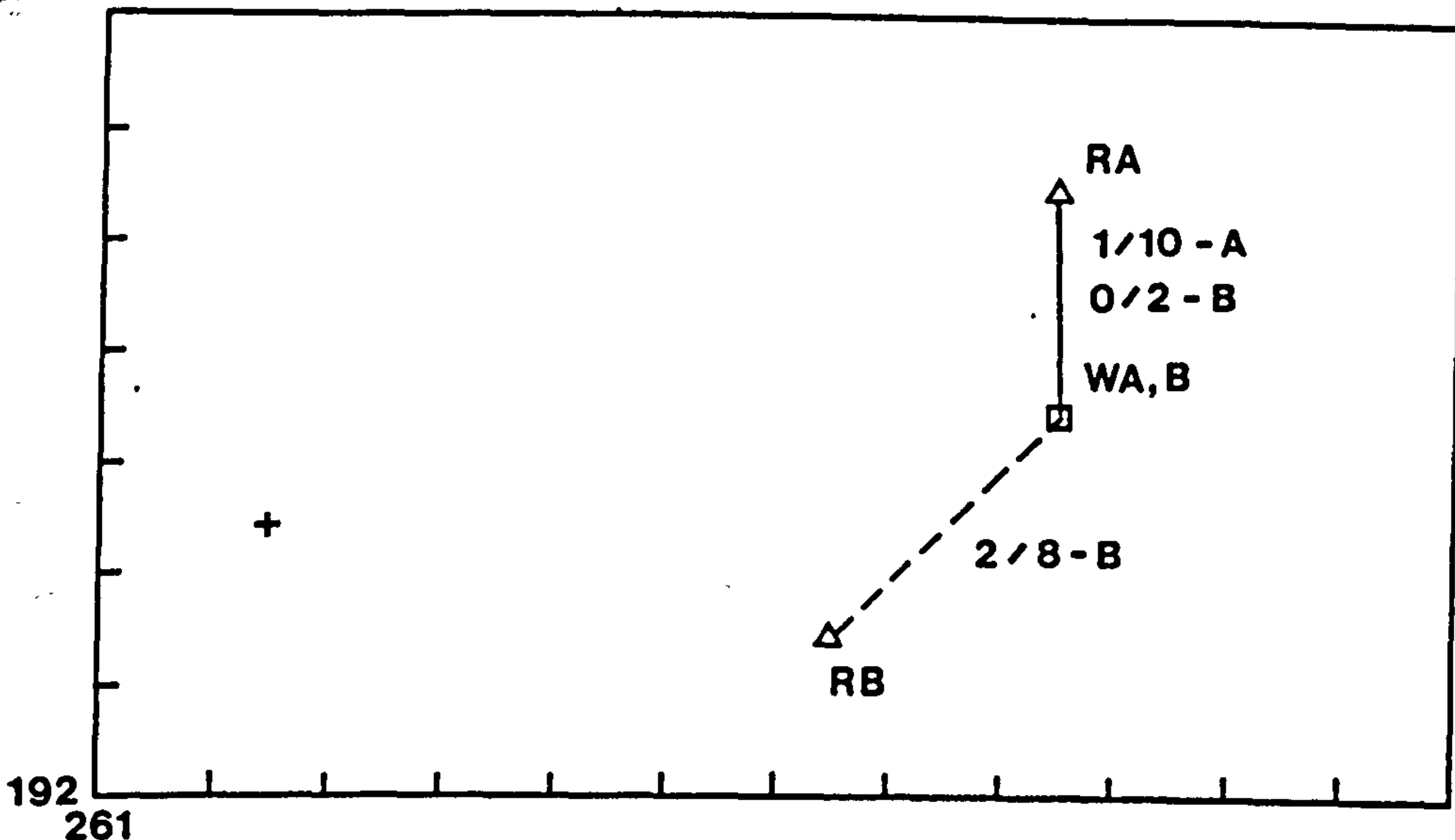


Fig. 10.3 Office Employee Residence-Work Patterns : Case No. 1019

1455

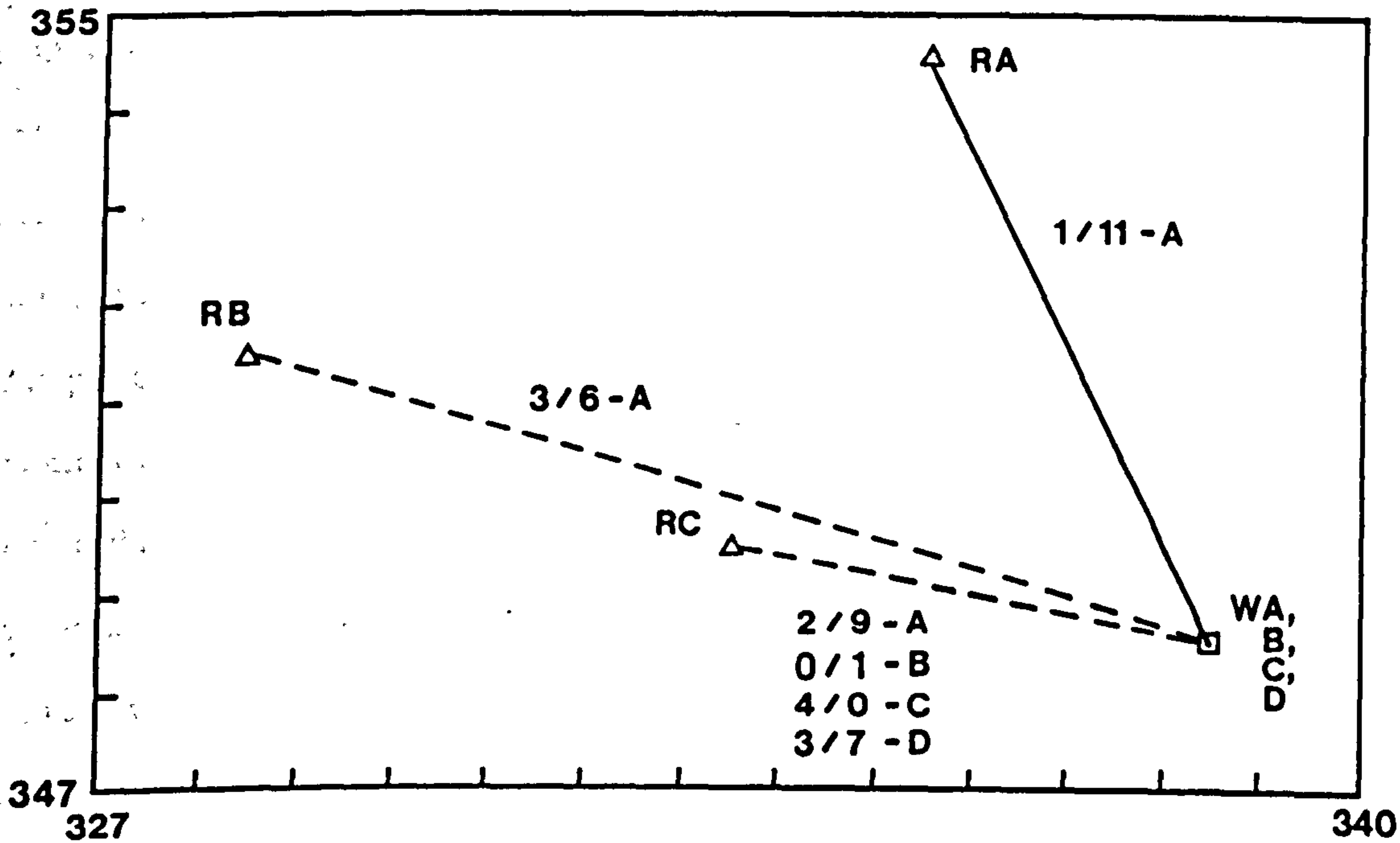


Fig. 10.4 Office Employee Residence-Work Patterns : Case No. 1455

The Influence Of The Individual's
Sex And Marital Status : Married
Women

Most married females employed by British Gas are clerical staff. This is not to suggest that they do not change posts, but that changes in employment often do not involve an increase in work status. In addition, their positional changes are not usually followed by a change in residence. Frequently they have held clerical positions outside the Industry.

The shorter average residence-work distance for married women has been indicated, but the journey to work itself is identified only as a minor factor in the residential location decision, and is amongst the economic factors seen to 'compete' with social factors.³⁸ For married women workers this predetermines their work search area, confined to a relatively short potential journey-to-work arc (especially for those with children) from a residential location chosen with reference to the husband's workplace, and not their own potential employment. Evidence of research conducted in relation to the female workforce suggests that social factors are of considerable importance in their participation in the workforce and that these motivate their residential relocation where they are able to influence such moves. Whereas for male employees it is transportation, particularly the possession of a motor car and the cost-benefits of residential location in relation to the workplace which are more important, described by Richardson as trade-off theory, and Beed as the least-cost theory of residential location.³⁹

Andrews found that variations in married women's activity rates are associated with such social factors as household structure,

number of children (both of pre-school and school age), crèche facility availability, and husband's attitudes, whilst also important are sex differentials in promotional opportunities, remuneration and employment conditions. Intrinsically, attitudes to work amongst most married women (and their husbands) continue to epitomise the ideal of "just a little job", often "just around the corner". The consequence of such attitudes, as shown by Kain in his work in Detroit is that women tend to reside nearer to their work site than men, a phenomenon also identified by Clark and Peters in their study of seventeen London boroughs. Married females tend to have considerably less investment in their employment compared with males, whose work expectations are higher, and for whom the rewards are greater.⁴⁰ The prevalence of such attitudes has been sufficient to affect the opportunities for female employment, particularly that of married women. The Confederation of British Industry, for example, advised employers that:

It is important to bear in mind that the differing occupational patterns of single and married women, and of married women with or without children, provide the key on a practical basis to their very different potentials for employment.⁴¹

Within Wales Gas this has meant that most women are clerical, and women provide almost all the required part-time workforce. Their allegiance to the Industry is often less marked than that of male employees, evidenced by shorter average lengths of service, higher turnover rates and interruptions in their careers when social factors (particularly children, or the husband's career) take precedence.

Thus Mrs. Edwards (case no. 1494) has held two previous posts external to the Industry, from May 1965 to March 1968 as a part-time cashier, and from that date to June 1975 as a full-time telephonist. Her first position with Wales Gas began in June 1975 as a telephone enquiry clerk at Maelor. When working part-time she undertook a

straight-line travel distance of only 3.6 Km, but since being appointed a full-time employee of Wales Gas she travels 8.8 Km. She provides a good example of a female employee who has returned to work after raising a family (she is now aged 48 years) and has become free to work at greater distance from her home.⁴²

In March 1963 Mrs. Williams (case no. 0701) obtained employment in her residential area of Cwmbran. Her previous employment, from March 1953 to December 1960, had been as a G.P.O. telephonist in Newport, her home area as identified by secondary school. After working in Cwmbran for some 5 years, she returned to her former telephonist position in Newport from July 1968 to December 1971, at which time, and aged 34 years, she again ceased to work. She restarted work in October 1975, aged 38 years, when she joined Wales Gas as a telephone clerk at Crindau. Despite moving residence to Abergavenny in December 1978 and thereby considerably increasing her journey to work (from a straight-line distance of 7.0 Km to 25.0 Km), she continues to show a preference for working for Wales Gas (and in her home area), and Crindau continues to be the nearest employment site within the Region for her particular position.

Mrs. Barnes (case no. 1131) is 55 years old, but her records indicate only one previous post, began in 1971, which continued until she took up her first position with Wales Gas in July 1977. In January 1978 she began her present post at Llandarcy as a clerk/typist, for which she is qualified with RSA in shorthand/typing, in addition to her previous work experience. All recorded employment and residence is within her home area. Again she is a married woman who has not followed a career but has entered clerical employment when in middle age.

Similarly Mrs. Jacobs (case no. 1026), aged 44 years, records employment only since May 1969. This first post as an accounts clerk, external to the Industry, continued until March 1971. In January 1973 she joined Wales Gas as a costs clerk at the Morryston Distribution Centre, where she remained until June 1975 when she took up a new post as a clerk in the transport section created at Llandarcy office. This latter move has shortened her journey to work to a similar distance to that travelled for her first employment, but has given no increase in status.

Although evidence has suggested that married women constitute the most 'disposable' portion of the office workforce,⁴³ there is evidence within the personnel data to suggest that efforts are made to offer alternative employment to such employees if, for instance, a change in the husband's employment makes continuation of the wife's employment at her present office site impossible. Mrs. Morgan (case no. 0746) for example was first employed as a library assistant in Cardiff, external to the Industry, but joined Wales Gas at Grangetown in July 1976. However, in November 1977 she changed residence from Grangetown to Newport. In the same month (only 10 days later) she took up employment at the Crindau office, Newport, as a mains records assistant. Typical of many young clerks (she is 25 years old), Mrs. Morgan has C.S.E. and 'O' level qualifications which, in addition to her previous experience, qualify her for her present post. Thus Mrs. Morgan has been able to continue her employment with the Region and to minimise her journey to work. In her first position, outside the Industry, she resided 1.4 Km from her workplace, but by taking up employment with Wales Gas at Grangetown she reduced this to 1.0 Km. Without changing her work location, her change in residence would have required a journey to work of over 22 Km, which she would

have been unlikely to undertake. Transferral to a new position at Crindau created an acceptable residence-work distance of 2.8 Km.

Similarly, Mrs. Hardy (case no. 0020) who is 44 years old has been found alternative employment within the Industry, following her husband's move from north east to south east Wales. From January 1972 to August 1975 she was employed as a clerk at the North Area office and resided some 3.2 Km from work. She now resides in a commuter settlement west of Cardiff, and as a result travels some distance (22.2 Km) to work at Grangetown, which is the nearest Area office to her residence. She was employed here as a clerk from August 1975 to July 1977, subsequently taking up her present position as Area administration assistant in September of that year (a clerical supervisory capacity). This represents a reward for her abilities and justifies not only her re-employment at the only alternative office site, but also her own acceptance of a considerably longer than average journey to work. In addition, Cardiff would appear to be her home area, and it is likely that her husband's move here is an example of return to home area in middle age.

Some married women have remained "faithful" to the Industry following the 1972 Reorganisation in Wales Gas and were prepared to travel increased distances to work. This is illustrated, for example, by Mrs. Clark (case no. 0800), who first worked external to the Industry as a shop assistant, some 4.1 Km from her residence. She remained in this employment for just over 10 years, then joined Wales Gas as a clerk in the Pontypool offices, increasing her residence-work distance to 15.1 Km, but nevertheless taking up this employment at the nearest Wales Gas office. She remained in this position from February 1964 until October 1972 when the Accounts function in which she was employed was transferred to Newport as part of the

Reorganisation programme. She then moved to a similar post in the newly-created East Area office, first at Mill Street and subsequently at Crindau. This increased her residence-work distance to 20.5 Km. Although not reluctant to change residence, for in January 1978 she moved to a new address, this was within one kilometre of her previous residence, and suggests a reluctance to move from her home area. This reluctance is particularly marked since her husband is employed at the same Wales Gas Crindau office : both are prepared to travel more than 20 Km to work and appear equally motivated to remain in the employ of Wales Gas and to reside within their home area.

A similar attachment to home area is displayed by Mrs. Jones (case no. 0802). In 1970 she too was a shop assistant, though in Pontypool, but in May 1970 became a G.P.O. telephonist in Newport. However, she soon changed employment again, and began work at the Newport office of Wales Gas (Mill Street) as a temporary clerk in July 1970. Although she has changed position by moving to a different section in July 1973, she has remained in a clerical capacity. When employed in Pontypool her residence-work distance was only 2.0 Km, but her recruitment by Wales Gas in Newport increased this to 10.2 Km, and her present work location, subsequent to Reorganisation, has only slightly reduced this to 9.5 Km.

It has been noted that married females may change residence in response to changes in their husbands' careers (this might be a higher status resulting from promotion, or a new location of employment), and that such change need not correspond with progress in their own employment. Examples have been given where these moves have been over some distance and efforts have been made by Wales Gas to re-employ those affected elsewhere in the Region. Such influences also occur at the more local scale, and at more frequent intervals.

For example, Mrs. Harvey (case no. 1455; Fig. 10.4) has changed residence twice during her period of employment by Wales Gas, all residences being within the Wrexham area. These changes occurred in April 1974 and October 1977, and cannot be related to changes in her employment, all of which occurred previous to these movements (June 1963 to June 1967: shorthand typist; June 1967 to June 1971: secretary; June 1971 to July 1971: progress clerk; July 1971 to date: finance clerk). Neither are they related to changes in her work location, as since joining Wales Gas in 1963 she has worked at the Wrexham site (although as part of Reorganisation this did involve a move to the Marchwiel site from the old Wrexham undertaking).

The married female workforce also provides the great majority of part-time personnel. Typically, such personnel have a short journey to work pattern. Mrs. Blackwell (case no. 1082) for example joined the part-time staff of West Area offices at the age of 34 in May 1978. Her original post was as part-time filing clerk, but since June 1978 she has worked as a part-time service clerk. She resides close to the Llandarcy office, and was educated locally. Home area and work site are thus coincident. It is likely that she has a young family and she may become a full time employee when her children are older, but with no qualifications and probably few career ambitions it is unlikely that she will ever improve her clerical position.

Mrs. Edwards (case no. 1045), aged 40 years, is employed on a temporary, part-time basis as a telephone enquiry clerk, a task which is particularly suited to part-timers, as the work load is heavily biased to certain periods of the working day. Employed at West Area office, her home area and work site are similarly coincident, with her residence-work distance being only 3.0 Km. Previous to this

she worked on a temporary but full-time basis for 6 months, from April 1977 to October 1977 as a radio clerk, also at Llandary.

The Influence Of The Individual's

Sex And Marital Status : Single

Women

Single female employees tend to fall into two main groups. The first consists of young women in their first employment and are almost all clerical staff, some of whom may be classed as trainees. The second group are older single women who often have considerable experience within the Industry, but nevertheless tend to have been relatively immobile, both spatially and in terms of work status, in comparison with male office employees.

As an illustration of the first group, Miss Haylin (case no. 0950) at 22 years of age is in her first post with Wales Gas, began in July 1978. It is likely that she resides at her parental home, as her residence is within her home area and only 3.0 Km from her work site. Clearly employed at the nearest Wales Gas clerical site to her home, this is a minor location where she is unable to obtain promotion. Both her previous positions, which each lasted for some 2 years (from August 1974 to December 1976 and from December 1976 to July 1978) have been as a shop assistant. In order to obtain further experience and possible increase in work status it will be necessary for her to move to one of the Area office sites, the nearest being Crindau, which would increase her residence-work distance to 13.2 Km, assuming no change in residence.

A single female employee of the second group, Miss Faraday (case no. 1887), aged 52 years, joined the Industry in July 1945 as a clerk for the former Cardiff Gas Light and Coke Company. Following

the creation of Wales Gas Board she became a shorthand typist/secretary. Since April 1970 she has worked as a secretary within the Chairman's department. Her 33 years of employment appear to have been spent entirely at the Bute Terrace site⁴⁴ and she has reached the acme of her chosen career. Throughout this time she has remained at the same residence in Penarth, the area where she attended Penarth County Grammar, and has had a constant residence-work distance of 4.1 Km. She was formally educated to 'O' level standard and has RSA qualifications.

Miss Peters (case no. 2278) is very much an exception. She is one of the few women who have succeeded in following a successful career within British Gas. Aged 44 years and single, she is also one of the very few women to have obtained technical status within Wales Gas, having been employed as a network engineer since January 1976. Now employed as a member of Higher Management, she has advanced to this status from an early clerical position, joining the Board in January 1954 at the age of 19 years as a showroom assistant. Previous to this she had only 5 months employment outside the Industry as a clerk. She became part of the network analysis team at the end of 1969, 15 years after joining Wales Gas. Her qualifications, both City and Guilds and degree level, have been gained whilst in the employ of Wales Gas. Miss Peters pursued her school education in Cardiff, but now resides in a commuter residential area to the west of the city.

"Professional" Employees

Although there are exceptions, as demonstrated above, most specialists or "careerists" are male employees. In the Gas Industry the most notable are the engineers. Some examples of these have been given, but to these may be added the employment history of Mr. James

(case no. 0737; Fig. 10.5). Aged 44 years, he is employed at East Area office as an assistant engineer. He began his career in nationalised fuel industries with the CEGB in October 1964, where he remained until taking up employment with Wales Gas at Newport in May 1968. Beginning as a mains records assistant, with the advantage of City and Guilds qualifications he became a draughtsman for the Region in July 1974, and gained promotion to his present post in March 1978. During his employment with the Region he has moved only once, in January 1973. This was over a distance of 3.2. Km, increasing his residence- work distance only slightly, from 1.0 Km to 2.2. Km, but is nevertheless an example of the outward movement associated with increasing status.

In addition to engineers, the Region also employs other 'professionals', such as Mr. Frank (case no. 1950; Fig. 10.6) who is a senior assistant solicitor. He has remained near his home area, educated at Porth, and resident in Penarth. He held previous positions external to the Industry as a member of two firms of solicitors in Cardiff situated near to Bute Terrace in the city centre and gaining appointment as an assistant solicitor with Wales Gas in May 1971. He obtained promotion to his present position in October 1972, possibly as a consequence of Regional Reorganisation.

Other 'professional' personnel are located in the audit section of the Finance department. Mr. Collins (case no. 2402) has school qualifications to 'O' level, but later obtained accountancy qualifications via employment with accounting firms, first in Cardiff, his home area, and later in Newport. He joined Wales Gas in April 1959 at the age of 34 years and has advanced within the Finance department to the position of assistant audit manager, gained in April 1977. Exactly a year prior to this he moved residence, but remained in the Newport area. This continues despite his employment at Regional

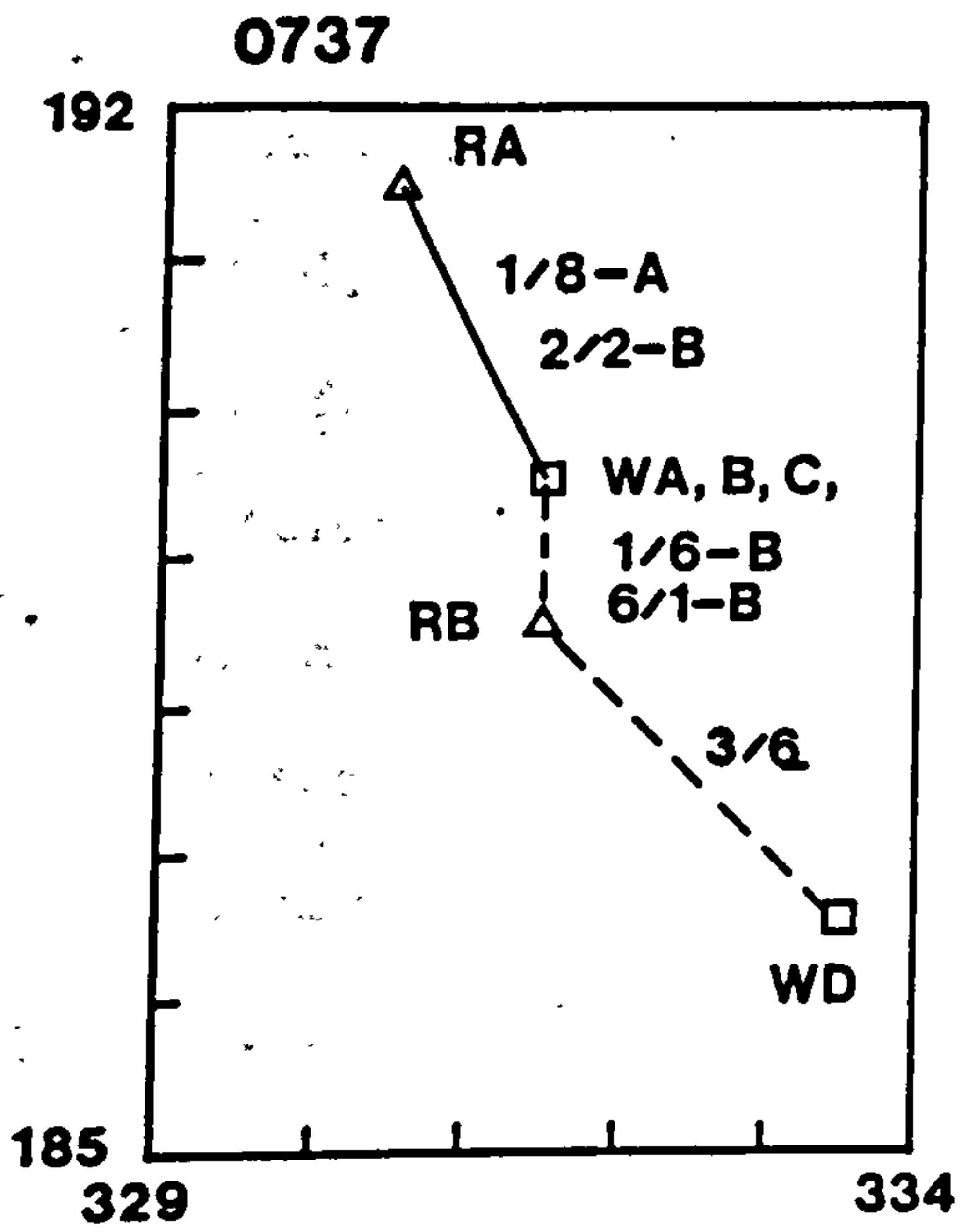


Fig. 10.5 Office Employee Residence-Work Patterns : Case No. 0737

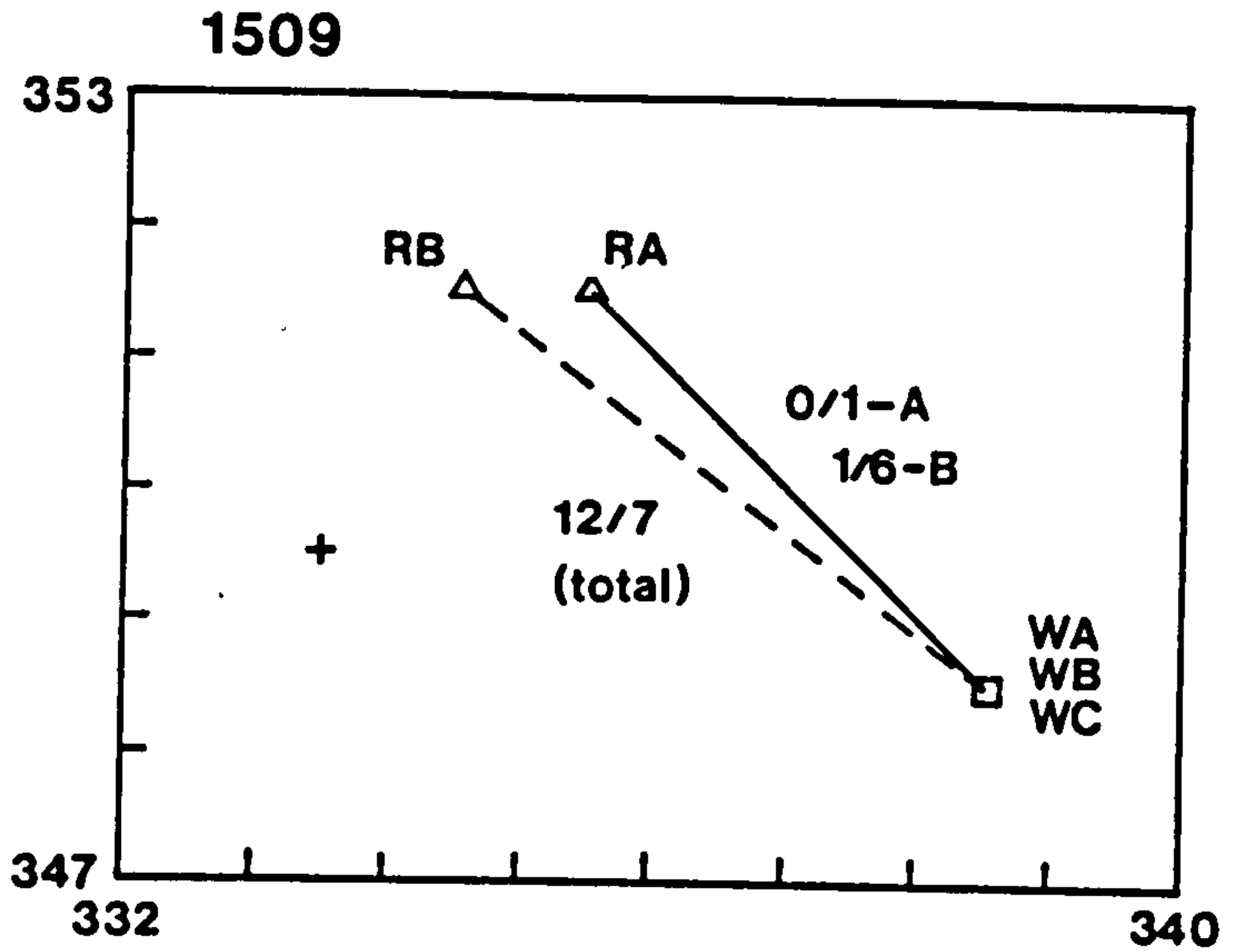


Fig. 10.7 Office Employee Residence-Work Patterns : Case No. 1509

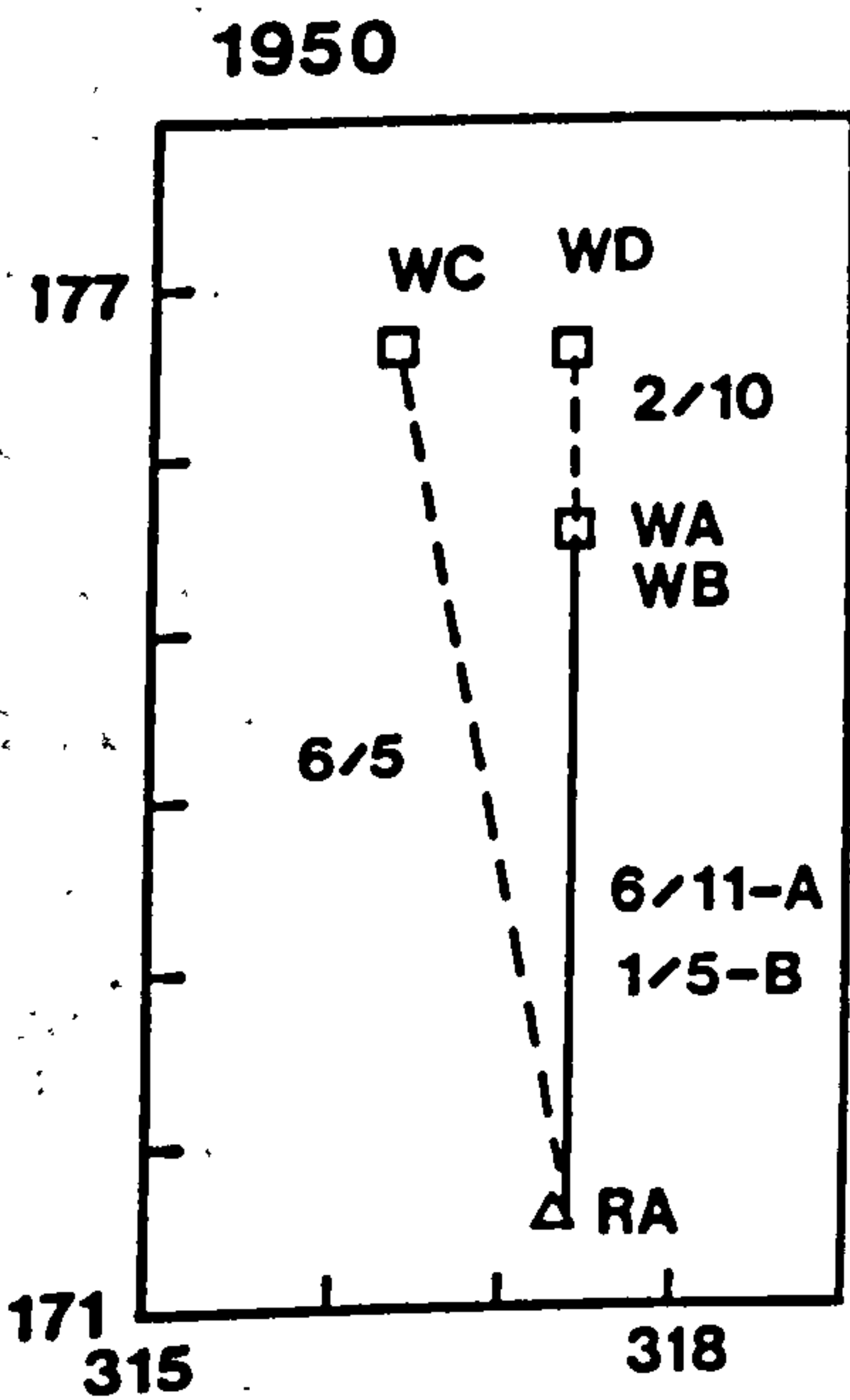


Fig. 10.6 Office Employee Residence-Work Patterns : Case No. 1950

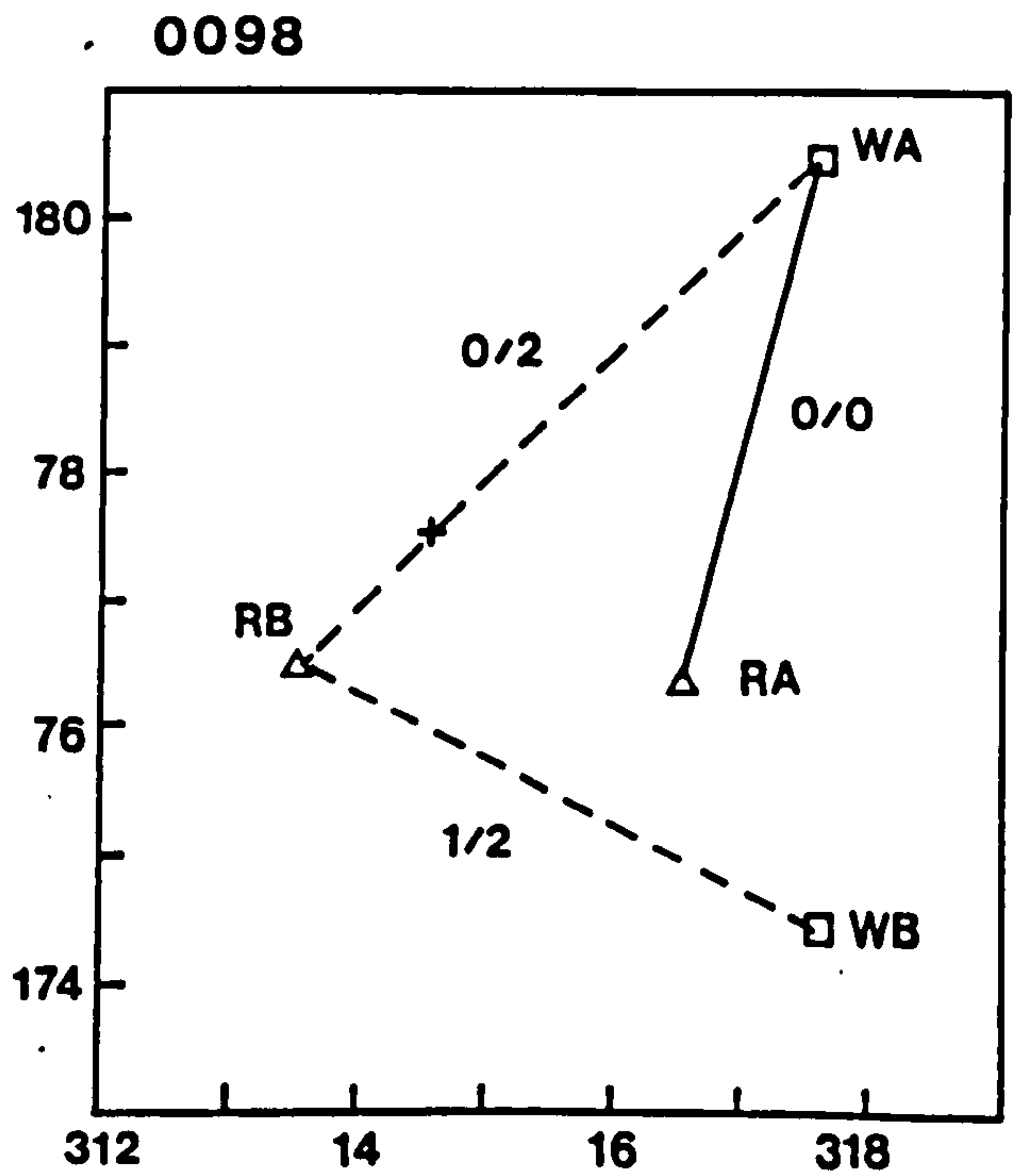


Fig. 10.8 Office Employee Residence-Work Patterns : Case No. 0098

Headquarters following his most recent appointment. Mr. Collins exemplifies an employee who continues to seek employment in his home area, notably at a major office site, but has settled in a new residential area from which he is reluctant to move. As all employees commuting to Cardiff from the east, and to a lesser extent the west, he has been considerably aided in his journey in recent years by the M4 motorway and the Cardiff by-pass. Undoubtedly this has greatly facilitated his decision not to change area of residence, since although his travel distance is above average, his journey time compares well with those who reside in north Cardiff for example. The costs of commuting are easily met by his increased salary resulting from his last promotion.

Mr. Simpson (case no. 2403) holds the same position of assistant audit manager with the Region and has similar accountancy qualifications, but at 37 years of age is considerably younger and therefore more likely to extend his career within the Industry. His home area is in south west Wales. When he first joined the Board aged 20 years, in December 1962, he was employed at his local Carmarthen site, and resided in Carmarthen. In April 1964 promotion led to his transfer to the new Snelling House Headquarters, and a month later he moved into a new Cardiff residence. He changed residence again, within Cardiff, in May 1971 and once more in May 1977, both during his period of employment as assistant auditor at Headquarters which lasted from December 1969 to February 1979, and from which he was promoted to his present position.

Somewhat less successful in recent career terms and in contrast to the employees discussed above but without the advantages of their accountancy qualifications is Mr. Mitchell (case no. 0188). Now aged 57 years, he joined the Board in February 1966 as a clerical member of the Finance department. In the early period of Reorganisation

he joined South Area office (July 1971) and was promoted to his present position of assistant area accounts manager. He has continued to reside in his home area, has obtained no external qualifications and has not gained experience outside the South Area. These are undoubtedly handicaps to any future increase in employment status.

In contrast, the present Headquarters regional transport manager (case no. 1988) has had an extensive career within the Region. Until January 1966 he resided in Blaenavon, but was educated in Pontypool, where he was originally employed by Wales Gas Board within the Transport department. He subsequently moved residence to Newport. However, in January 1970, just prior to Reorganisation, he moved to work in Cardiff, although he has continued to reside at his Newport home, a further example of reluctance to move from a surrogate home area, encouraged by ease of access to the work location. A specialist within the Transport department, Mr. Leach has proved his suitability via relevant City and Guilds qualifications and progression through supervisory and senior officer levels to his present managerial level. He first gained experience under the former Group organisation (as regional transport superintendent, Pontypool, from January 1968 to January 1970), then at Board level (as assistant Regional transport officer, January 1970 to January 1972), and following Reorganisation he gained Area experience (Area transport officer, East Area, Newport, January 1972 to February 1977) before he returned to Regional Headquarters to take up his present Regional post.

A possible candidate for similar advancement is Mr. Gale (case no. 1036), who at 34 years of age is West Area customer service administration manager, appointed in April 1976. He joined Wales Gas in his home area in June 1964, with 'O' level qualifications, at the clerical level, but progressed within the East Area to reach the level

of systems administrative assistant in February 1975. In April 1976 he gained considerable increase in status by moving to West Area to take up his present position. The following month he set up permanent residence in Swansea. In order to progress further it is likely that Mr. Gale will again change work location, and will probably spend at least a short period at Regional Headquarters, which would necessitate another change in residence.

Male Clerical Personnel

Emphasis has been given to the large number of female clerical personnel, particularly married females. However, there are also considerable numbers of male clerical employees. These exhibit few common features, as demonstrated by the variability of the examples given below.

Mr. Godwin (case no. 1509; Fig. 10.7), aged 48 years, has been employed by Wales Gas at Wrexham since June 1966, in which period he has held three different clerical positions. Over the same period he has occupied two residences, both within Wrexham, while his previous employment was also in Wrexham. Thus he exhibits one frequent characteristic of clerical staff, a strong tendency to remain within his home area.

In contrast, Mr. Brown (case no. 0098; Fig. 10.8) is only 19 years of age, and took up his first employment as a clerk with Wales Gas in August 1978. In February 1979 he was promoted to senior clerk. Employed at the Grangetown office, this initially created a residence-work distance of 4.5 Km, but in December 1979 he moved (possibly to an independent residence after living at his parental home), some 3.0 Km, slightly reducing his residence-work distance to 4.1 Km. At

present he has only school qualifications ('O' levels), but by gaining experience within the Industry and perhaps further, relevant qualifications he may be expected to progress beyond the clerical level to at least supervisory status.

Mr. Hopkins (case no. 0750; Fig. 10.9) joined the Region in January 1973 as a clerk at Cefn On Regional Stores. He held another clerical position from January 1974 until August 1976, when he was promoted to Stores technical assistant. Two years later he took up his present post as a planning assistant at East Area office. His advancement from early clerical posts has been possible for a combination of reasons, not least because he is comparatively well qualified (O.N.D. and 'A' levels). Further, he has displayed a willingness to change work location, and it is possible that his move to an Area office will be followed by a period spent at Regional Headquarters, which would allow him to gain a wide range of experience, suitable for future Senior Officer and possibly Higher Management positions, since he is at yet only aged 27 years.

Foundations Of Future Employment

Structure : Young Male Employees

The employment history of Mr. Hopkins (above) gives an indication of his possible future role in the Region. Obviously British Gas needs to attract young employees with all types of skills to fulfil the needs of its future employment structure, and the emphasis must continue to be placed upon male employees, despite equal opportunities, since it is these who have proven long service records and greater career expectations. This need to provide personnel for future positions is, of course, a feature of all large organisations; "Since the organisation typically has a life span longer than the career of an individual, prospective successors must...be prepared for

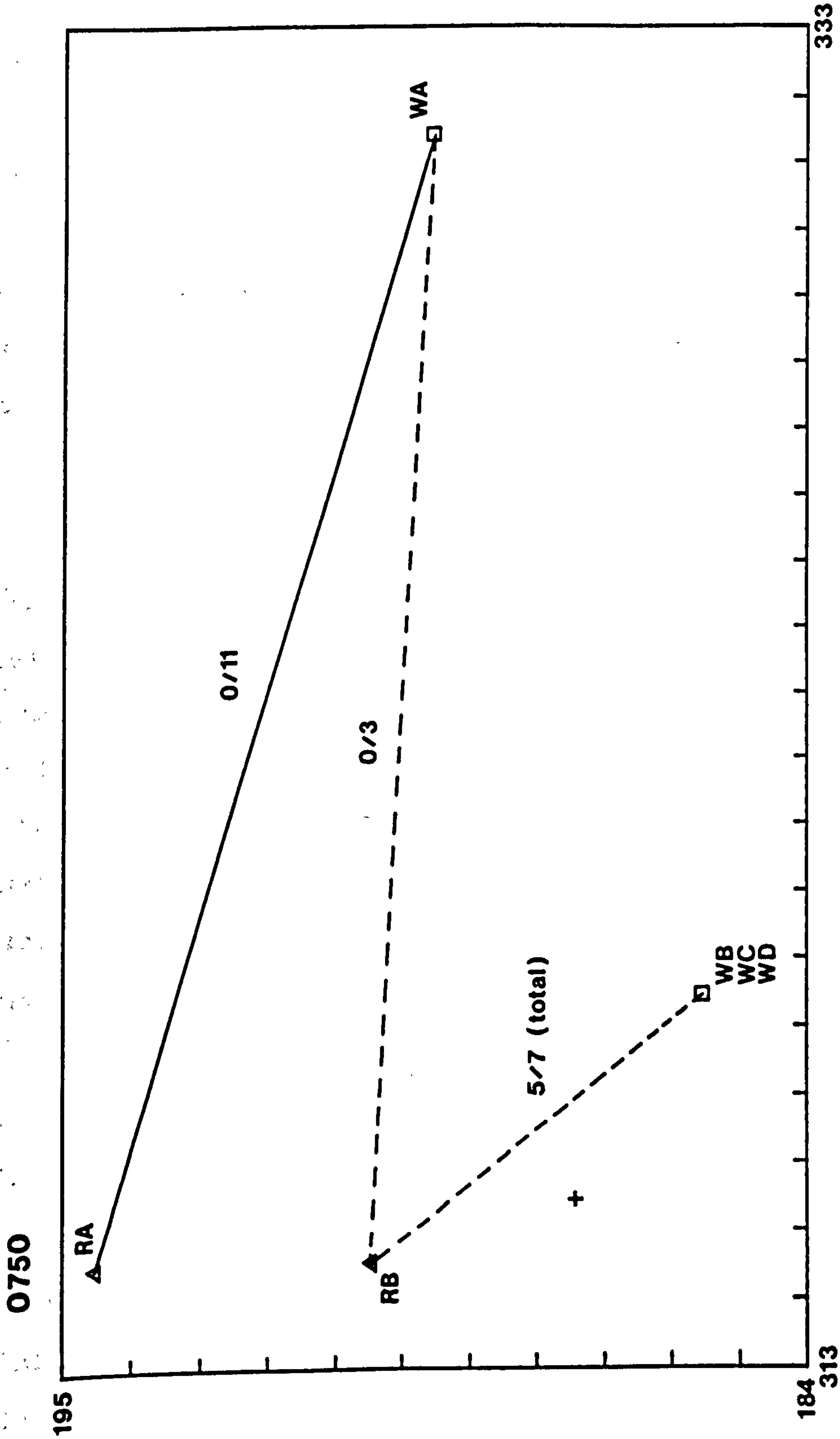


Fig. 10.9 Office Employee Residence-Work Patterns : Case No. 0750

positions as and when they fall vacant."⁴⁵

Mr. Conway (case no. 0578; Fig. 10.10) is a similar young employee, aged 26 years, and employed as a distribution assistant. He joined the Region at Caerphilly Depot as a technician, qualified with a H.N.C. obtained at Llandaff Technical College. Since taking up his present position he has changed residence, although this has increased considerably his residence-work distance. This move was to a higher status residential area, undoubtedly facilitated by his promotion, whilst he also has a high probability of future promotion.

A young employee who has benefitted from the computer development within the Industry is Mr. Allan (case no. 2070), aged 31 years, and employed at Regional Headquarters as a computer shift leader. Educated in South Wales, he held a succession of clerical posts external to the Industry before joining Wales Gas Computer department in January 1969. He gained promotion to his present position in June 1972. He has continued to reside in Newport however, doubtless benefitting from the M4 motorway and although he has changed residence once, this was a movement of less than one kilometre and within the same residential estate.

General Findings : The Use Of Personnel
Histories In Assessing Present Office Work-
force Evolution And Future Office Workforce
Characteristics

The approach followed in this chapter arises from a belief that: "Micro-processes form the basis of any general picture, and so there is always a need for continuing empirical measurement at the micro-scale."⁴⁶ Of course, to some degree such aims of data definition at the micro-scale have been pursued to obtain the overall cross-

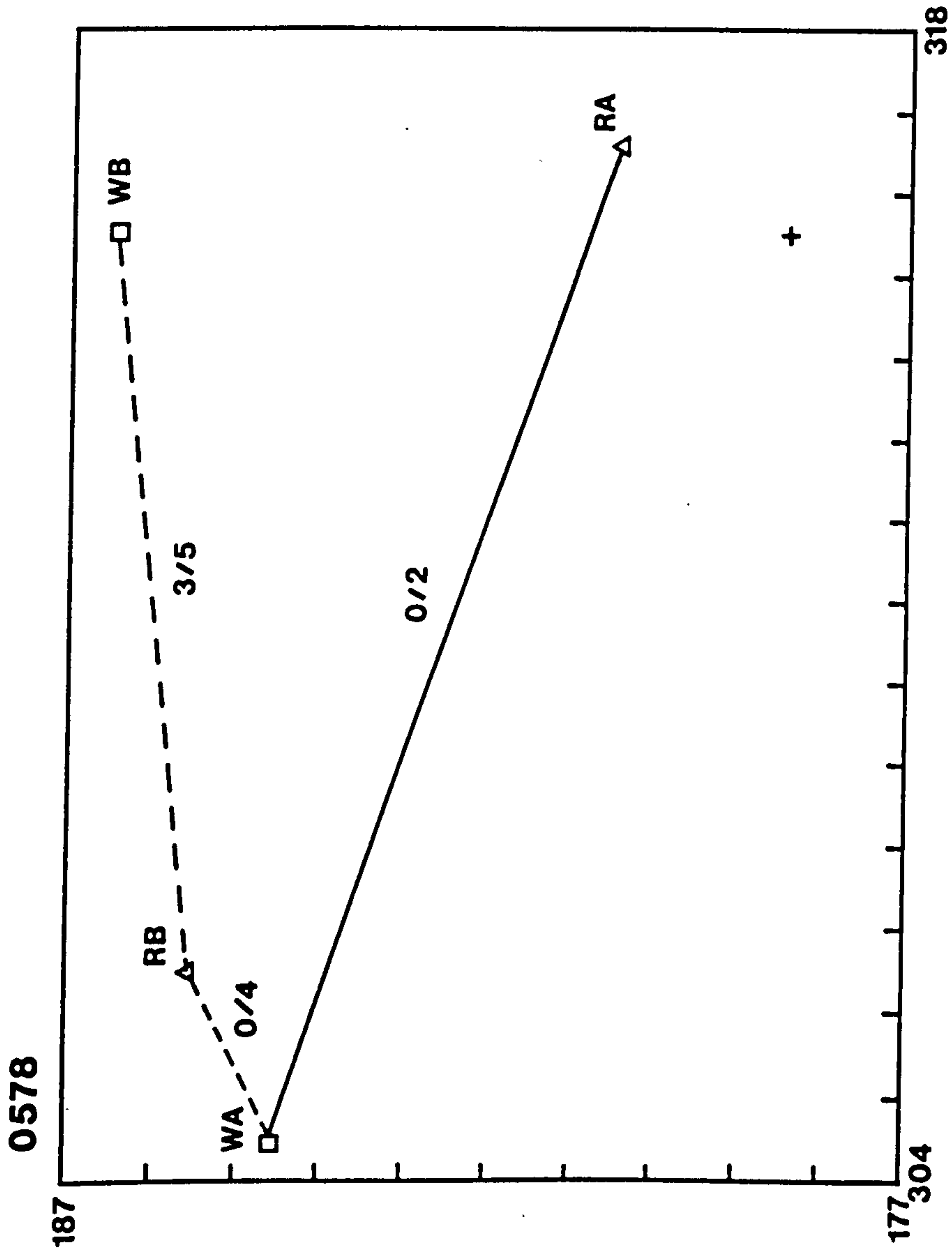


Fig. 10.10 Office Employee Residence-Work Patterns : Case No. 0578

sectional information relating to the Regional office workforce. Though advantageous in providing information relating to each and every office employee there are obvious limitations to this 'snap-shot' technique, for "one does not achieve any depths of understanding unless what happens over time is also considered....Process takes shape as four-dimensional form."⁴⁷

As a means to study the process of office workforce evolution within Wales Gas the quasi-longitudinal study has been undertaken as described above. Hägerstrand's technique of mapping three-dimensional time-space paths within which time forms the Y axis has not been used, but his definitions of the "life-perspective environment"⁴⁸ form the basis of conventional cartesian co-ordinate mapping techniques which have been used to represent individual "personnel history" material.

Although only Wales Gas hand-kept personnel records have been utilised, interviews with representatives of other Regions (particularly members of the Personnel function), have indicated that similar processes are to be observed throughout British Gas. Interviews with British Gas Headquarters personnel disclosed that, in common with most large organisation headquarters, some differences are to be observed when compared with the Regions, for example there is a larger proportion of young single women in the clerical workforce, senior members of Higher Management frequently have considerable experience within the Regional organisation (and may have experience in other related industries, particularly the nationalised industries), and the proportion of graduates is larger. At the individual level however, the "personnel history" of office employees throughout British Gas reflect the various patterns recognised amongst Wales Gas office employees.

One notable feature demonstrated by this individual case study approach is that the 1970/71 Reorganisation undertaken by Wales Gas was not directly a major motivator of residential relocation. Its most evident impact is some considerable change in journey to work distances, caused through the major and extensive relocation of employment opportunities from a large number of minor sites to very few, central sites. Most office employees thus affected were given, and accepted, alternative employment at these central office sites, for example the majority of the clerical personnel formerly at Pontypool were redeployed at Newport. Most of these preferred to maintain their residential locations, and even where subsequent residential changes have occurred, these have often taken place within the home area in preference to moves which would shorten the journey to work. Discussions with such employees suggested that motivations for this home area loyalty are primarily social and psychological. These office employees display similar features to employees identified as "non-movers" in various studies of relocation, both of office and manual functions.⁴⁹

The first major step towards centralisation of the main functions, which occurred with the installation of mainframe computing facilities at Regional Headquarters in 1964, probably had a greater impact upon office employee residential movement than the later amalgamation of local administrative units. The case histories indicate that it was those employees who sought to improve their work status who were prepared to undertake new employment at Regional Headquarters. For those previously employed at sites situated some distance from Cardiff this demanded residential relocation. These employees display the features normally associated with "movers" and "spiralists": they are technical and managerial personnel, many of whom occupied or were

destined to occupy key positions within the Region's organisation.

Nonetheless, throughout the data there is strong evidence of home area attachment, albeit particularly amongst long term clerical employees (the main contributors to the "non mover" group). The majority of office employees appear to have been educated in Wales, whilst many continue to work at the Wales Gas office site nearest to their home area as defined by school attendance and habitual residence. As a result, attachment to British Gas, as represented by Wales Gas, as employer, is strong. The various pension and employment protection schemes act to reinforce this loyalty.⁵⁰ Such schemes are offered by other nationalised industries and some large national and multi-national organisations, where they undoubtedly induce a similar loyalty and paternalistic relationship to that demonstrated by Wales Gas.

Identification of potential movers and non-movers can be of use in the forward planning of office reorganisations and relocations, for even though non-movers may be prepared to travel considerable distances to the new work site, the intervening work opportunities increase and may lead to adoption of alternative employment at a later date. This would appear to be especially likely amongst women employees, whose degree of work specialisation is relatively low, and whose clerical skills are easily transferred to alternative office employment. The potential female workforce in the new office location catchment area is therefore an important consideration in the light of female workforce turnover. Replacement requirements must be met by the new catchment area, not that initially preserved from the former office site.

Confirming the results of most previous research investigating residential location, there is positive evidence of life cycle

influences upon residential location and changes in employment. Residential movements are also sometimes associated with increases in work status. This may be through residential movements necessitated by changes in work location in order to improve work status, for example employees who obtain promotion from an Area office to Regional Headquarters. Alternatively residential relocation may follow improvement in work status even when work relocation does not occur : such movements are frequently away from the work site, thereby increasing the journey to work distance.⁵¹ A further form of residential relocation has been found to be associated with those entering employment with the Region from employment outside the Industry. This is not clearly evident in the Wales Gas data relating to changes of address, since only those previously employed by other Regions provide records of their previous addresses, but the location of previous employment can indicate this, as do changes of address which sometimes occur shortly after taking up employment.

However, residential relocation is not necessarily associated with features of employment. Female employees in particular report changes in residence, for example at the time of marriage, which are unrelated to employment (although there is increased likelihood of their employment becoming part-time, and a reduction in the likelihood of improving their work status). Also, residential relocation necessitated by the husband may result in a female employee obtaining new employment at the nearest suitable office site within Wales Gas. Of course, such changes in personal circumstance are likely also to result in the resignation of female employees. Generally, the most important employment linked residential movements are undertaken by men : there are obviously strong differences between the sexes in the motivations for residential movement.

In terms of movement potential, this is greatest amongst Higher Managers who tend to be male, often possess formal qualifications, and have been most willing to change work site in order to increase their work status, and as a result have wider experience within British Gas, even though this may be confined within one Region. Technical personnel also tend to be qualified, and are often professional engineers, although their qualifications may result from their employment with British Gas. Their experience with the Industry is often utilised by their appointment as Senior Officers and later Higher Management, which itself provides impetus for changes in work location. As a result, the main movement of employees between the Areas and Regional Headquarters is related to the need to gain experience, the process of functional specialisation and the increased propensity for promotion.

Strong differences between the sexes also exist in the residence-work distance, with men willing to travel further than women. Married women appear to be willing to travel slightly further than single women, but this difference is small. Thus in the sample 42.9 per cent of single women reside less than 5 Km from their workplace, compared with 38.8 per cent of married women, whilst 77.1 per cent of single women reside less than 10 Km from their workplace, again slightly more than the 73.2 per cent of married women. In contrast, only 34.8 per cent of men travel less than 5 Km, and 58.6 per cent less than 10 Km. The 10 Km band thus encloses the residences of nearly three-quarters of all female office employees, but less than three-fifths of the male office workforce. Overall, the general pattern of residence-work distance shows a strong negatively skewed distribution, a pattern generally observed in journey to work studies.⁵²

There are similar differences between the sexes in the motivations for changing employment. Men are considerably more likely to

follow a career pattern than women, for this usually necessitates changes in work site to gain experience and/or improve work status. Few women attain status beyond the supervisory level, and this is frequently obtained through long service but usually narrow experience within a particular department. However, both sexes are more likely to advance if experience is supported by relevant qualifications. Men are apparently more likely to gain qualifications than women whilst within the employ of British Gas. Further qualifications gained by women tend to be confined to typing or related clerical skills.

Obtaining qualifications through part-time study in this manner is a feature of British management as a whole.⁵³ For example, the national survey of more than 10,000 managers employed by 51 large organisations undertaken by the Acton Society Trust in 1956 to enquire into their social and educational background noted an increase in the possession of formal and professional qualifications, many of which were obtained through part-time study. This trend has continued, according to later less comprehensive studies, including that of the British Institute of Management in 1976, which showed that less than a quarter of its respondents had attended university full time and part-time study continued to be important.⁵⁴ According to Marsh, Gillies and Rush, who undertook a study of managers in the engineering, chemical, and printing and publishing industries, sampled from throughout the United Kingdom, the majority of managers in all these industries are skilled working class in origin, although the high numbers of graduates amongst the younger chemical industry managers suggested that this is beginning to change. Nevertheless, "it is evident...that the tradition that the skilled artisan becomes the manager in industry dies hard."⁵⁵ Wales Gas provides evidence that this process has persisted in British Gas. Amongst the older employees particularly initial status within

the Industry gives little indication of present status, for many of the Senior Officers and Higher Management entered the Industry at clerical or sometimes manual levels, a trend which has been noted in a variety of organisations.⁵⁶ Further, with present policies of secondment, whereby management potential amongst employees is developed through the temporary placing of personnel in different positions (often at alternative work locations), this process is likely to continue to persist in the short-term.

However, there is already a number of employees of less than 30 years of age employed at non-clerical levels who have never been employed at lower levels. Again this is associated with the possession of qualifications and is particularly marked amongst graduates who have entered the Industry. The need to plan for future Higher Management needs and to promote the necessary skills have gained wide recognition amongst large organisations, not least the nationalised industries. Bell, for example, has emphasised this greater need for manpower planning:

The higher management of a concern is in a more healthy condition if the arrangements for training and progress at all levels are in good order....A continuous and well-regulated flow of individuals with varied qualifications, from whom the higher ranks of the organisation can be recruited, can be ensured only by careful planning.⁵⁷

In British Gas graduate recruitment programmes are increasing the numbers of personnel entering the Industry at higher initial work levels,⁵⁸ but part-time study continues to be encouraged, including the day-release schemes offered to clerical trainees. All employees are offered the opportunities of job progression, but as yet such progression is very much associated with male employees. Not surprisingly, the effects of differential status upon movement is noticeable amongst the male workforce, where male employees who have attained

Senior Officer or Higher Management status in early or mid career are more likely to change both their positions and their work locations than male Staff. Residence-work distances also differ amongst the different work levels.

Attitudes towards employment are changing. The opportunities for long-term career prospects within large organisations still exist. However, the requirements for formal training, spatial mobility, and a willingness to acquire both wider experience and relatively short-term specialised skills, are of growing importance for the successful careerist. In contrast, the clerical workforce has become more entrenched in its attitudes. As a group (for which trade unions are a major representative) this has become more vociferous in its demands, less willing to accept change, and a costly item in any relocation/reorganisation expenditure programme. Many of the tasks performed by this workforce have become, and are becoming, increasingly specialised, such that, despite the growing pool of available labour, a simple substitution of workforce members unwilling to participate in change offers no easy solution to manpower planning problems.

Although it is not claimed that the features of this quasi-longitudinal case study approach may be used to directly extrapolate future trends, features of the present office workforce exhibited by the cross-sectional analysis may be directly related to past conditions and the employment histories of individuals. The segregation of outmoded conditions from prevailing conditions and the identification of their differing influences provides a better indication of likely changes in the office workforce structure and, more accurately, permits a prediction of possible outcomes of relocation/reorganisational changes.

NOTES

1. See Chapters III and VIII.
2. Allan [R] Pred, "The Choreography of Existence : Comments on Hägerstrand's Time-Geography and Its Usefulness", Economic Geography 53 (1977), 208.
3. Bo Lenntrop, Paths in Space-Time Environments : A Time-Geographic Study of Movement Possibilities of Individuals, Lund Studies in Geography, series B, no. 44 (Sweden : Royal University of Lund, 1976).
4. P.H. Rossi, Why Families Move : A Study in the Social Psychology of Urban Residential Mobility (Illinois : Free Press, 1955).
5. Kathleen Gerson, C. Ann Stueve and Claude S. Fischer, "Attachment to Place", in Networks and Places : Social Relations in the Urban Setting, ed. Claude S. Fischer et al (New York : Free Press, 1977), pp. 139-61.
6. A. Hunter, Symbolic Communities (Chicago : University of Chicago Press, 1974); J.D. Kasarda and M. Janowitz, "Community Attachment in Mass Society", American Sociological Review 39 (1974) 328-39; C.A. Nathanson, "Moving Preferences and Plans among Urban Black Families", American Institute of Planners 40 (1974), 353-59; Gerson, Stueve and Fischer, Attachment to Place.
7. Identified within this study as work level or grade.
8. D.G. Rankin, "Journey to Work Movements and Labour Supply Areas in the Nottingham-Derby District with specific Reference to Industrial Firms", Ph.D. thesis, University of Nottingham, 1971. G. Humphrys, "The Journey to Work in Industrial South Wales", Transactions of the Institute of British Geographers 36 (1965), 85-96.
9. United Kingdom, Laws, Statutes etc., Contracts of Employment Act, 1963.
10. Examples of additional information not included are possession of a driving licence, number of children, and attendance on training courses.
11. See Appendix D.
12. Using random number tables.
13. These data were abstracted from the personnel files over the period January - May 1980. Removal of the records of employees who leave the Industry from the files occurs after 2 months: however, this caused no problems in this study. Note that the "present" in terms of description refers to 1979.
14. That is, the number of women to every 100 men.

15. Rossi, Why Families Move; J.M. Thompson, "Commuting Patterns of Manufacturing Employees", Industrial and Labour Relations Review 10 (1956), 70-80; J.B. Lansing and E. Mueller, Residential Location and Urban Mobility (Ann Arbor, Michigan : University of Michigan Survey Research Center, 1964); James W. Simmons, "Changing Residence in the City : A Review of Intra-Urban Mobility", Geographical Review 58 (1968), 622-51.
16. D.G. Clark, The Industrial Manager : His Background and Career Pattern (London : Business Publications, 1966), p.146.
17. Eugene Emerson Jennings, The Mobile Manager (New York : McGraw Hill, 1971), forward. He also coined the term "mobilography" for the study of career movements.
18. Elizabeth Sidwell, "London to Bristol : The Experience of a Major Office Organisation and its Staff", in Spatial Patterns of Office Growth and Location, ed. P.W. Daniels (New York : Wiley, 1979), pp. 349-72.
19. In the context of this study the "home area" is applied to that area with which the individual is most familiar through contact over a long period of time, particularly during childhood/adolescence. For comparative purposes this is given a 5 Km. radius, that is, a circular area of 10 Km. about the long-term residence.
20. E.A. Friedmann and R.J. Havighurst, The Meaning of Work and Retirement (Chicago : University of Chicago Press, 1954). Cyril Sofer, Men in Mid Career : A Study of British Managers and Technical Specialists, Cambridge Studies in Sociology 4 (Cambridge : Cambridge University Press, 1970).
21. See Michael Mann, Workers on the Move, Cambridge Studies in Sociology 6 (Cambridge : Cambridge University Press, 1973); S.J. Carey, Relocation of Office Staff : A Study of the Reactions of Office Staff Decentralised to Ashford, Location of Offices Bureau Research Paper no. 4 (London : Location of Offices Bureau, 1969); and M. Bateman, D. Burtenshaw and R. Hall, Office Staff on the Move, Location of Offices Bureau Research Paper no. 6 (London : Location of Offices Bureau, 1971).
22. For example the former Finance Director of Wales Gas, who became Deputy Chairman of West Midlands Gas, and subsequently Deputy Chairman of North Thames Gas.
23. Hunter, Symbolic Communities.
24. Transport mode is not a concern here, but as an example of such studies see P.W. Daniels, "Some Changes in the Journey to Work of Decentralised Office Workers", Town Planning Review 44 (1973), 167-88.
25. Michael Crozier, The World of the Office Worker, trans. David Landau, Studies of Urban Society (Chicago : University of Chicago Press, 1965), introduction.

26. For example, see Gerson, Stueve and Fischer, Attachment to Place.
27. See, for example, J.S. Adams, "Directional Bias in Intra-Urban Migration", Economic Geography 45 (1969), 303-323; R.J. Johnston, "Activity Spaces and Residential Preferences : Some Tests of the Hypothesis of Sectoral Mental Maps", Economic Geography 48 (1972), 199-211; B. Donaldson, "An Empirical Investigation into the Concept of Sectoral Bias in the Mental Maps, Search Spaces and Migration Patterns of Intra-Urban Migrants", Geografiska Annaler 55B (1973), 13-33.
28. R.V. Clements, Managers : A Study of Their Careers in Industry (London : Allen & Unwin, 1958); and Institute of Directors, "The Anatomy of the Board", survey carried out by J.L. Jolley & Partners Ltd., The Director (1965), 86-91. Clark, The Industrial Manager, pp. 72, 138. He used for his sample companies listed in the trade directory, Kompass, vol. 3, 1964 (published by the Confederation of British Industry).
29. Clark, The Industrial Manager, p.137.
30. Ibid., p.145.
31. Thompson, Commuting Patterns of Manufacturing Employees, p.80; Rankin, Journey to Work Movements and Labour Supply Areas in the Nottingham-Derby District.
32. These patterns have been verified in Chapter IX.
33. P.W. Daniels, "Office Dispersal and the Journey to Work in Greater London : A Follow-up Study", in Spatial Patterns of Office Growth and Location, p.389.
34. No record of previous employment.
35. Kain, for example, found that if the only difference between households in their incomes, then "the length of the household's journey to work would increase as an increasing function of income". J.F. Kain, "The Journey to Work as a Determinant of Residential Location", Papers and Proceedings of the Regional Science Association 9 (1962), 147.
36. For example, meter readers/collectors.
37. R.J. Johnston, Spatial Structures, The Field of Geography (London : Methuen, 1973), p.85. This is not to say that manual employees are poorly paid by British Gas.
38. See B.M. Moriarty, "A Test of Alternative Hypotheses of Urban Residential Growth", Proceedings of the Association of American Geographers 2 (1970), 97-101. Residence-work distances are examined in aggregate in Chapter IX.

39. Harry Richardson, Urban Economics (London : Penguin 1971); and Clive Beed, "The Development of the Least Cost Model for Residential Location", in Analysis of Urban Development, ed. Nicholas Clark (Melbourne : Department of Civil Engineering, University of Melbourne, 1970), pp.2.51-2.65, who also noted that this theory was first formulated by Leo F. Schnore in "The Separation of Home and Work : A Problem for Human Ecology", Social Forces 32 (1954), 336-43. See also Edgar M. Hoover and Raymond Vernon, Anatomy of a Metropolis (Cambridge, Mass.: Harvard University Press, 1959); and W. Alonso, Location and Land Use : Toward a General Theory of Land Rent (Cambridge, Mass.: Harvard University Press, 1964).
40. H.F. Andrews, "Journey to Work Considerations in the Labour Force Participation of Married Women", Regional Studies 12 (1978), 11-20 Equality of rights is now the subject of legislation : Equal Pay Act 1970, Sex Discrimination Act 1975. The quotations of women's (and men's) attitudes are contained in P. Jephcott et al, Married Women Working (London : Allen & Unwin, 1962). See also Confederation of British Industry, Employing Women : The Employers' View (London : C.B.I., September 1967); and Barrie O. Pettman, Womanpower : An Underutilised Resource (Bradford, England : M.C.B. Monographs, 1977).
Kain, The Journey to Work as a Determinant of Residential Location, pp. 137-60. See also J.F. Kain, "Urban Travel Behaviour", in Social Science and the City, ed. L [eo] F. Schnore (New York : Praeger, 1968), pp. 161-94; and O.D. Duncan and B. Duncan, "Residential Distribution and Occupational Stratification", American Journal of Sociology 60 (1955), 493-503. Colin Clark and G.M. Peters, "The Intervening Opportunities Method of Traffic Analysis", Traffic Quarterly 19 (1965), 101-119.
41. Confederation of British Industry, Employing Women : The Employers' View, p.2, para. 2.
42. See V. Klein, Britain's Married Women Workers (London : Routledge & Paul, 1965).
43. See Chapters III and VIII.
44. Although it is possible that she spent some time at Windsor Terrace, a short distance from Bute Terrace (once the Board Headquarters).
45. Sofer, Men in Mid-Career, p.14.
46. Sidwell, London to Bristol : The Experience of a Major Office Organisation and its Staff, p.349.
47. Torsten Hägerstrand, "The Domain of Human Geography", in Directions in Geography, ed. R.J. Chorley (London : Methuen, 1973), pp. 73, 77.

48. T [orsten] Hägerstrand, "On the Definition of Migration", in Readings in Social Geography, ed. Emrys Jones (London : Oxford University Press, 1975), pp.200-209. See also Allan R. Pred. "Urbanisation Domestic Planning Problems and Swedish Geographic Research", Progress in Geography 5 (1973), 1-76, especially p.39; Pred, The Choreography of Existence : Comments on Hägerstrand's Time-Geography and its Usefulness.
49. See Sidwell, London to Bristol : The Experience of a Major Office Organisation and its Staff; Mann, Workers on the Move.
50. Pensions are linked to length of service. They are backed by a large pensions investment scheme offering very good security.
51. See Kain, The Journey to Work as a Determinant of Residential Location.
52. See Daniels, Office Dispersal and the Journey to Work in Greater London : A Follow Up Study, p.390, Fig. 14.6.
53. Nuala Swords-Isherwood, "British Management Compared", in Technical Innovation and British Economic Performance, ed. K. Pavitt (London : Macmillan, 1980), pp. 88-99.
54. Acton Society Trust, Management Succession (London : Acton Society Trust, 1956). Nuala Swords-Isherwood (British Management Compared, p.91) for example, quotes the following percentages of graduate managers in previous studies : Acton (1956) 19 per cent; Clements (1958) 25 per cent; Clark (1966) 35 per cent.
55. A. Marsh, J. Gillies and M. Rush, "The Training of Managers in Industrial Relations", Stage I Report, St. Edmund Hall, Oxford, 1976 (typewritten), cited and quoted more extensively by Swords-Isherwood, British Management Compared, p.97.
56. See Clark, The Industrial Manager.
57. R.W. Bell, "The Relation of Promotion and Training to Higher Management in British Nationalised Industries", Public Administration 29 (1951), 204.
58. "British Gas has established a tradition of successful graduate recruitment....Each year we recruit approximately 200 graduates; many join us straight from university although some do so after one or two years of work experience". British Gas, Graduate Opportunities 1981 Current Vacancies Bulletin, British Gas Corporation, October 1980, p.1.

CHAPTER XI

GENERAL REVIEW OF FINDINGS AND CONCLUSIONS

General Synopsis

In broad terms this study assesses changes in the locations of British Gas offices. It undertakes the identification of the causal or partially causal variables responsible for these changes and the implications of change for the office workforce.

The thesis has two main parts. The first is a reconstruction of events in the British Gas Industry, with particular attention given to the post-nationalisation period. This aims to trace the causal relationships and interaction between, (a) national policies, (b) changes in technology, and (c) internal organisation, including the distribution of office sites and areal division of control and responsibility. The second part is an examination of office employment, which is presented in detail for a number of selected Regions. These Regional data sets have been analysed to reveal differing aspects of office workforce composition at sub-Regional, Regional, and national levels. This analysis forms the background to a special enquiry into the residence-work distance and the various distance patterns characteristic of different groups of employees. As a final stage, and in addition to the considerable analysis of Wales Gas as a Region (in itself a case study approach), a sample of Wales Gas office personnel records have been examined in quasi-longitudinal format, thereby extending the use of case studies to the level of the

individual employee.

Presentation of this material and findings is in three sections. The first section (Chapters II, III, IV) documents the structure and evolution of British Gas at the national and Regional scale, and the development of technologies. Material pertaining to Wales Gas is utilised to illustrate the potential for cross-comparison between changes in organisation (including location) and technology development with changes in the workforce. The pre-nationalisation structure of the Industry is represented, again by reference to Wales, illustrating the processes of rationalisation and innovation which were in progress prior to 1948. British Gas as a whole is presented as a corporate structure and a major office workforce employer. Various technological innovations, both internal and external to the office environment, are described as causal factors in the contraction of the manual workforce and growth in the office workforce within the trend of an overall decline in total employment. Causal relationships amongst innovative changes, including organisational changes not necessarily locationally manifest, are portrayed through the examination of Wales Gas evolution (a thematic approach continued in the third section).

The second, central, section (Chapters V, VI, VII) documents the processes and resultant patterns of locational change within British Gas. These are related to the organisational and technological changes documented in the first section. Encompassed with these external locational features of the office sites is a consideration of their internal features and working conditions provided at/by these offices. Attention is paid to those factors identified as possible influences upon the overall characteristics of personnel. This

section thus presents a detailed examination of post-nationalisation office location decisions, exemplifying the difficulties which have prevented an idealised approach (notably in the 1950's) and examining the organisational benefits accrued from the adoption of various office technologies and accompanying work techniques. Assessment is made also of the levels of adoption of facilities and policy implementations designed to improve the conditions of employment of the office workforce. These are judged especially important where they have, or have had, a major influence upon office location policy, for example insistence upon good on-site car parking facilities.

The third and final section (Chapters VIII, IX, X) presents the Regional workforce data. These illustrate the general characteristics of a Regional workforce, whilst attempts are made to explain the observed differences, both at inter- and intra-Regional level. Profiles of Eastern, South West, and part of North West Regions are presented, with additional reference to the office workforces of Southern and South East Regions and the South Eastern Electricity Board. These are considered with reference to the findings established in the examination of Wales Gas data.¹ Inadequacies of these data to illustrate the long-term results of locational policies upon personnel is countered by the examination of a sample of Wales Gas personnel records. In summary, this section considers the general features (including those locationally manifest) of a corporate office workforce. This, the employee structure, is interrelated with the office locational and working conditions policies of the corporate employer structure. Although emphasis in interpretation is given to influences of the latter upon the former, this is not a uni-dimensional relationship.

Review Of Data: The Three Main
Variables Influencing Office

Location

Three main variables have emerged as integral to British Gas office location decisions: the office workforce (and to a lesser degree employment in the Industry as a whole); organisation, both structural and locational; and technology usage, within the office and in methods of gas production and distribution. Considerable data of all three types have been accessed and have proved invaluable in understanding the present office location pattern. The major primary sources of information are the Industry's annual reports and interviews with representatives of the Industry, supplemented by internal records and reports made available by these personnel on behalf of British Gas.

A further variable (in addition to organisation and technology adoption) found to have considerable influence at the national scale is Parliamentary legislation and the policies of the relevant Ministry² (now the Department of Energy, but initially the Ministry for Fuel and Power and later the Department of Trade and Industry). Yet evidence also suggests that governmental influence has acted to legally enforce those changes which were features of the Industry's natural development, for example the need for greater amalgamation in the late 1940's and early 1950's enforced by nationalisation; the growing centralisation and greater need for co-operation following the importation of liquid gas supplies which provided the impetus for greater control from central headquarters (the creation of BGC); and the increasing need for forward planning and research and development, financed by increased borrowing powers.³

Thus the dominant factors of British Gas evolution are found to result from the inter-relationship of organisational change and technology introduction, which together have acted to form the primary source of its present structure, including location, and govern office workforce requirements. Characteristics of the office workforce are thus indicative of organisational and locational structure, and to a lesser degree office technology adoption. It is suggested that these relationships are not confined to British Gas, but are present, with varying degrees of influence, in all organisations.

The Office Workforce

The growth of employment in the service industries is widely acknowledged and is reflected in relative growth of the office workforce even in the more traditional industries.⁴ Patterns of employment are changing, with the office sector gaining in importance. These trends are reflected in British Gas, and are important elements in any assessment of its office locational policy formation and implementation.

The British Gas office workforce has not only increased in size but has undergone significant changes in composition,⁵ largely as a result of changing demands in terms of skills, training and responsibilities. Similar changes may be observed in other office organisations, of course, such that many of the comments concerning British Gas may be ascribed to other organisations. For example, as in office industries generally, there are considerable numbers of female employees who dominate the clerical positions. All posts above the clerical level are dominated very strongly by male employees. British Gas displays many of the "typical" features of a large office workforce, both Regionally and nationally.

Although preservation of female labour is considerably less important than that of males (a common attitude amongst office workforce employers), there is evidence of paternalism continuing in the Industry, often resulting in long-term employment of individuals. This paternalism is responsible for the considerable redeployment which occurred following the cessation of gas production, resulting in a large number of production engineers being redeployed in other administrative posts, many of which were created within the Engineering function as the tasks of gas distribution and the maintenance of natural gas supplies became increasingly more complex.

As the office sector has become increasingly important there have developed departments specifically designed to monitor work performance and to maximise and maintain work efficiency. The O & M departments (and work study departments which monitor manual tasks), often embraced as Productivity Services, devise schemes through which the workload of each individual is increased, dealt with more efficiently and at greater speed. They obviously play a crucial role in office technology introduction and development.

British Gas does much to ensure its quality of service, to which end it is reliant upon the abilities and attitudes of its employees. Office employees are offered both direct and indirect (peripheral) inducements to maintain their full participation in the workforce. Although BGC provides guidelines for certain provisions, a degree of inter-Regional variation exists in the level and incidence of these inducements, as expressed through the survey of facility provisions.⁶ Also considered are the inducements offered to employees who participate in office relocation. These take the form of monetary allowances for mileage, subsistence and travel time, usually calculated

on a pro rata distance basis, whilst those employees required to relocate residence receive reimbursement for various removal expenses and monetary assistance in the removal process.⁷ The increasing level of reimbursement to those relocated reflects the increasingly pragmatic approach taken by employees and their representatives to the relocation process.

Nevertheless, very good working conditions and the good conditions of service provided by British Gas have ensured achievement of a general office employee stability which is of significant advantage to the implementation of long-term management planning proposals and maintenance of a highly trained, contented workforce.

A final element has been the evaluation of changes, primarily in office location but by implication also in organisation and technology usage, from the viewpoint of the individual office employee. Increasing consideration has been given to the office employee in processes of office renewal. This partially results from the increased concern for the working conditions of office employees common to most large office workforce employers. Many additional facilities and amenities, certainly in comparison with pre-war conditions, are now an accepted part of the office environment. These influence personnel on two levels: firstly, as an aid to recruitment and maintenance, and secondly, as a means by which the maximum output might be obtained from employees. Within this context it is noted that British Gas offers good rates of pay and rewards for long service.

A survey of British Gas office employees measuring their evaluation of conditions of work, including rates of pay, work location and the working environment, would have permitted the assessment of the workforce's subjective response to these conditions. With

this intention, but very much in the context of office relocations, it was planned to undertake a postal survey of a large sample of Wales Gas office employees, using a questionnaire devised to elicit response to the 1970/71 reorganisation from those who had remained in the employ of the Region from before this period (this was a major variable identified in sample selection). However, with the imminent move to the new Regional Headquarters (the site of which at the time of discussions with the Region concerning the feasibility of such a survey was still at a relatively early planning stage) the prompting of discussion concerning the possible harmful implications of relocation was considered inadvisable, and questionnaire implementation was vetoed by the Regional Executive.⁸ A similar response of prevailing general policy to avoid discussion of possible relocations with those subject to its effects was given by the British Gas Corporation. Again this was an outcome of expected unfavourable response by employee representatives to any relocation plans.⁹ Such plans were of course under consideration at that time regarding the Corporation headquarters. Similar caution is exercised regarding new office technology introduction. These reactions undoubtedly reflect the greater power now available to office personnel as a whole, which is more generally used to ensure good working conditions.

The Main Organisational Influences

The growth of functionalism and hence the decline of General Management principles has been the overriding organisational influence. This has encouraged specialisation amongst employees, which British Gas has countered by providing a wide training base for potential higher management/senior personnel, whilst positive efforts have been made to maximise the cross reference (or "cross-functionalisation") amongst the line managements of the main functions. In

strict management terms this has invalidated the original hierarchical structure, although this continues within function.¹⁰

The growth of functionalism is clearly not restricted to British Gas, and has been adopted as the organisational form by many large organisations because of the advantages it provides via specialisation.¹¹ Its attendant problems of non-integration are counteracted in a variety of ways, however. In British Gas this is largely through the formation of Area management teams.

The structures of the British Electricity Industry and Gaz de France are presented for comparative purposes.¹² Distinct parallels are evident with these, emphasising that the conditions prevalent in British Gas may be observed in other similar major national industries. Reassessment of much of the material produced by previous research into the Electricity Industry offers the opportunity to make fuller comparisons and to identify the major factors which have encouraged its structural development.¹³ (Is the introduction of nuclear power in any way comparable with natural gas adoption, for example?) This has not been attempted in this study.

Very importantly, functionalism has permitted the strengthening of control by BGC headquarters and has rendered the role of Regional Chairman a position of little overall power in terms of Industry policy formation. Nevertheless, Regional Chairmen are retained as the apex of the Regional management executives, even though the real decision-making power is held by the national functional committees, the national executive, and ultimately the Corporation itself. Regional function heads are engendered with dual responsibilities, to their Regional Chairmen and to their functional director at BGC headquarters.

For the individual this organisation dictates that a highly successful management career depends not only on intra-Regional, but also inter-Regional and Regional-BGC Headquarters movement. For clerical staff and other members of the 'non-spiralist' group the implications are that organisational and locational decisions are ultimately taken by management committees far removed from the relevant area.

In terms of the offices themselves, clear distinctions have been drawn between the different hierarchical levels (which are defined by the size of the area over which they are responsible, albeit often measured by the number of consumers therein, whether this responsibility is for one or a variety of functions). These distinctions are especially notable between headquarters offices and Area/District offices (the Customer Service Centres). Although these have been discussed in centralisation terms (and headquarters offices are predominantly locationally centralised), this office centralisation is the concentration of many personnel into large office sites.¹⁴ Such concentration of employment has had much greater impact upon the organisational form than the selection of locationally centralised or decentralised sites, although obviously the latter has important implications for the definition of employee catchment areas (not least because of differing accessibility patterns).

The Main Technological Influences

Organisation of British Gas into Regions has been essential to the successful history of technology adoption: the success of BGC as a decision-maker has arisen from its proven ability to integrate, control and stimulate the adoption of successful developments which frequently emanate from dispersed, but by no means fragmented,

research projects. The Regional structure is particularly advantageous in permitting the simultaneous assessment of alternative technologies and processes (whilst it also permits consideration of Regional variations).

Undoubtedly BGC would not have attained its present size without the development of North Sea gas supplies, and had such development not been facilitated by importation of liquid gas supplies. Thornhill saw technical progress within the Industry to be of two kinds; firstly the development of a national grid, and facilitated rationalisation of production; and secondly, the use of petroleum feedstocks in oil gasification plants and the importation of liquid methane (LNG).¹⁵ It is the combination of these technical progressions that has permitted the exploitation of North Sea natural gas, and which in turn has had such an impact upon the structure of British Gas.¹⁶

Greater impact upon the individual office employee, however, has arisen from the computerisation of daily activities and transactions. The skills of the present clerk are very different from those of his predecessor, whilst the size, location and design of offices have created a much-altered working environment.¹⁷ Computerisation permitted, indeed was dependent upon, centralisation, not only of decision-making, but of the many routine tasks previously associated with small dispersed sites. Thus were created large headquarters and sometimes independent computer centres. A later development has been the tendency to retain and process work in the lower level offices at Area or District level, although these little resemble the small dispersed office sites of pre-rationalisation.

But such changes are not unique to British Gas. For example,

the other utilities, electricity and water, have undergone very similar processes of increasing technology usage, rising capital investment and increasing size of areas of control. Thus accounting machinery, telemetry (many water pumping stations, like gas holders, are now unmanned, control being assumed elsewhere in conjunction with computer monitoring equipment), and developments in telecommunications and computerisation generally have played essential roles in organisation change. Similar trends are also to be found in transport, such as British Rail (again telemetry equipment permits unmanned signal boxes and computerised control of movement), and in the separated Post Office and British Telecom.¹⁸

Technology adoption demands a degree of office centralisation. Its first requirement is a streamlined approach to largely repetitive tasks, which has encouraged the growth of functionalism and the amalgamation of fragmented work sites at which personnel carried out similar tasks. Further, the introduction of automation in itself has stimulated greater centralisation as a means of reducing costs and maximising the benefits of machinery investment. In terms of the office workforce new office technologies affect three aspects: work techniques, work patterns, and required skills. Technology convergence has permitted the wider adoption of technically-assisted techniques, and future developments will increase the use of technology. These changes forecast an increase in basic skill requirements and a lowering of the size of the basic clerical workforce, but a proportionate increase in those with technical skills and those involved in monitoring progress, forward planning and investigations of work techniques. This trend towards a more highly trained office workforce is likely to be a common feature of most large office organisations.

The Location Of British Gas

Offices

Identified Patterns Of Office

Location

Office location patterns reflect two types of distribution, the hierarchical/aspatial division and the areal/spatial division. Both are indicators of organisation. As British Gas offices serve customer service as well as administrative functions it is reasonable to question the extent to which the numbers and location of office sites are governed by the distribution of consumers. Since the number of consumers has been used by a number of Regions as a controlling factor in the selection of the number of Area/District office sites and in defining the areal extent of responsibility of such offices these are obviously important factors in defining the hierarchical pattern.¹⁹ However, particularly with the increasing sophistication of communications technology and the extensive encouragement of the telephone as a medium for customer contact, the location of an office within its area of control has been increasingly less subject to consumer distribution. The areal location pattern of major office sites is far more dependent upon land/office availability, which itself is often the result of inheritance and reflecting the pattern of former gas production sites.²⁰

The influence of operational requirements upon locational decisions increases with successively lower levels of the office hierarchy.

However, the encouragement of co-siting and combined sites, including use by manual personnel (largely as a means to maximise the number of personnel benefitting from on-site facility provisions, as

well as maximising the use of such sites when they are Industry-owned) does imply that some offices reflect the locational characteristics associated with other offices in the hierarchy. British Gas land ownership is a significant factor in defining the "restricted cognitive range" evident in the delineation of the search field for office sites, where the definition of a least costs location always takes priority over any other definition of the optimal location (although any site must, of course, satisfy the basic requirements of the new office development in order to be considered a valid alternative).

Major differences have been identified in the sites of headquarters offices and offices lower in the hierarchy. Two types of headquarters locations are distinguished, central urban locations and greenfield locations.²¹ The adoption of the latter is largely the result of failure to obtain a site of the former type. Except where associated with major reorganisations, push factors are usually more important than pull factors in initiating office movement. For non-headquarters offices, factors which have influenced site selection and thus distinguish the existing sites are the advantages they offer as: (1) Industry-owned sites (permitting cost savings); (2) their suitable position in relation to organisation (for example a site in an Area's major town, offering advantages of a good employee catchment area and, though of considerably less importance, a prestigious location); and (3) technological advantages (for example the ease of installing telephone lines, local area dialling within the consumer catchment area, or the ability to house large banks of telephone enquiry clerks).

Processes Of Office Locational Change

Three phases of relocation activity have been identified,

each of which has its own characteristics.²² Relocation in the early-mid-1960's was very functional in approach. Office designs were very basic with few of the luxuries now associated with major office developments. The Industry was in decline and many relocations were simply expediential measures undertaken through necessity (perhaps because of the loss of former premises) or in an attempt to obtain greater organisational efficiency, as in the establishment of accounting centres. Developments of the late 1960's to 1970's were similarly rather basic in design, but the hope of a new prosperity for the Industry and a desire to benefit from the opportunities offered by technological change ensured that many such developments were associated with reorganisation. Many of the offices built/acquired at this time were the result of unsuitability of existing premises to absorb the equipment and employee centralisations which the new organisations demanded in the interests of administrative efficiency. Finally, offices built during the phase of relocation initiated in the late 1970's are of much improved design and provide a distinctively higher standard of working environment. These have been acquired largely to replace out-dated, inefficient premises unsuitable for improvement. Although the North West Gas projects of this period for the building, rebuilding and modernisation of office premises are associated with the reorganisation programme, these latest office developments do not form such an integral part of reorganisation programmes as those of the second phase of office relocation.

These descriptions of phases of relocation activity are recognised upsurges in a general trend representing periods of significantly large office acquisitions. Not every relocation fits into this pattern and the acquisition of office premises is being

undertaken virtually continuously somewhere within British Gas. Where details of processes of relocation have been defined these include illustrations of the procedures through which recommendations are made as required by the site selection process. In some cases this process has involved the use of consultants.²³

Overall, discussion and description of office premises and relocation procedures has illustrated that differing types of site and likewise differing building forms have been chosen as the most suitable, both in various Regions and for offices at varying hierarchy levels, in association with the various phases of relocation activity.²⁴ Of course, constraints upon office movements much be acknowledged also, the main causes being monetary and legislative control. Both of these are likely to be of significance in the future.

Motivations For Locational Change

It has been demonstrated that the present office location pattern is largely the result of decisions made and implemented in the 1960's and 1970's.²⁵ Four factors have been isolated as the primary forces responsible for the pattern in areal and temporal incidence. These are: (1) the availability of finance, (2) the closure of production sites, (3) the adoption of developments in communications technology, and (4) changes in organisation towards greater functionalism. Regional differences in the existence of or response towards these factors have been responsible for variation in Region interpretation. Thus North Thames Gas has been heavily influenced by its initial strong functional structure in its overall development, whilst Wales Gas has been influenced by its former production sites, East Midlands Gas by financial constraints, and Eastern Gas by its rapid adoption of radio technology. Yet this is not to suggest that one

factor has been the overriding influence in each Region: all Boards suffered considerably from financial hardship until the mid-1960's for example. Of these factors the closure of production sites is unique to the Industry. Although widespread comparisons have not been undertaken within the confines of this thesis, the more limited availability of land holdings has been identified as an important factor differentiating the search for new office sites in the Electricity Industry from that of British Gas.²⁶

Considerable inertia maintains the existing office locations. Motivations for relocation must overcome this inertia. Such forces have resulted in at least one major reorganisation involving relocations in each division of British Gas since nationalisation.²⁷ The following factors have been identified which encourage office relocation: (a) unsuitability of inherited premises; (b) increase in specialists at headquarters; (c) functionalism; (d) demands for better standards of service; (e) computer technology; (f) telecommunication developments; and (g) the economic growth of British Gas.²⁸ In broad terms, the greater the number of these motivations, the more change that has been introduced via relocations policy, notably when combined with Regional reorganisation. The reorganisation of Wales Gas offers an excellent example of this condition.

Each Region has operated under continuously changing economic conditions, and consumer demand in particular has changed dramatically since nationalisation. In the mid-1960's the trend of increasing production costs was reversed: gas became available as an industrial and domestic fuel at a very competitive price. Concurrently there had been trends of increasing service requirements in terms of both speed and standard; trends evidenced throughout British consumer-

orientated industries. Thus administrative and customer service demands increased dramatically, creating office workforce growth and placing severe pressure on existing office accommodation. Operative change became inevitable.

The British Gas Office Workforce

Main Features Of The Office Workforce

An examination of the differences amongst the Regional office workforce profiles and the identification of the probable causes of these differences has been undertaken, partially because these might provide evidence for the projection of the effects of locational changes. To achieve this the Regional data sets have been examined selectively.²⁹

The major factors identified as responsible for differences in the Regional workforces are the organisational structure (notably the number, size and degree of control exercised from the Area offices) and the different characteristics of the male and female workforces. Offices high in the office structure contain larger proportions of Higher Management and Senior Officer personnel, as should be expected in relation to their greater decision-making responsibility. These offices illustrate not only centralised decision-making, but also centralisation of clerical personnel, which is more marked in some Regions than in others. Thus the overall size of offices does not decrease with increasing decision-making status but actually increases as the number of support personnel rises, the largest Regional office being the Regional headquarters. This is responsible for introducing apparent anomalies into the office workforce structure, for example these headquarters not only contain the highest proportion of senior

personnel they also contain the highest proportion of part-time staff, the lowest ranking employees.

Functional representation also varies amongst the hierarchic levels. Non-operational functions are highly centralised at headquarters locations, whilst the lowest level offices are entirely operational in function, whether multi-functional, such as combined Engineering and Service depots, or mono-functional. The use of combined operational centres is dependent upon a number of factors, including the internal organisation of the operational functions, the extent to which their areal sub-divisions overlap, and the existence of sites suitable for such combined developments.

Differences between the male and female workforces are very distinctive: female employees are almost entirely clerical, constitute almost every member of the part-time workforce, display higher turnover rates/shorter length of service, are less well educated, and are distinctly less likely to obtain significant promotion.³⁰ Rare exceptions to this general picture are the few single females who may be described as "careerists" within British Gas.

Office Employee Residential Patterns

Examination of the residence-work distances illustrated that these too are related to two distinctive workforce variables: the work level/grade of employees and their sex. The residences of male personnel are more widespread than those of females and the average distance between their residential and work locations is longer. Amongst the three main grades of employment Staff tend to travel considerably shorter distances to work than members of Higher Management or Senior Officers. It would seem that sex is a more

important determinant than work level, since even amongst Staff women travel shorter average distances than men.³¹

The quasi-longitudinal study undertaken of a sample of Wales Gas personnel revealed that more than half of the sample had never changed residence whilst in the employ of the Region, and that those moves which had occurred were generally of less than 5 Km (this being the distance used to define a "home area" limit). Yet the large majority of the sample had held at least two posts within Wales Gas. The data suggest that employment changes only occasionally promote residential movements.³² Significant home area attachment was found amongst clerical employees, many of whom belonged to the group of employees termed "non-movers", and not surprisingly movement was greater amongst male employees than females.³³

The Possibilities For Future Change
And The Likely Impact Upon Office
Employees

Personnel have participated to an increasing degree in successive relocation programmes, a relationship which is not confined to British Gas. Increased value placed on senior personnel encourages the development of their full co-operation in any reorganisational/relocational changes as a means of their retention. The paternalistic attitude of British Gas, especially as a nationalised industry, insists that even junior personnel are given similar opportunities.

Through investigations of the Wales Gas personnel records it was possible to conclude that the relocation which formed a major part of its reorganisation programme was not directly a major motivator of residential relocation. Obviously some residential relocation did occur, since the worksite relocation was great, but encouragements

given for remaining with the Region appear to have been sufficient. It has not been possible to measure how many personnel left the employ of the Region as a direct result of reorganisation, but some eight years after its initiation the pattern of length of service in the Region shows no significant difference from that of Regions which had not undertaken such extensive relocation in this time period.³⁴ Thus, regardless of the immediate effects, the medium-term effects of relocation policies are not causes of concern, and even short-term effects have been outweighed by the considerable benefits to be gained from a more efficient organisation. Employees too benefit from the improved working conditions, despite possible problems of increase in the length of the journey to work and reduced accessibility.

Undoubtedly the use of office technologies, and these technologies themselves, will continue to expand and develop. These make ever-changing demands upon the workforce. The possibilities of decentralisation of work, perhaps even into home work stations, remain, and British Gas has undertaken preliminary studies into these options,³⁵ but as yet the pressures for maintaining centralisation of personnel into relatively large offices remain. The inertia arising from personnel preference and Industry investment at present sites will continue to operate for some time. Notably the BGC headquarters decision to remain within London indicates a general desire to continue with traditional locational patterns, whilst Regional policies continue to maximise use of existing office developments and land-holdings.

Major organisational changes are unlikely to originate within the Industry. British Gas has a strong corporate structure; but the threat of enforced restructuring from governmental sources (particularly with the threatened dispersal of sales interests) remains.

Removal of the gas carrier monopoly for example could lead to considerable changes in investment plans, which obviously would have repercussions throughout British Gas.³⁶

Nonetheless, trends are evident in the workforce, such as the growth in personnel occupying senior positions in order to control the expanding complexities of the business, and the decline in clerical employment as mundane tasks are increasingly absorbed by developments in technology and increasingly larger workloads are carried by a contracting clerical labour force. Within the total workforce British Gas has been able to control such developments through policies of recruitment and natural wastage.

Overall, the Industry is likely to continue to protect the interests of its employees, particularly those whom it has prepared for future Higher Management positions. But within this context it must be expected to follow national employment trends, and to make demands upon its employees in a similar fashion to other large organisations, such as an increased willingness to relocate elsewhere within the Industry. The changing structure of the workforce reflects these needs.

As a result both of the extensive reorganisation/relocation programmes undertaken throughout British Gas to date and of the inevitable inertia which exists as an outcome of such heavy investment (particularly where this has involved extensive rebuilding programmes), there is unlikely to be any major relocation programme initiated in the short to medium-term. Indeed, the final stages of programmes in progress in North West and South West Regions indicate the growing time scales over which these have been implemented in recent years. Even those Regions which undertook to replace out-moded buildings as

a gradual rebuilding programme, such as East Midlands, have exhibited a lengthening of the original replacement period. Although some rationalisation and replacement will continue it is clear that the degree of reorganisation this requires will continue to decline. Most development of this type undertaken recently has been restricted to small offices such as reporting centres. Obviously the dicotomy between headquarters and non-headquarters offices will continue, but with advances in technology offering opportunities to restructure the division of responsibilities between headquarters offices and Area/District offices (a process which has been adopted to a limited extent already in some Regions). The division of work between these levels is subject to an increasingly wide degree of interpretation.

For future research, a fuller monitoring of the relocation process and the inter-relationship with reorganisation policies within large organisations, particularly those which provide opportunities for large-scale employment throughout much of Britain, would produce useful and thorough insight into the mechanics of these processes. Organisations can maximise the effectiveness of relocation opportunities by greater understanding of the complexities of its integration with reorganisation, whilst recognising the need for minimising workforce disturbance (the perception of which is a growing threat to such processes). The individual employee may benefit through greater acknowledgement of his problems by his employer, particularly as the need to undertake voluntary moves increases. The employer's need to retain specialist, trained personnel encourages his greater understanding and support. Both employers and employees often demonstrate a fear of office relocation which largely arises from lack of knowledge. Employee participation is a proven means of reducing their fear, but for employers it is suggested that further research might

reveal that unfavourable effects upon the workforce arising from relocation are overcome rapidly and should not be given undue significance in the relocation decision.

NOTES

1. Wales Gas data is presented initially in Chapter III. The findings are re-assessed in Chapter VIII. However, the residence-work distances for all selected Regions are presented in Chapter IX.
2. For descriptions of governmental intervention and control, see Graham L. Reid and Kevin Allen, Nationalised Industries, Penguin Modern Economics Texts (Harmondsworth, Middx: Penguin, 1970), particularly pp. 54-81; Allen Skuse, Government Intervention and Industrial Policy, 2nd ed. (London: Heinemann, 1972); and G [raham] L. Reid, Kevin Allen and D.J. Harris, The Nationalised Fuel Industries (London: Heinemann, 1973), especially the section relating to the Gas Industry by Reid.
3. See Chapter II.
4. For example, see Sant: "The proportion of employment in manufacturing industries accounted for by [administrative, technical and clerical workers] ... in 1924 was about 10 per cent, in 1954 about 18 per cent, and in 1974 it had reached 27 per cent.... Moreover, the main components of the shift were found in the increase of women in clerical jobs and both men and women in administrative jobs". Morgan Sant, "Issues in Employment", in Issues in Urban Society, eds. Ross Davies and Peter Hall (Harmondsworth, Middx: Penguin, 1978), p.90.
5. The British Gas office workforce as a whole is discussed in Chapter II. Details of selected Regions are given in Chapters III, VIII, IX and X.
6. The results of this survey are presented in Chapter VII.
7. For Wales Gas (at reorganisation) these are given in Chapter III. For North West Gas and British Gas generally, see Chapters VI and VII.
8. The pursuit of this aspect of the project would have resulted in a more limited analysis of the Regional workforces, as initially the intention was to compare only two Regions. British Gas response to making the required information available for these analyses was very favourable. The more objective consideration of the office workforce thus became a major part of the project.
9. Secretary's Department, British Gas Corporation, letter of 2 January 1978.
10. This is evidenced by the organisation charts. See Appendix A.
11. Other industries with functional organisations include British Steel and British Telecom.
12. These are presented in Chapter II.

13. See, for example, Jacqueline Charlton and David Heald, "Restructuring the Electricity Supply Industry", Public Administration Bulletin no. 29 (April 1979), 43-60; although the main sources of information are of course the publications of the Industry itself, notably the various annual reports and accounts.
14. See Chapter IX.
15. W. Thornhill, The Nationalised Industries: An Introduction (London: Nelson, 1968).
16. This is discussed in Chapter II.
17. See Chapter VII.
18. For the Post Office, compare for example the use of the post code, and for British Telecom the adoption of System X; see Michael E. Corby, The Postal Business 1969-79: A Study in Public Sector Management (London: Kogan Page, 1979), especially pp. 196-202. Examples of similar technology usage outside the nationalised industries include the extensive use of magnetic bar coding by British banks, food manufacturers, et cetera.
19. See Chapter V; for example in South West Gas and Wales Gas.
20. See Chapter VI.
21. Discussion of headquarters location is presented in Chapter V.
22. See Chapter V.
23. Use of consultants is illustrated fully in Chapter VI.
24. Thus headquarters in particular, but also other city centre sites, are usually multi-storey buildings, whereas non-central offices, particularly those built on extensive gas works sites, tend to be only one or two storeys high. The unusual locations of Northern and West Midlands Regional Headquarters have permitted the development of low level structures. Thus there is not a simple relationship between office function and physical structure, but a combination of these with features of its site and situation, as well as the period of development which result in the building form.
25. See Chapters V and VI.
26. See Chapter VI for comparisons with South Eastern Electricity Board. This view was expressed specifically by the Management Services Officer, interview at Board Headquarters, Hove, 29 August 1980.
27. These are identified in Chapter V.
28. These are presented in Chapter VI.

29. Most of this examination is undertaken in Chapter VIII.
30. Of course, these features of the female workforce are not unusual, but are common features of female employment. See, for example, Alice H. Amsden, ed., The Economics of Women and Work (Harmondsworth, Middx: Penguin, 1980).
31. See Chapter IX.
32. This is concluded after detailed examination of the temporal and spatial incidence of residential and workplace relocations, with additional consideration of positional changes.
33. Evidence for these conclusions is presented in Chapter X.
34. See Chapter VIII for comparison with Eastern Gas. It should be noted also that the Wales Gas office relocations were not completed for some years, as these took place in two phases.
35. Assistant Secretary, British Gas Corporation, interview at Marble Arch offices, 20 December 1978.
36. These are the primary features of the privatisation policies as they affect British Gas.

APPENDIX A

ADDITIONAL ILLUSTRATIONS

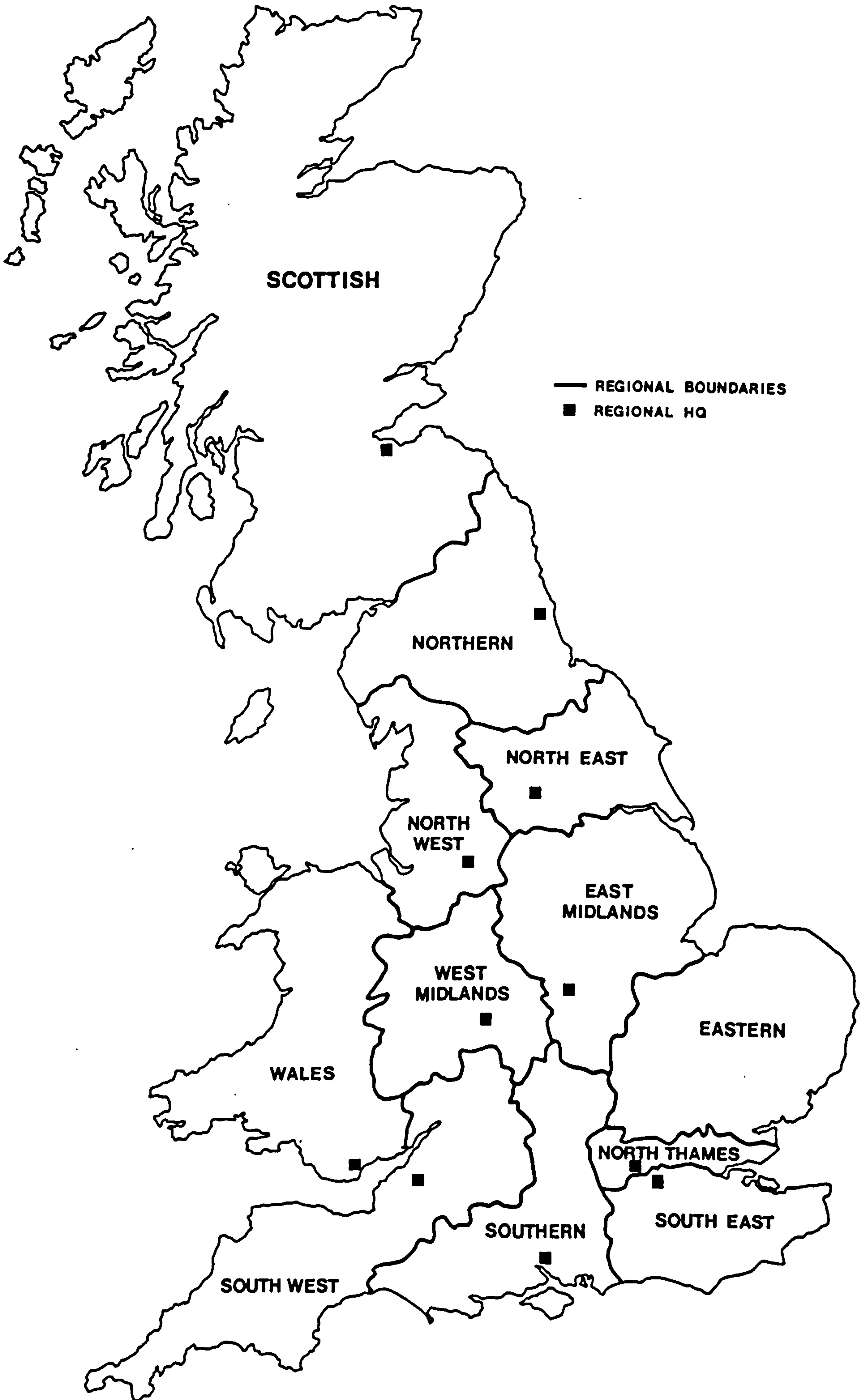


Fig. A.1 Regions and Regional Headquarters of British Gas

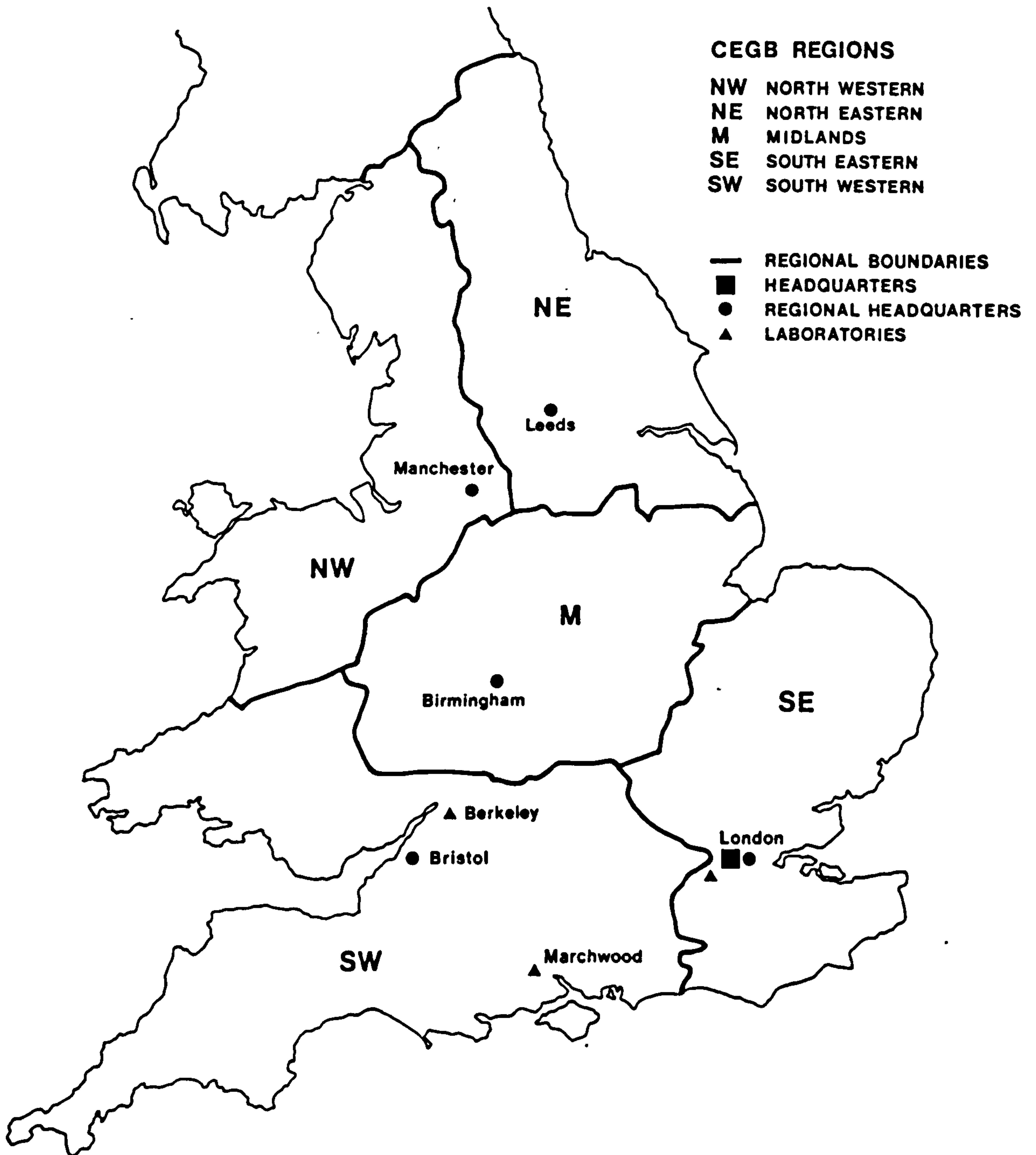


Fig. A.2 Regions of the Central Electricity Generating Board

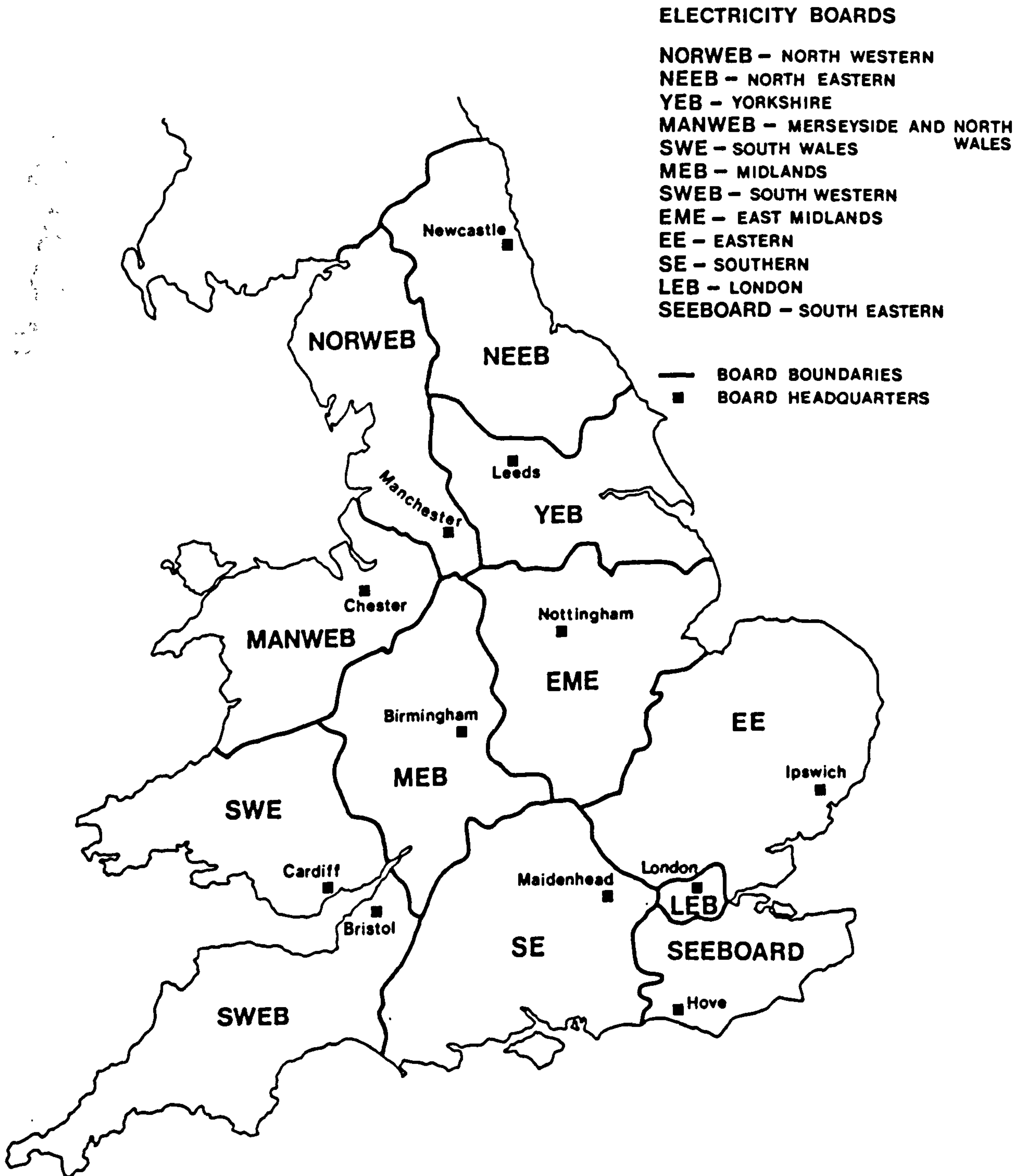


Fig. A.3 Electricity Boards of England and Wales

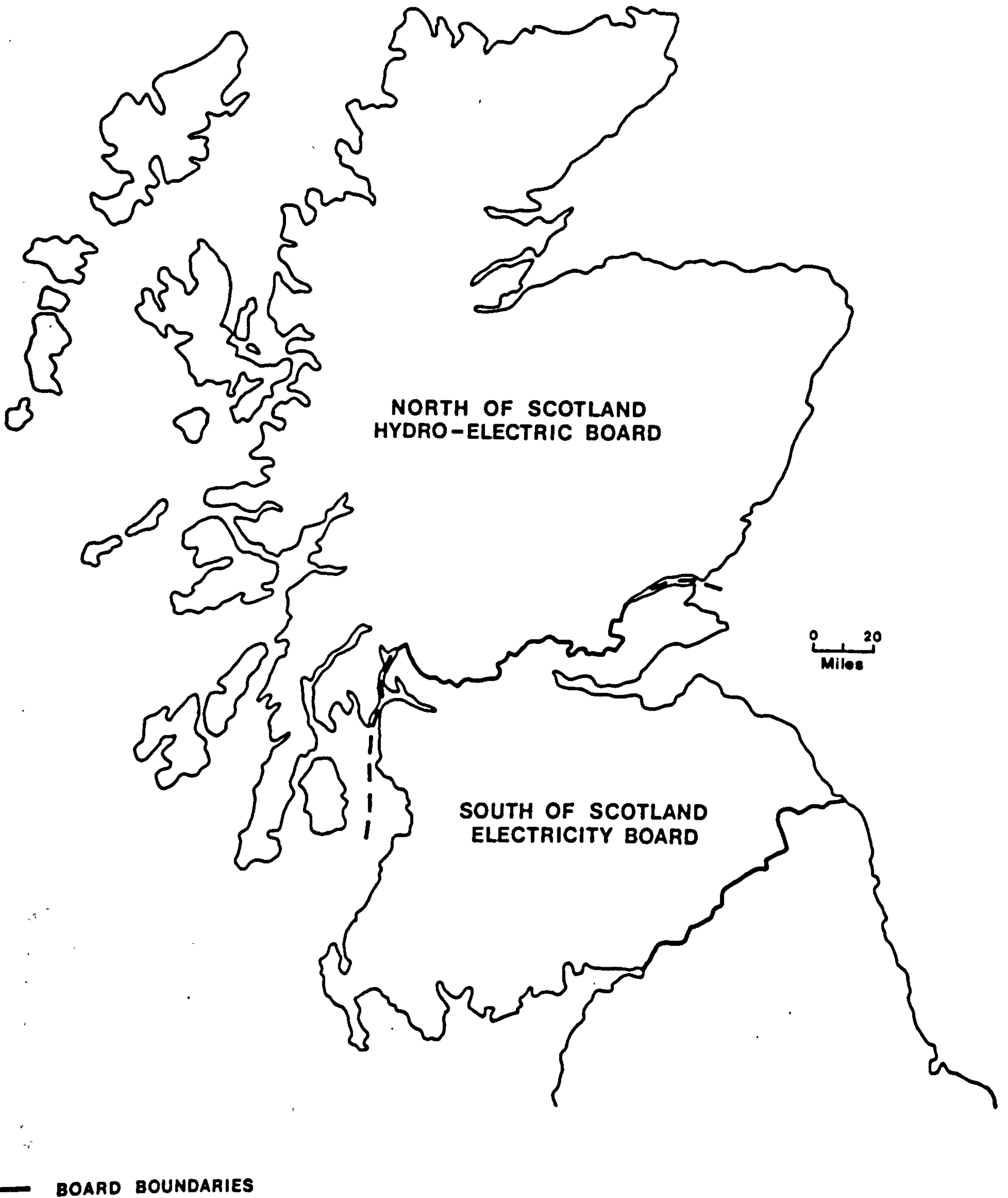


Fig. A.4 Electricity Boards of Scotland

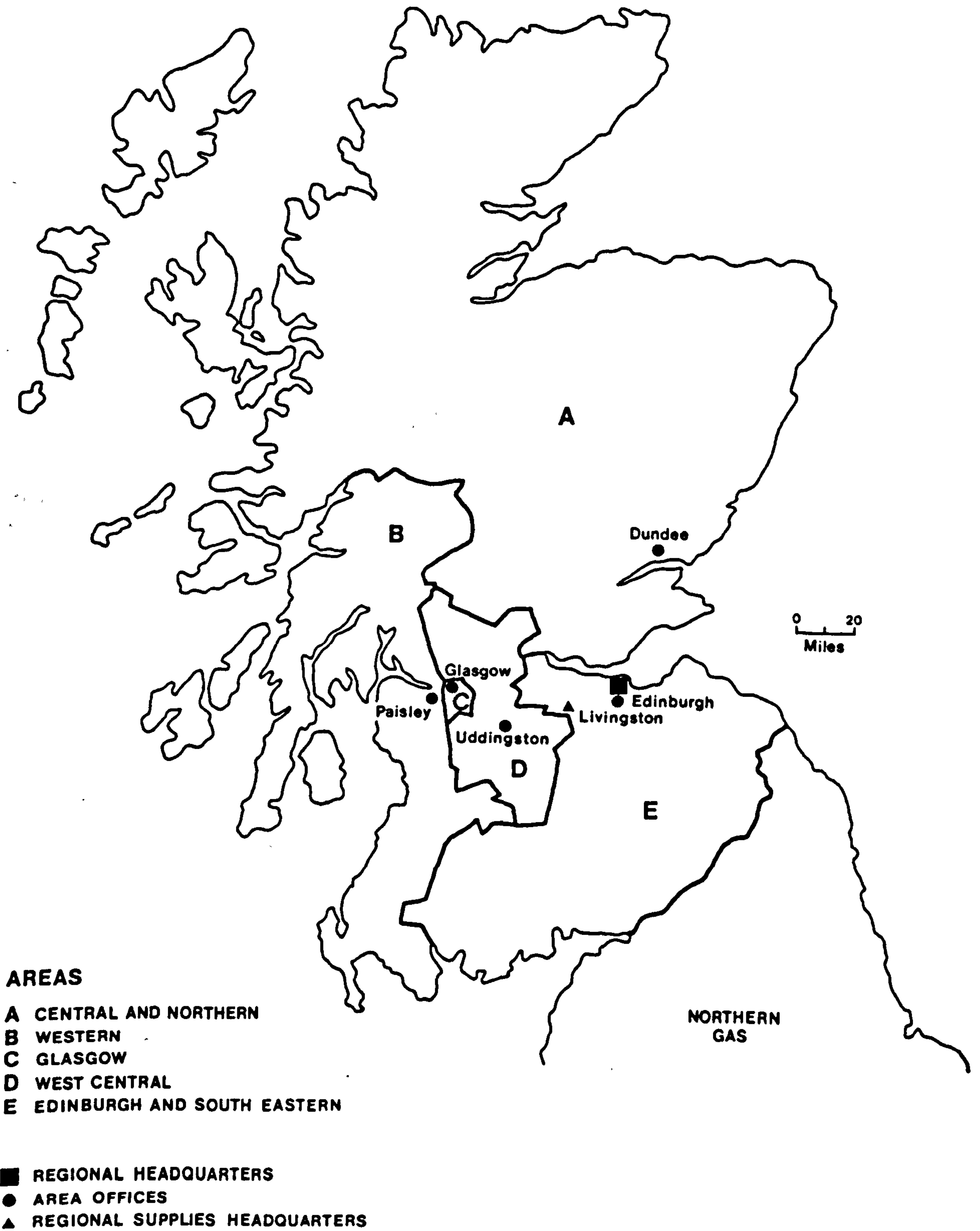


Fig. A.5 Administrative Areas of Scottish Gas

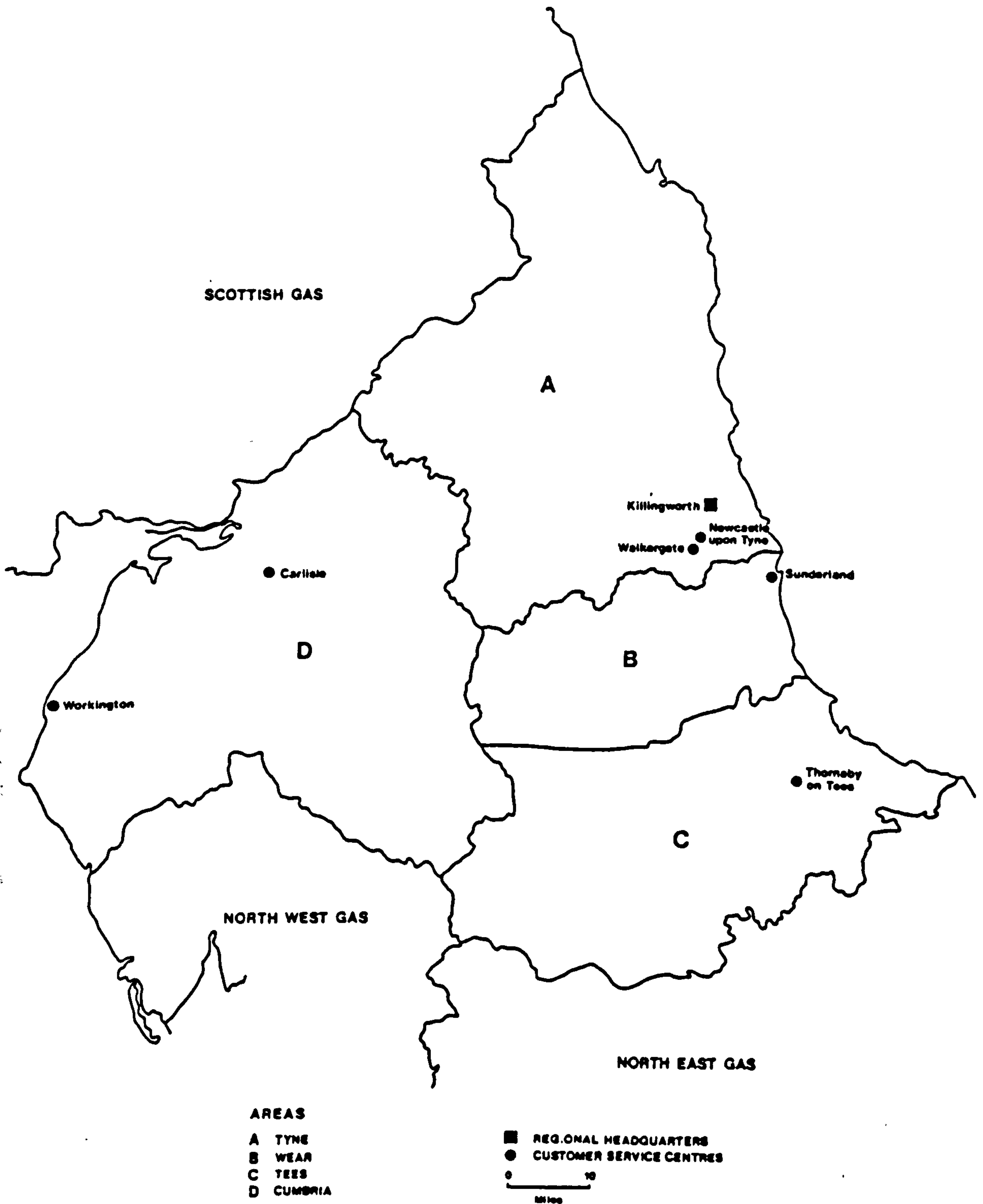


Fig. A.6 Administrative Areas of Northern Gas

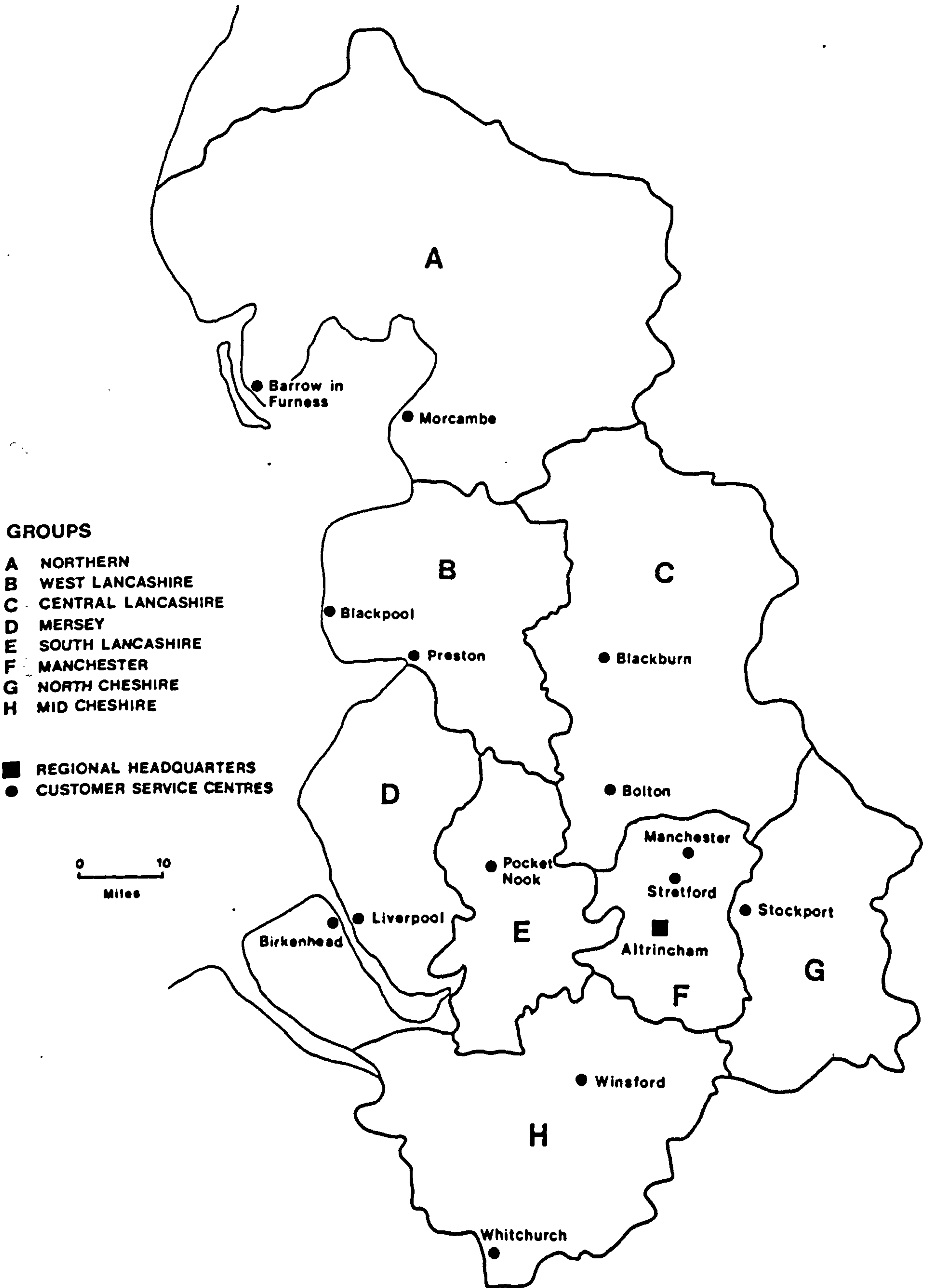


Fig. A.7 Administrative Areas of North West Gas

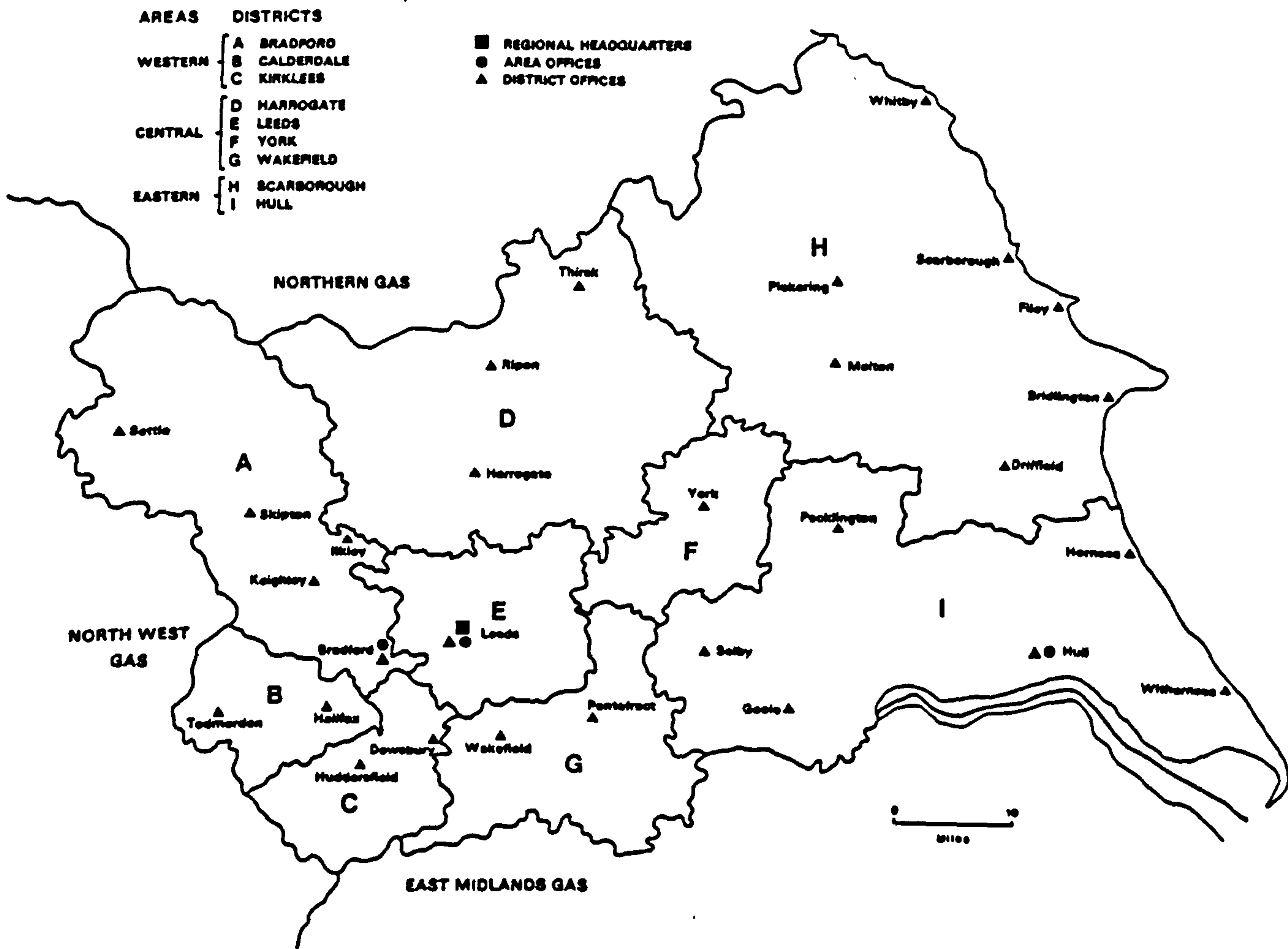


Fig. A.8 Administrative Areas of North East Gas

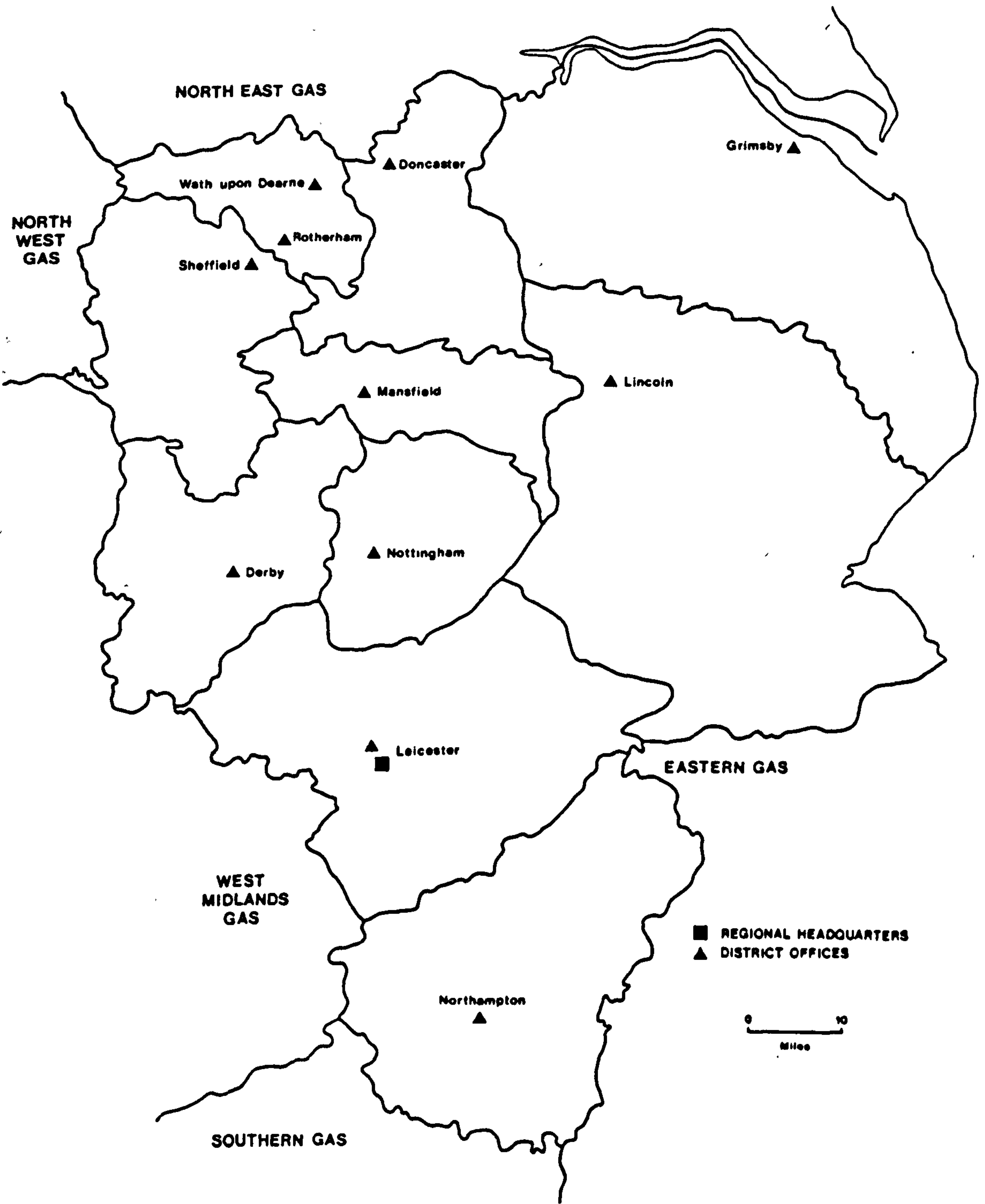


Fig. A.9 Administrative Areas of East Midlands Gas

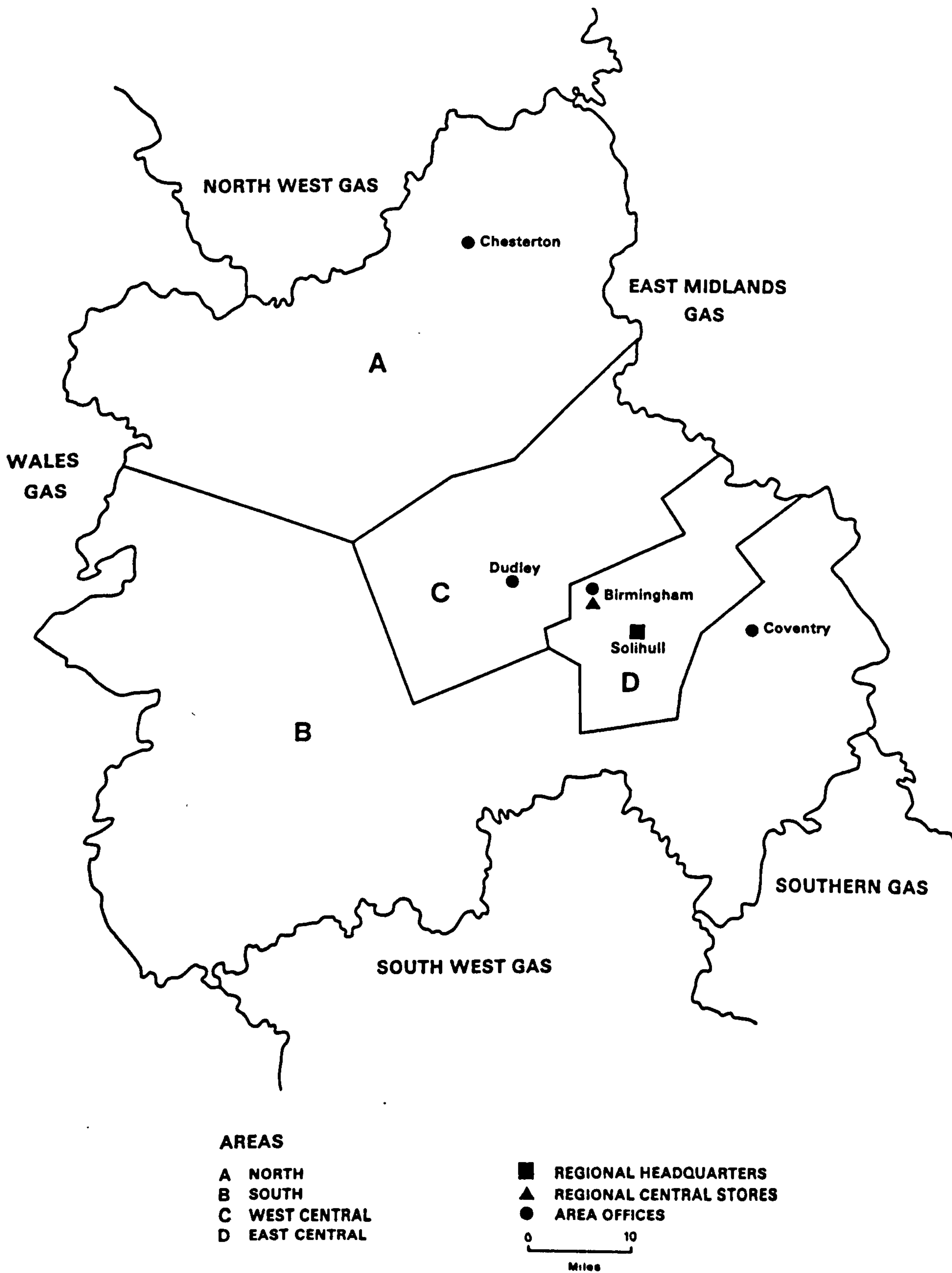


Fig. A.10 Administrative Areas of West Midlands Gas

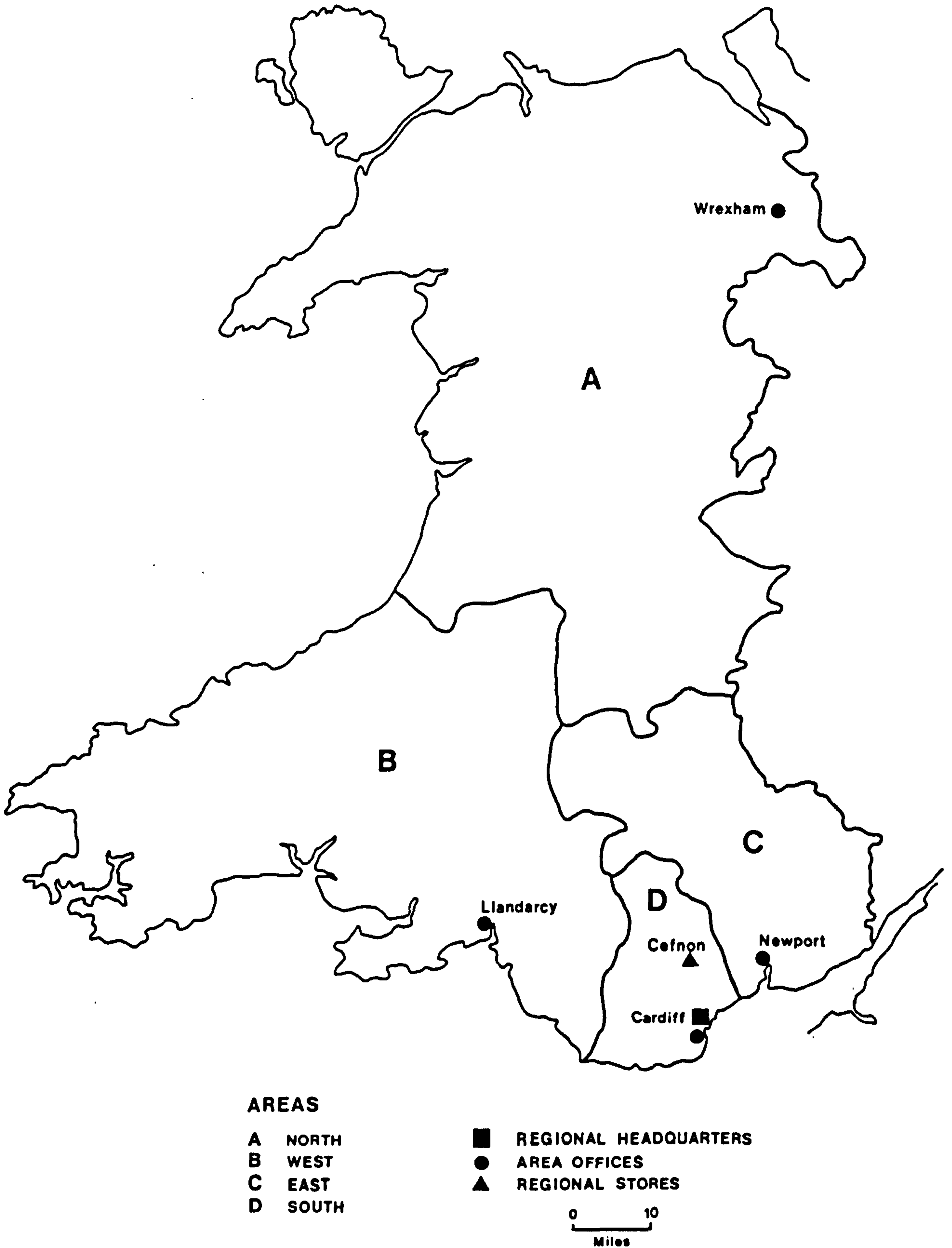


Fig. A.11 Administrative Areas of Wales Gas

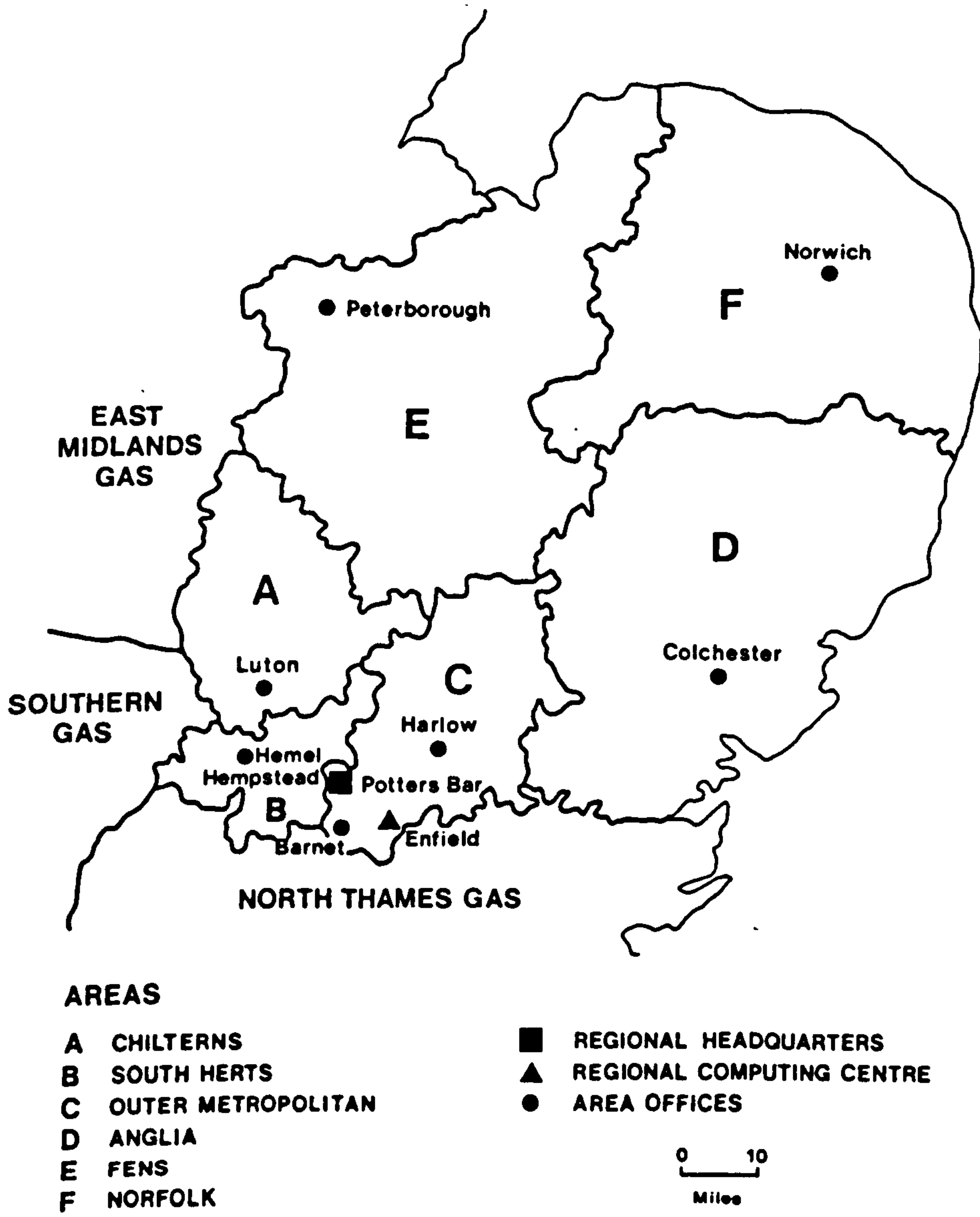


Fig. A.12 Administrative Areas of Eastern Gas

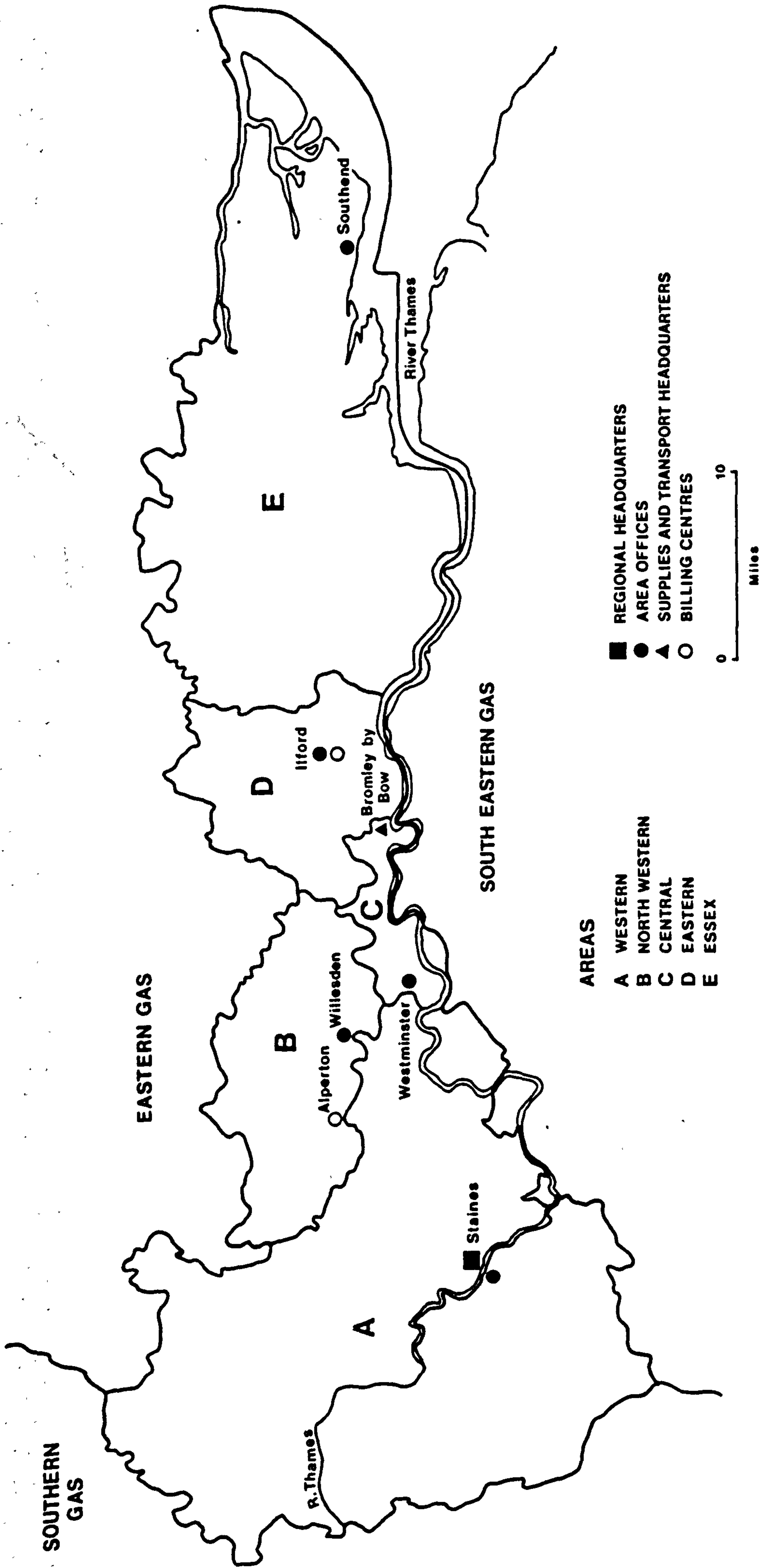


Fig. A.13 Administrative Areas of North Thames Gas

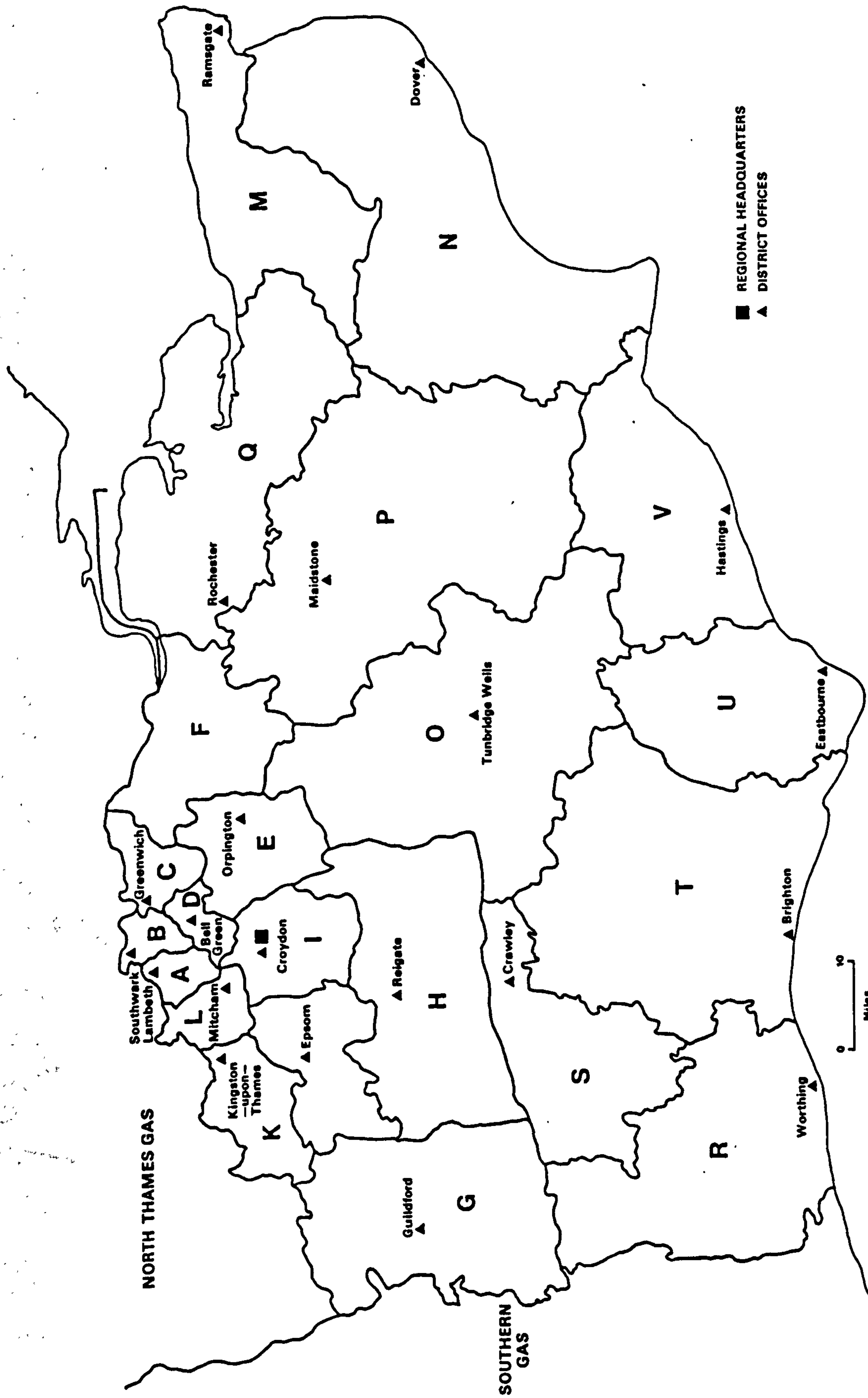


Fig. A.14 Administrative Areas of South East Gas

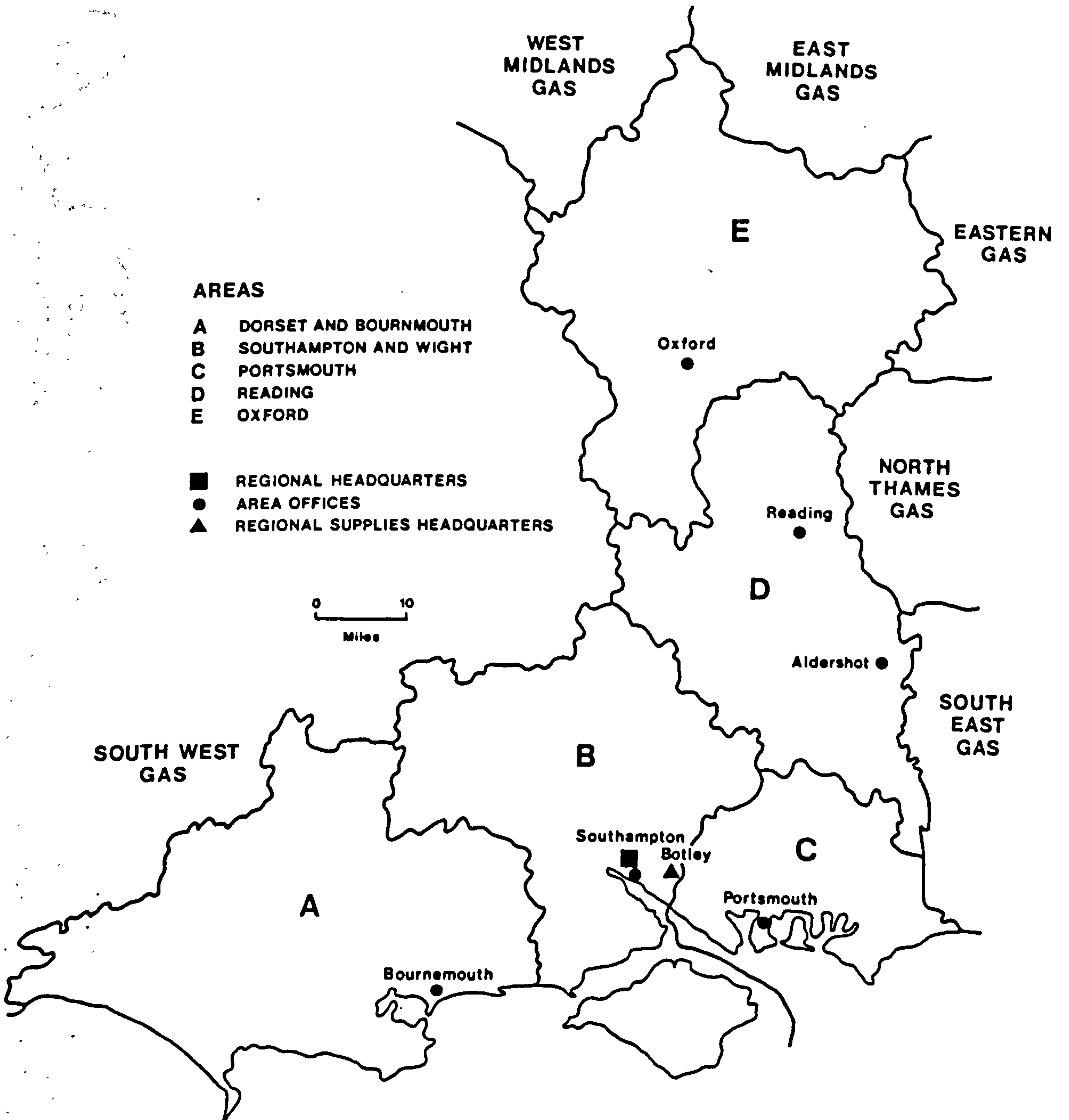


Fig. A.15 Administrative Areas of Southern Gas

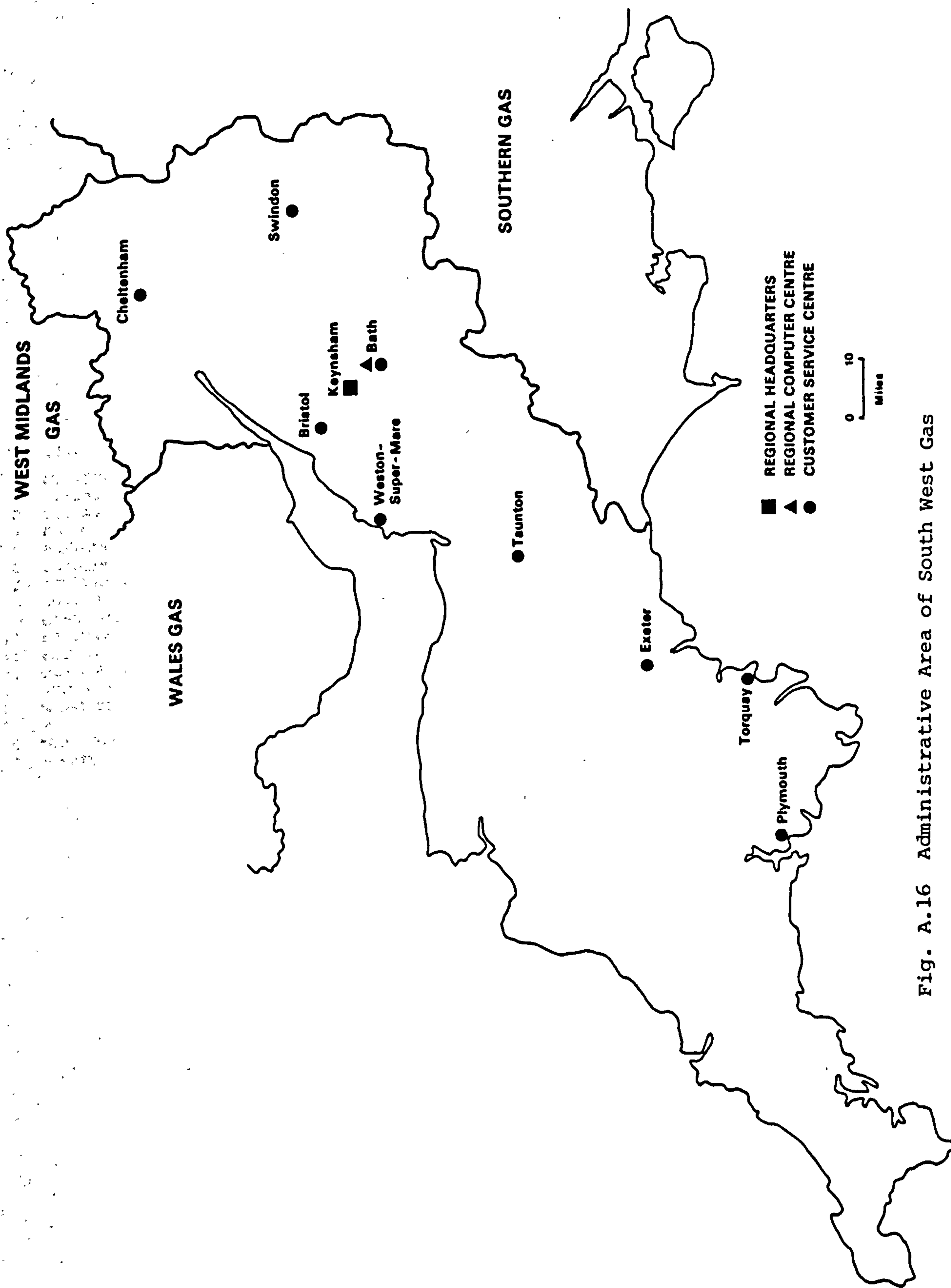


Fig. A.16 Administrative Area of South West Gas

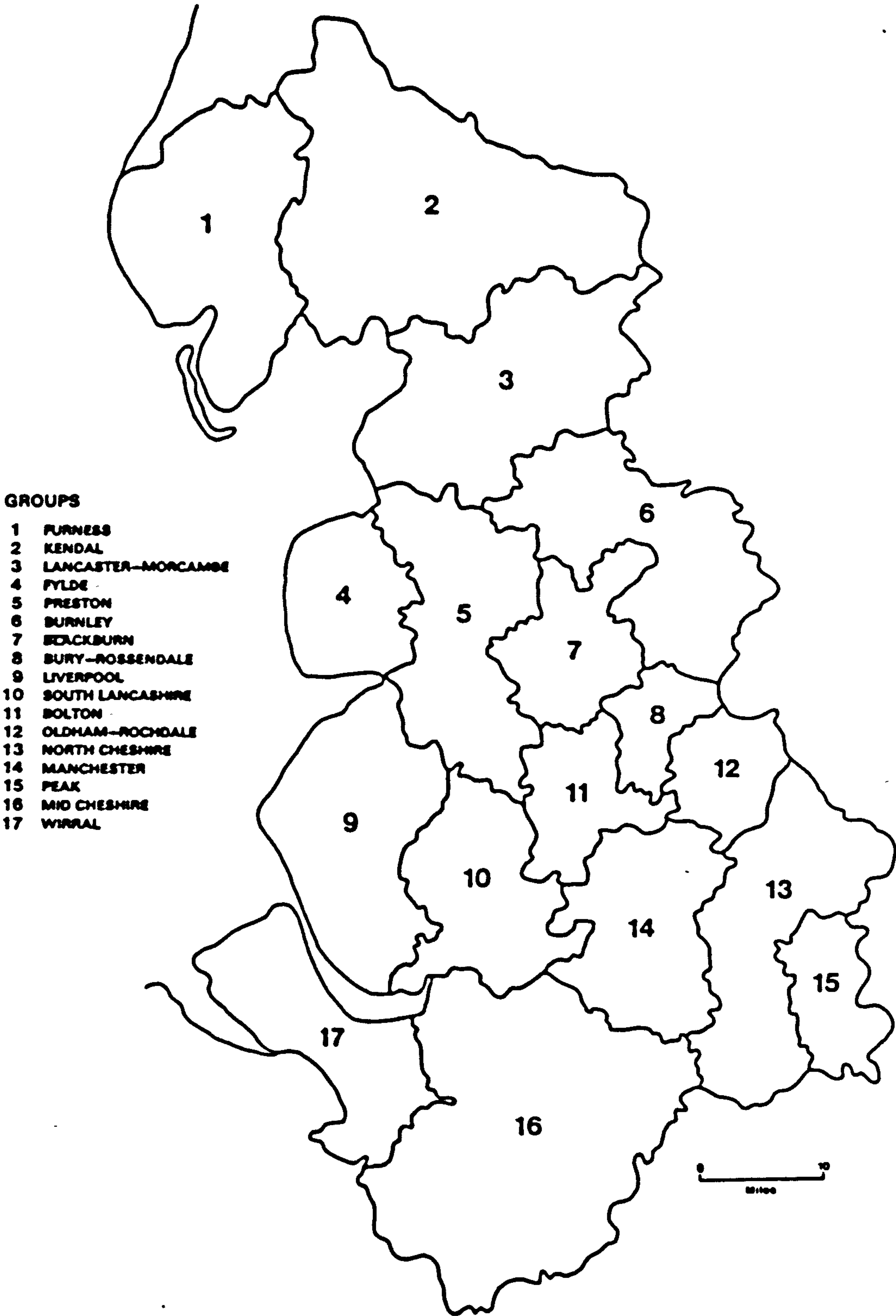


Fig. A.17 Administrative Areas of North Western Gas Board, as at 31 March 1950

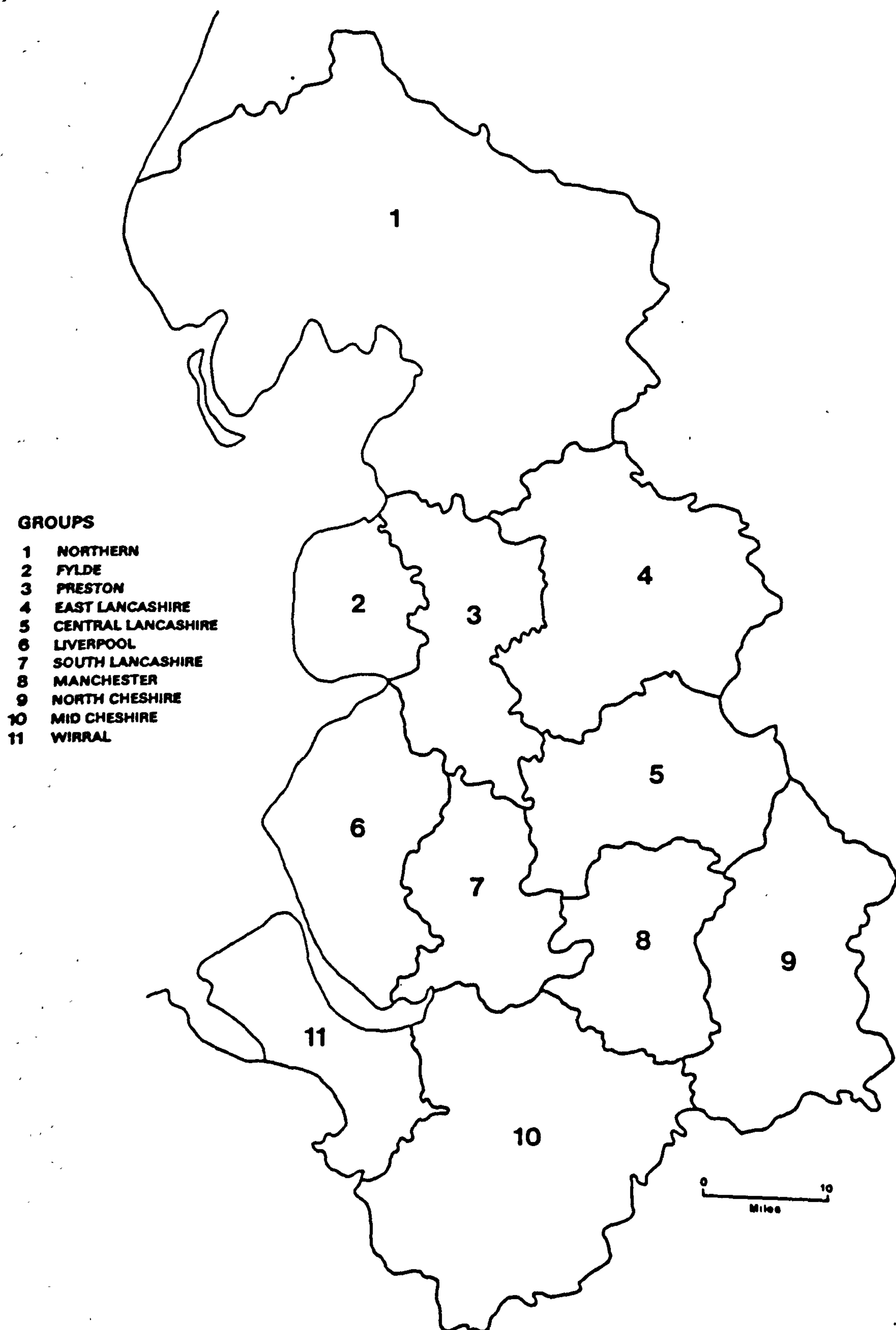


Fig. A.18 Administrative Areas of North Western Gas Board, as at 31 March 1955

LEGEND - Fig. A.19

GROUP	DISTRICT - NUMBER OF CONSUMERS	
Bradford	1	5410
	2	26957
	3	108712
Huddersfield - Halifax	4	8956
	5	50811
	6	59223
	7	17724
Leeds	8	172099
	9	48356
Wakefield	10	7645
	11	37352
York - Harrogate	12	32880
	13	3979
	14	18078
	15	36416
West Yorkshire Gas Grid	16	9641
	17	98230
	18	10468
	19	1627
	20	1272

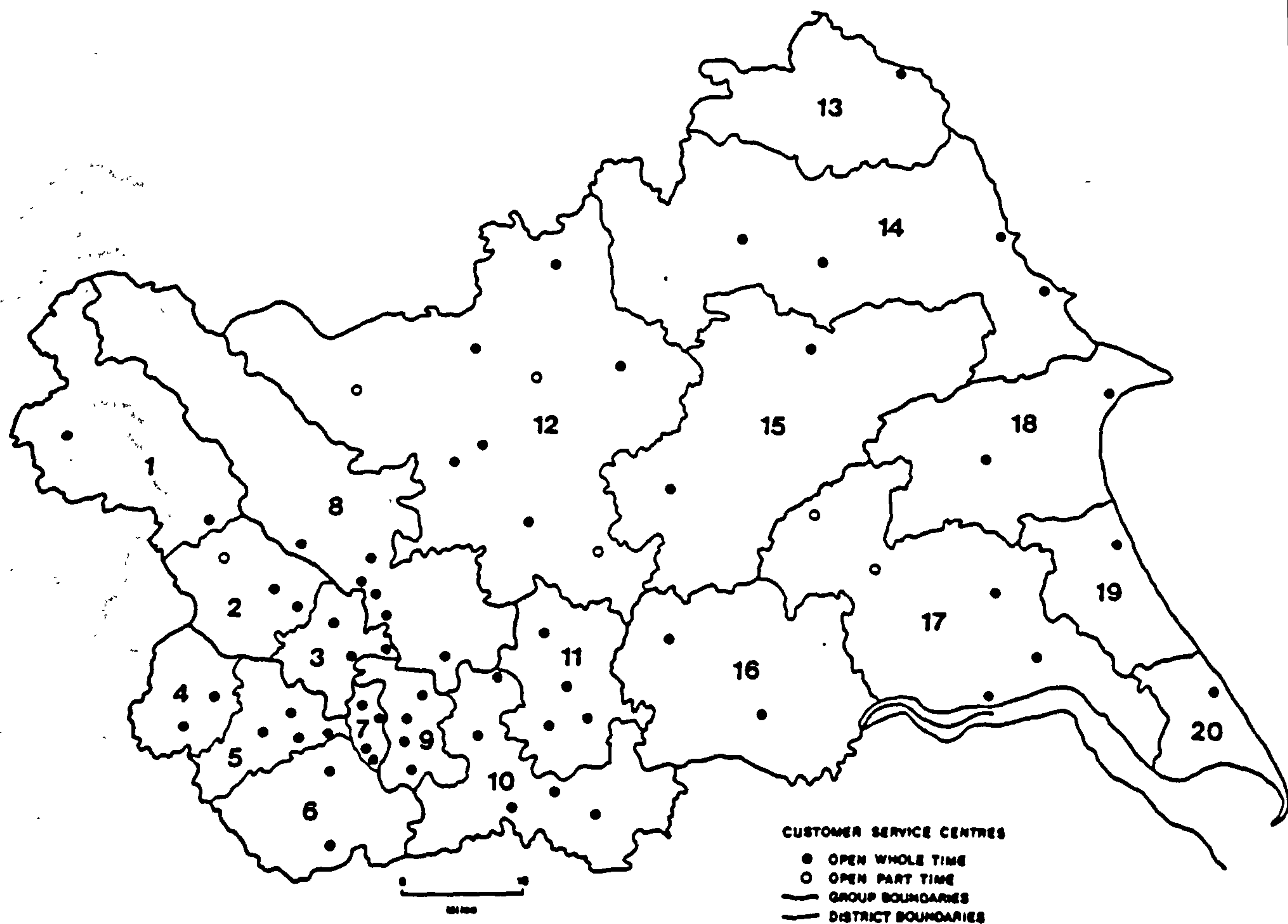


Fig. A.19 Administrative Areas of North Eastern Gas Board, as at 31 March 1965

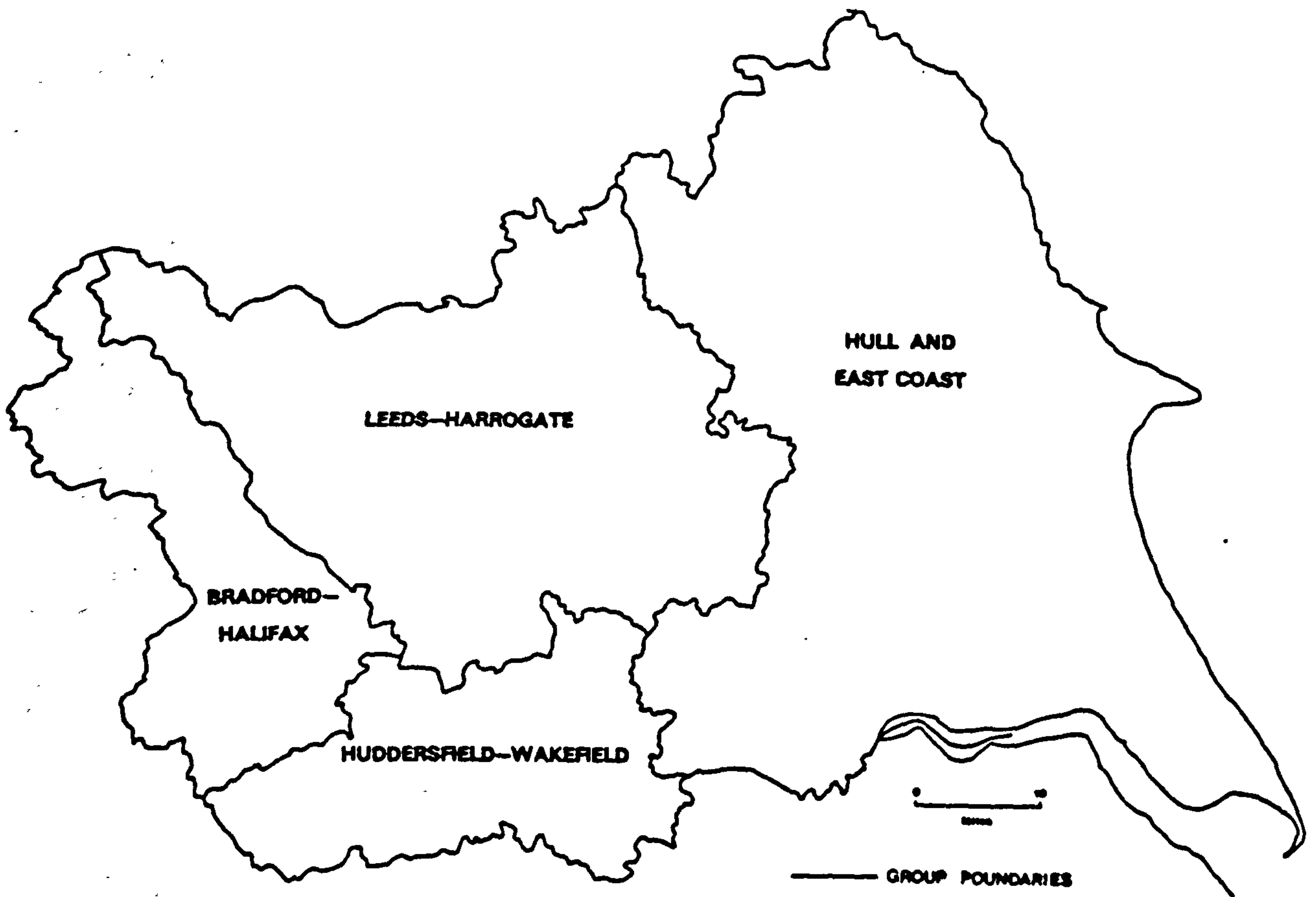


Fig. A.20 Administrative Areas of North Eastern Gas Board,
as at 1 April 1967

LEGEND - Fig. A.21

DIVISION	DISTRICT
Sheffield and Rotherham	1 BARNSELY
	2 SHEFFIELD
	3 MATLOCK
	4 DEARNE VALLEY
	5 ROTHERHAM
	6 BEIGHTON
	7 DONCASTER
	8 WORKSOP
Notts. and Derby	9 DERBY
	10 BURTON
	11 CHESTERFIELD
	12 HEANOR
	13 LONG EATON/ILKESTON
	14 MANSFIELD/SUTTON
	15 NEWARK
	16 NOTTINGHAM
Lincolnshire	17 SCUNTHORPE
	18 LINCOLN
	19 SPALDING/STAMFORD
	20 GRIMSBY
	21 SKEGNESS
Leicestershire and Northants.	22 NORTH WEST LEICESTERSHIRE
	23 LEICESTER
	24 NORTHAMPTON
	25 WELLINGBOROUGH

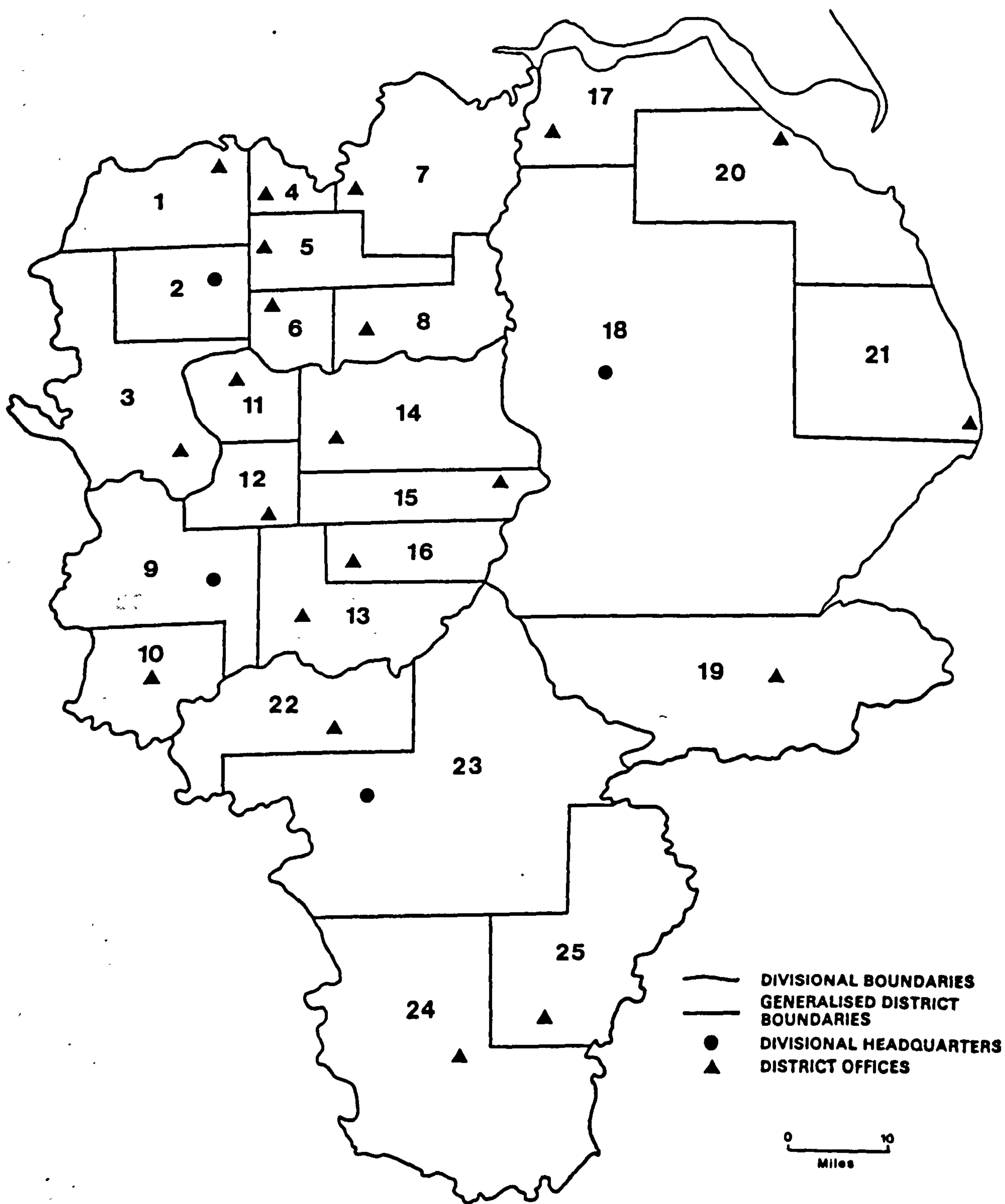
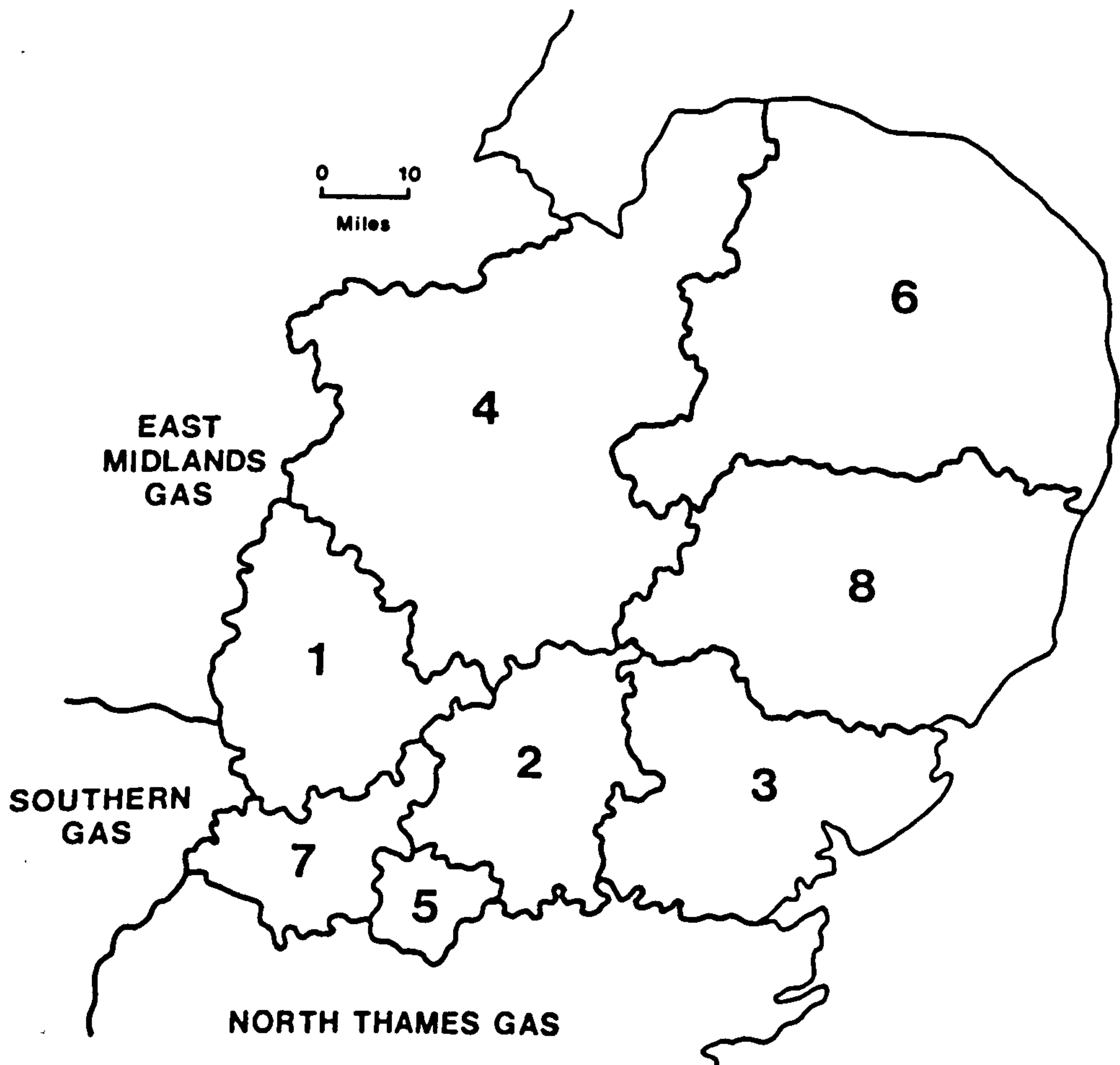


Fig. A.21 Administrative Areas of East Midlands Gas Board, as at 31 March 1964



REGIONS

- 1 CHILTERNS
- 2 EAST HERTS & HARLOW
- 3 ESSEX
- 4 FENS
- 5 METROPOLITAN
- 6 NORFOLK
- 7 SOUTH HERTS
- 8 SUFFOLK

Fig. A.22 Administrative Areas of Eastern Gas Board, as at 1 January 1966

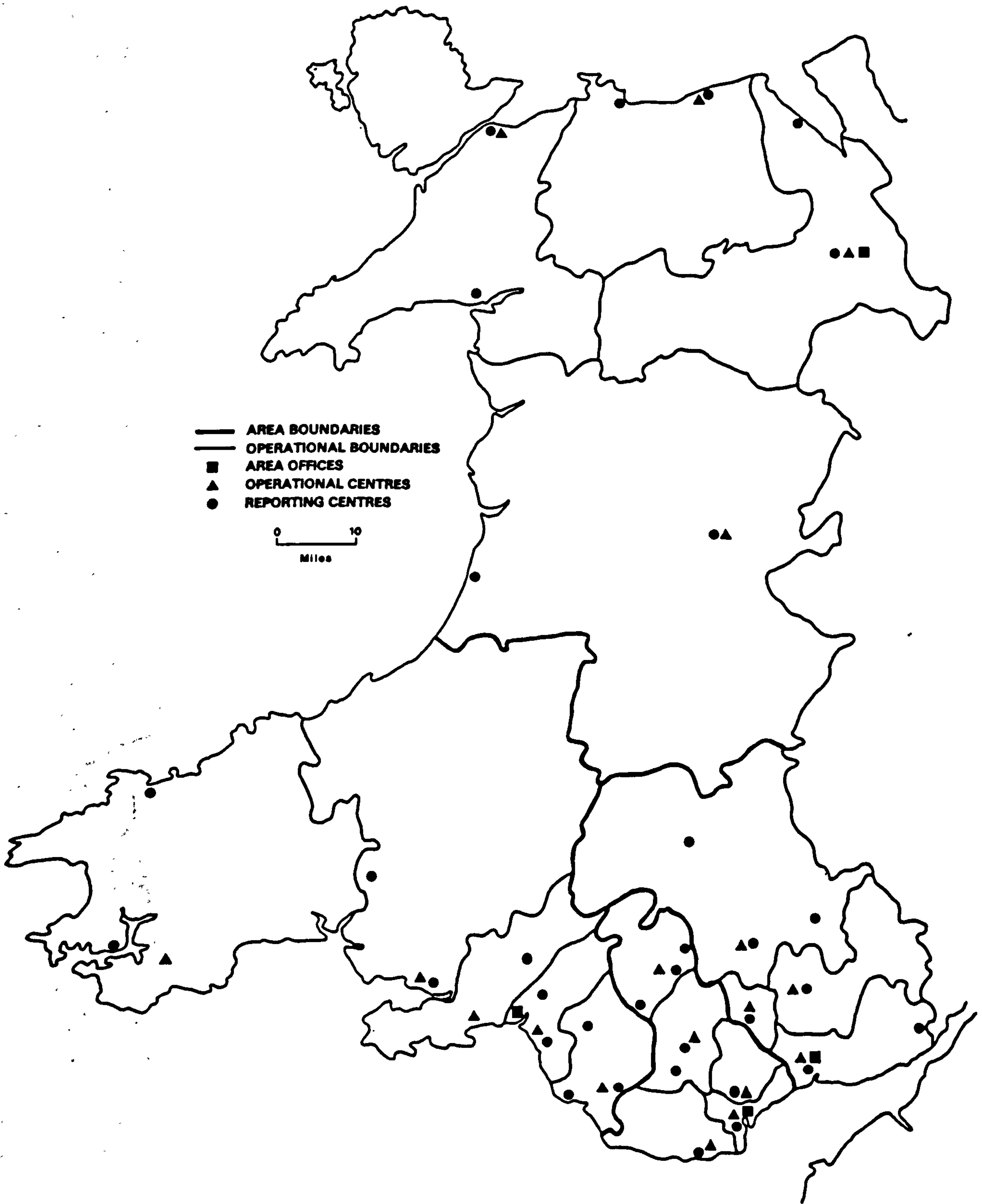


Fig. A.23 Distribution Districts of Wales Gas, as at 31 March 1981

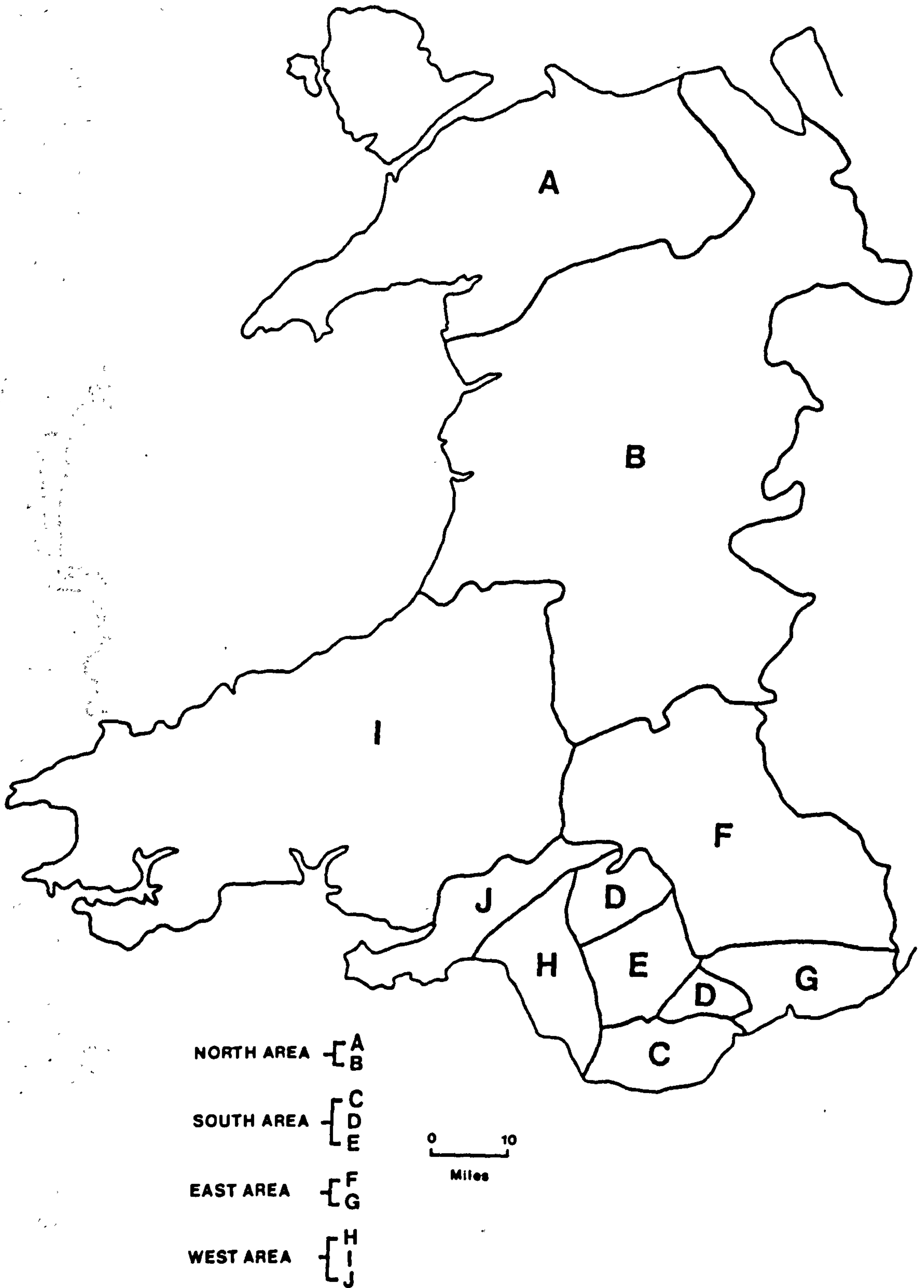


Fig. A.24 Distribution Districts of Wales Gas

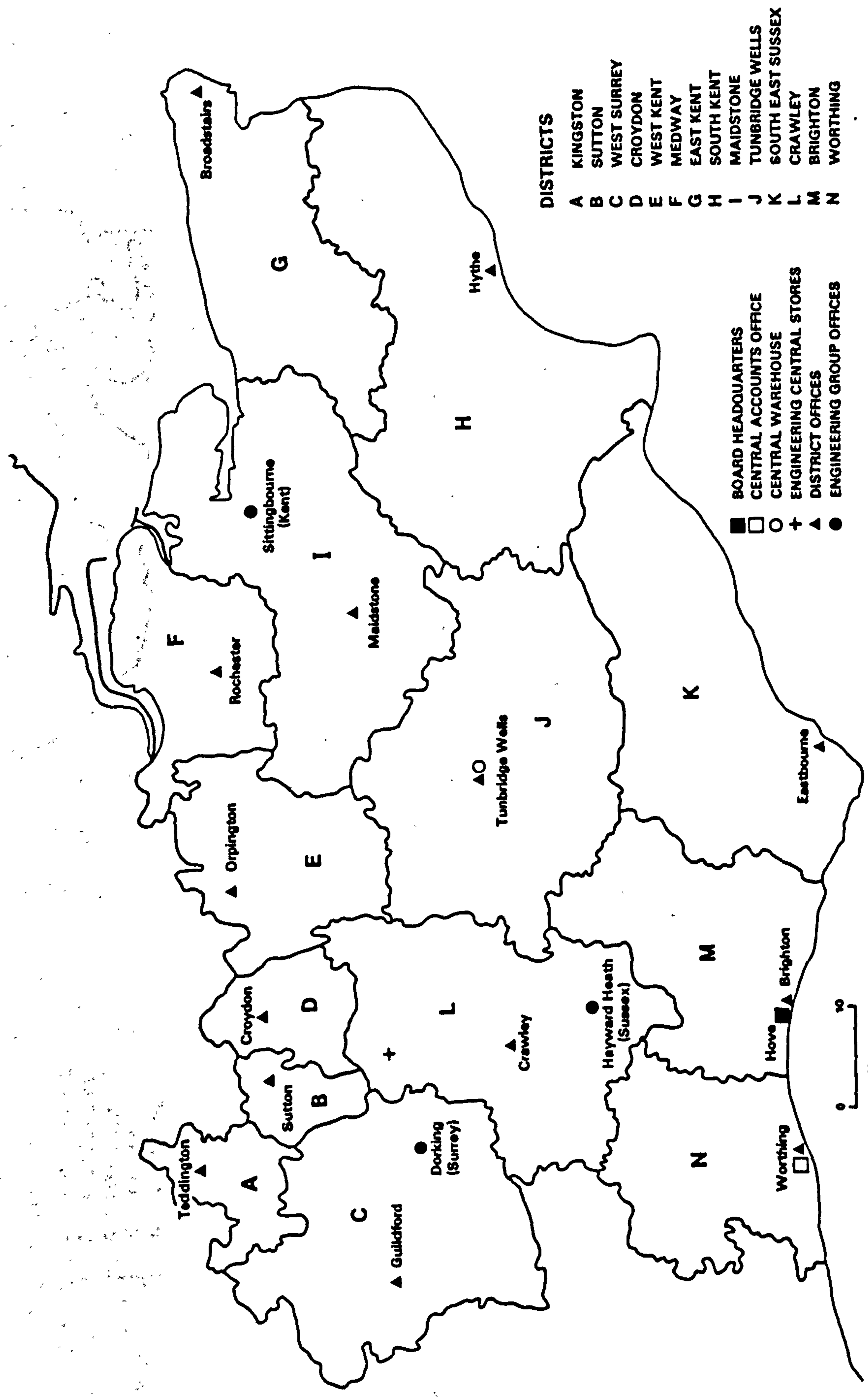


Fig. A.25 Administrative Areas of South Eastern Electricity Board

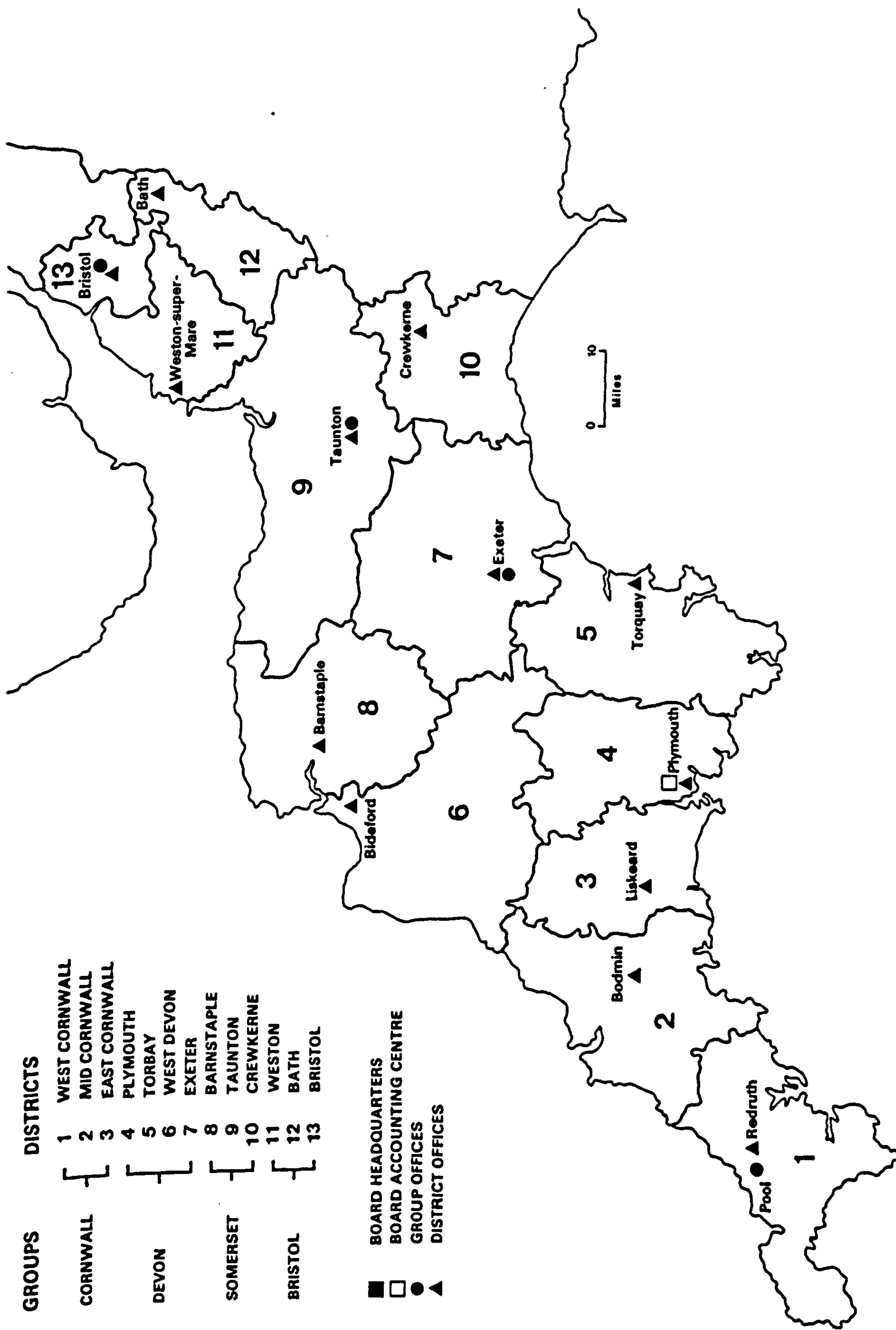


Fig. A.26 Administrative Areas of South Western Electricity Board, as at 31 March 1980

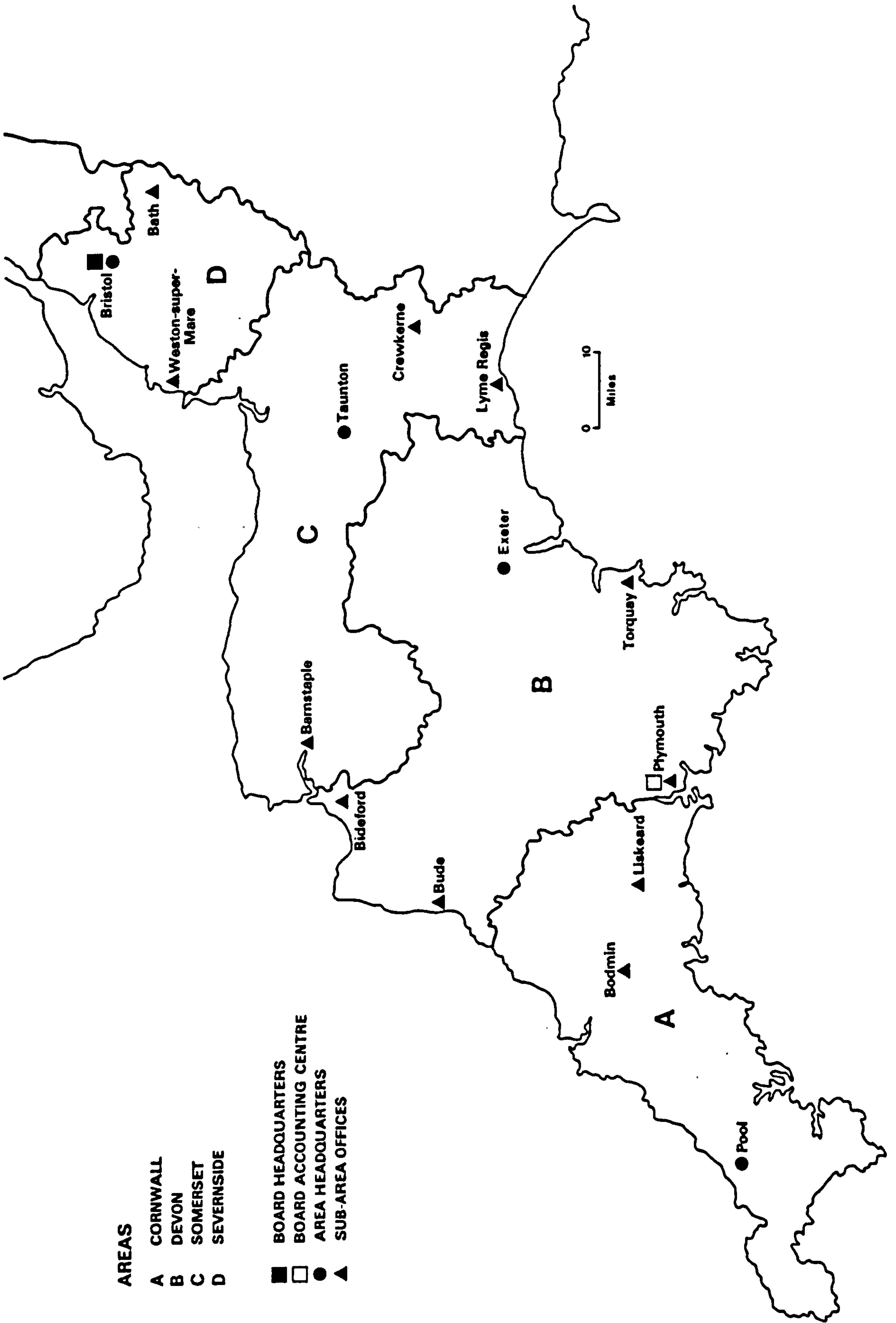


Fig. A.27 Administrative Areas of South Western Electricity Board, as at 1 April 1980

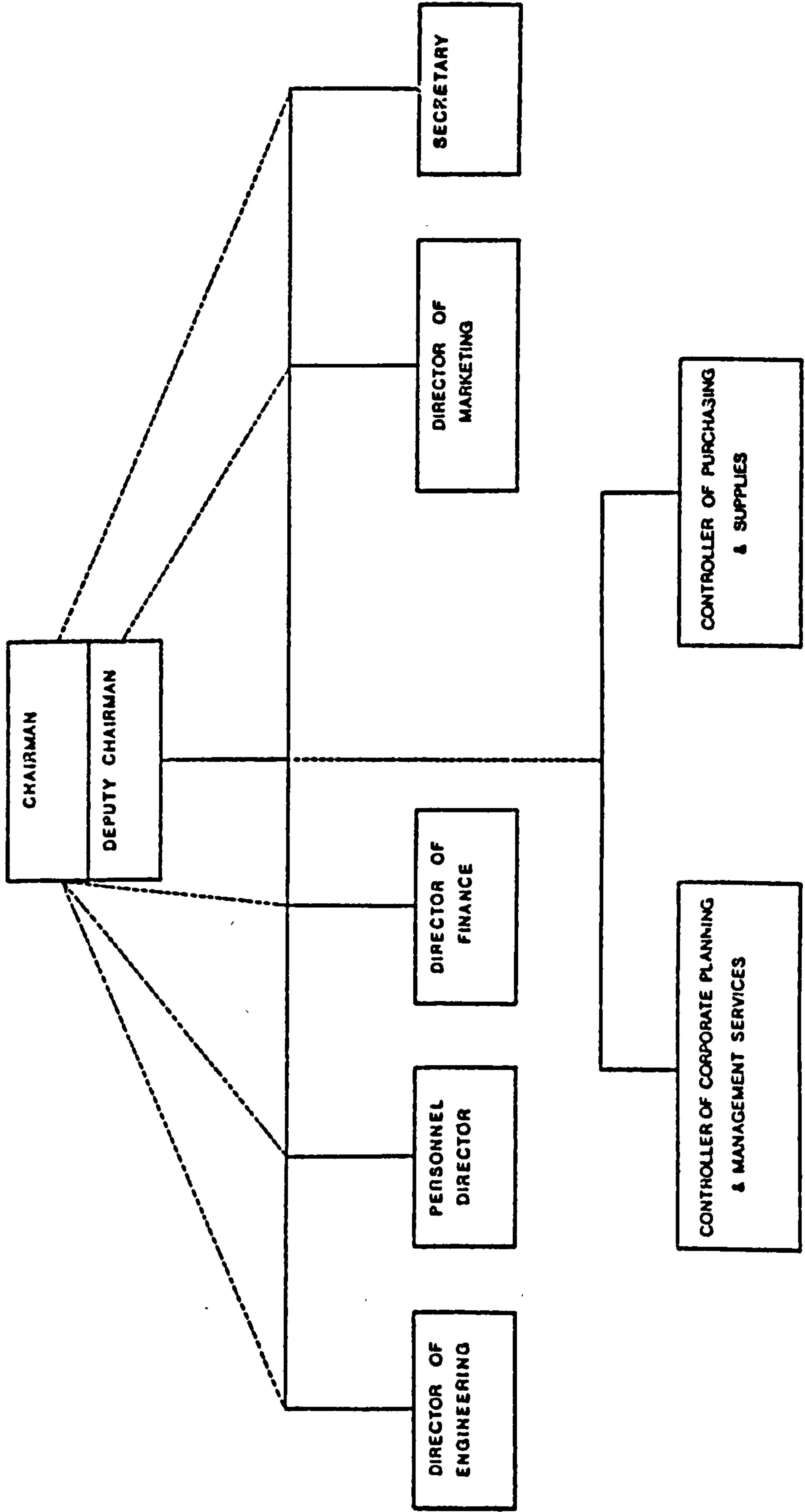


Fig. A.28 Basic Organisation of Wales Gas, as at April 1979

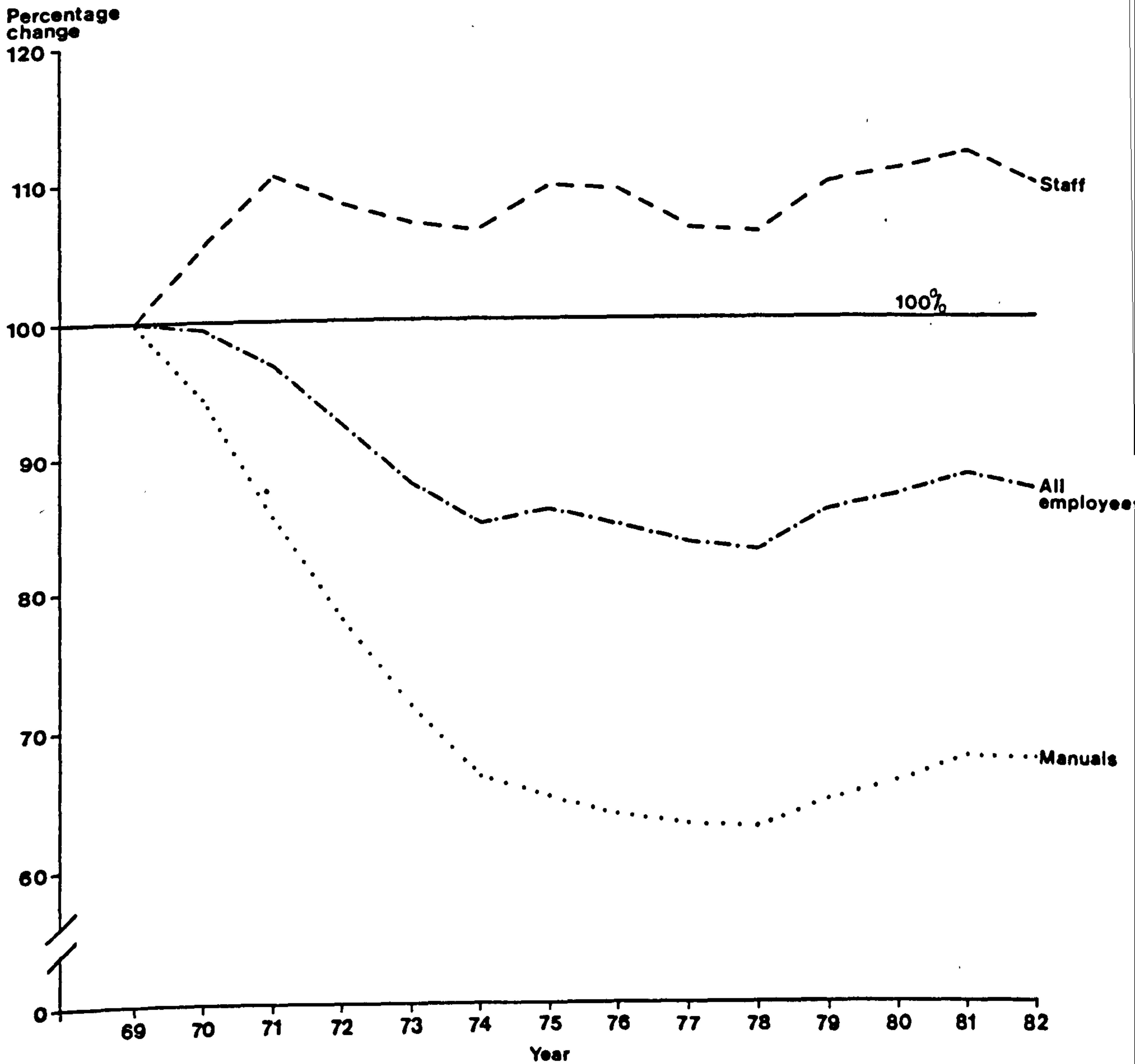


Fig. A.29 Percentage Movement in British Gas Employment (Index Year: 1968/69)

APPENDIX BADDITIONAL TABLES

TABLE B.1
MAJOR FEATURES OF THE BRITISH GAS REGIONS

	Area (sq.miles)	Population (000's)	Domestic consumers (000's)
Sc	30,400	5167	979
N	6,000	3020	840
NW	3,900	6662	2040
NE	4,000	3271	985
EM	6,780	5327	1582
WM	4,750	5129	1494
W	8,000	2808	627
E	7,100	4622	1149
NT	1,050	5294	1813
SE	3,300	5827	1840
S	5,220	3845	999
SW	8,250	3803	787

SOURCE: British Gas Corporation, Report and Accounts 1981/82.

TABLE B.2

THE FUNCTIONAL AND WORK LEVEL REPRESENTATION IN REGIONAL HEADQUARTERS,
WALES GAS

Work level	Chairman's	Secretariat	Stores & Supplies	Corporate Planning	Marketing	Engineering	Finance	Sales	Personnel
1	2	1	1	1	1	1	1	0	1
2	0	4	3	3	1	5	3	0	2
3	0	7	10	9	12	10	8	7	4
4	2	14	10	32	8	11	27	14	5
5	0	16	9	34	3	23	58	5	3
6	3	41	10	52	9	6	45	4	3
7	0	18	30	64	8	14	103	6	5
Total	7	101	73	195	42	70	245	36	23

SOURCE: Wales Gas PMIS data.

TABLE B.3
THE FUNCTIONAL AND WORK LEVEL REPRESENTATION IN NORTH
AREA, WALES GAS

Work level	Secretariat	Stores & Supplies	Corporate Planning	Marketing	Engineering	Finance	Sales	Personnel
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	1	2	0	1	2	1	3	1
4	1	1	0	9	21	1	8	0
5	1	4	1	30	37	9	14	1
6	11	4	0	3	20	13	22	1
7	8	5	2	55	30	60	46	1
Total	22	16	3	98	110	84	93	4

SOURCE: Wales Gas PMIS data.

TABLE B.4
THE FUNCTIONAL AND WORK LEVEL REPRESENTATION IN
EAST AREA, WALES GAS

Work level	Secretariat	Stores & Supplies	Corporate Planning	Marketing	Engineering	Finance	Sales	Personnel
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	1	1	0	1	1	1	2	1
4	1	1	1	8	13	1	5	0
5	2	1	0	29	23	8	11	2
6	8	3	0	3	11	14	16	1
7	9	2	0	56	24	57	34	1
Total	21	8	1	97	72	81	68	5

SOURCE: Wales Gas PMIS data.

TABLE B.5
THE FUNCTIONAL AND WORK LEVEL REPRESENTATION IN
WEST AREA, WALES GAS

Work level	Secretariat	Stores & Supplies	Corporate Planning	Marketing	Engineering	Finance	Sales	Personnel
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	1	1	0	1	6	1	2	1
4	1	1	1	9	20	1	7	0
5	1	2	1	31	39	10	12	4
6	10	3	0	3	17	17	25	1
7	9	4	1	60	34	65	44	1
Total	22	11	3	104	116	94	90	7

SOURCE: Wales Gas PMIS data.

TABLE B.6

THE FUNCTIONAL AND WORK LEVEL REPRESENTATION IN
SOUTH AREA, WALES GAS

Work level	Secretariat	Stores & Supplies	Corporate Planning	Marketing	Engineering	Finance	Sales	Personnel
1	0	0	0	0	0	0	0	0
2	0	0	0	0	3	0	1	1
3	1	3	0	1	16	1	5	5
4	2	2	1	12	46	1	12	5
5	5	6	0	39	66	7	19	24
6	13	6	1	4	21	21	22	2
7	12	6	0	84	38	87	44	2
Total	33	23	2	140	190	117	103	39

SOURCE: Wales Gas PMIS data.

TABLE B.7
 ESTIMATED IMPORTANCE OF FEMALES IN TOTAL
 EMPLOYMENT FOR SELECTED GAS REGIONS

	Male %	Female %
Wales	77.2	22.8
Eastern	77.6	22.4
South West	81.5	18.5
North West	75.9	24.1
Southern	76.0	24.0
Average	77.3	22.7
Seaboard	79.3	20.7

TABLE B.8
FUNCTIONAL REPRESENTATION OF FEMALE OFFICE EMPLOYEES IN EASTERN AND SOUTHERN GAS

	Eastern			Southern		
	Total office workforce	Female office workforce	Females as % of function	Total office workforce	Female office workforce	Females as % of function
	No.	No.	No.	No.	No.	No.
Marketing	1633	760	46.5	1488	725	48.7
Engineering	828	152	18.4	691	142	20.5
Finance	1017	486	47.8	806	407	50.5
Secretariat	34	20	58.8	72	55	76.4
Corporate Planning	7	3	42.9	3	1	33.3
Personnel	187	63	33.7	46	24	52.2
Management Services	255	95	37.3	183	53	29.0
Surveyor's	27	5	18.5	-	-	-
Medical	12	12	100.0	11	10	90.9
Press & Public Relations	5	1	20.0	8	3	37.5
Purchasing & Supplies	333	150	45.0	74	37	50.0
Solicitor's				21	12	57.1
Transport				56	16	28.6
Training				56	11	19.6
Totals	4338	1747	40.3	3515	1496	42.6

SOURCE: British Gas PMIS data.

TABLE B.9

DISTRIBUTION OF OFFICE EMPLOYMENT GRADES AMONGST THE FUNCTIONS OF EASTERN AND SOUTHERN GAS

	Eastern				Southern			
	All Office Workforce	Higher Management	Senior Officers	Staff	All Office Workforce	Higher Management	Senior Officers	Staff
Marketing	1633	44	171	148	1488	28	139	1321
Engineering	828	52	185	591	691	37	187	467
Finance	1017	24	69	924	806	19	61	726
Secretariat	34	2	5	27	72	7	1	64
Corporate Planning	7	4	0	3	3	2	0	1
Personnel	187	19	56	112	46	12	9	25
Management Services	255	18	69	168	183	34	66	83
Surveyor's	27	4	12	11	-	-	-	-
Medical	12	0	1	11	11	1	2	8
Press & Public Relations	5	1	2	2	8	1	3	4
Purchasing & Supplies	333	10	34	289	74	1	8	65
Solicitor's	-	-	-	-	21	4	3	14
Transport	-	-	-	-	56	0	5	51
Training	-	-	-	-	56	4	19	33
Totals	4338	178	604	3556	3515	150	503	2862

758

TABLE B.10
OFFICE EMPLOYMENT AT THE AREA SERVICE CENTRES,
EASTERN GAS.

No. of office employees	
Barnet	444
Harlow	78
Hemel Hempstead	276
Luton	307
Peterborough	256
Colchester	323
Norwich	285

SOURCE: Eastern Gas PMIS data.

TABLE B.11
PROPORTIONS OF LENGTH OF SERVICE GROUPS RESIDING
IN THE SAME TEN KILOMETRE GRID SQUARE AS THE SOUTH
AND EAST AREA OFFICES, WALES GAS

Years of service	Grangetown			Crindau		
	All office employees	Males	Females	All office employees	Males	Females
0 - 4	45.0	36.2	52.5	26.1	25.7	26.4
5 - 9	45.7	37.7	51.9	27.1	26.5	27.8
10 - 14	30.4	29.6	33.3	23.3	17.1	36.8
15 - 19	30.0	25.7	60.0	17.0	18.2	14.3
20 - 29	34.2	34.2	33.3	15.7	15.6	16.7
30 - 39	46.9	45.2	100.0	15.4	15.0	16.7
40+	50.0	50.0	-	57.1	57.1	-

SOURCE: Wales Gas PMIS data - derived.

TABLE B.12
 TYPE OF EMPLOYMENT WITHIN OFFICE WORKFORCE AGE
 GROUPS IN WALES GAS.

Age in years	Managerial	Technical	Supervisory	Clerical
< 25	3	79	14	289
25 - 34	53	153	93	335
35 - 44	72	99	92	321
45 - 54	87	63	84	437
55+	44	39	67	250

SOURCE: Wales Gas PMIS data.

TABLE B.13
 RESIDENCE-WORK DISTANCES FOR SELECTED GAS REGIONS

Distance in Kilometres	Wales	Eastern	South West	North West
0 < 10	1788	2933	2100	2221
10 < 20	620	787	533	514
20 < 30	147	338	174	150
30 < 40	35	119	32	22
40 < 50	23	51	19	8
50+	61	110	44	16

SOURCE: Wales Gas PMIS data - derived.

TABLE B.14
COMPOSITION OF PERSONNEL SAMPLE, WALES GAS

Age				
Years	No.	%		
< 25	39	12.0		
25 < 35	68	20.9		
35 < 45	81	24.9		
45 < 55	90	27.6		
55+	48	14.7		
Years of service			Years in present job	
Years	No.	%	No.	%
0 > 10	176	54.0	309	94.8
10 > 20	84	25.8	11	3.4
20 > 30	45	13.8	3	0.9
30 > 40	18	5.5	3	0.9
40+	3	0.9		
Full/Part time			Permanent/Temporary	
Full		Part	Perm.	Temp.
No.		No.	No.	No.
South	64	2	63	3
North	57	3	58	2
East	56	4	57	3
West	58	2	55	5
H.Q.	76	4	80	-
Totals	311	15	313	13
Hours worked each week				
		No.	%	
< 37		15	4.6	
37		272	83.4	
> 37		39	12.0	

SOURCE: Wales Gas Personnel Records.

APPENDIX C

QUESTIONNAIRE SCHEDULE

The questions indicated below formed a guideline used during in-depth interviewing. Questions were not asked specifically as worded, nor were the interviews structured into this questionnaire format. Differing sections drew upon the knowledge of various Regional and BGC Headquarters personnel, such that the questions asked were largely dependent upon the interviewee's knowledge and responsibilities. Additional questions were added in the course of the interview procedure, according to the Region and the interviewee, whilst in some cases specific questions were presented formally in writing. A number of questions, particularly relating to numerical data, for example office size and employment, received written replies, either as a result of prior discussion, or at a later date to the face-to-face interviews.

a) Present Office Provision

- 1) What are the locations of the present offices?
- 2) What is the status of each office and its function?
- 3) What is the size of these (major) offices? (sq. ft.)
- 4) What is the size of the geographical area each office serves? (Is there a divisional map available?)
- 5) How many people are employed in each office? (Particularly the major offices.)
- 6) Are these offices owned or rented?
- 7) Who originally built the premises?
- 8) Are any of these offices joint depots etc.?
- 9) Is there any excess office capacity?
- 10) Can you provide any further information regarding the former offices?

b) Facility Provision/Conditions of Employment

- 1) What facilities/incentives do you make available to your staff? e.g. flexi-time; catering facilities; tea/coffee-machines? car parking; special transport - for travel to and from work, or shopping 'buses. - Do you employ contractors to supply any of these?
- 2) Do you have any problems of staff recruitment, and if so, is this more marked at some office sites than others?
- 3) Are there any particular problem areas regarding staff turnover and/or absenteeism?

- 4) How much use is made of part-time staff? Is this associated with particular departments and/or particular office sites?
- 5) What inducements/recompense are offered to personnel following relocation?

c) The Planning Process - Office Provision

- 1) Do you have, or have you had, any specific office location policy?
- 2) Are there any specific locational guidelines/criteria followed? e.g. try to use own site; provide sufficient car parking; or preferences of office type, e.g. open plan offices; single, two, or multi-storey buildings.
- 3) Are there any other locational policies followed by the Region? e.g. for depots, or showrooms? If so, what form do these policies take?
- 4) Have any internal studies been carried out concerning office locations, or by consultants?
- 5) Are consultants used in any office-related capacity?
- 6) Can you say why changes have taken place in office provision?
- 7) Have there been any problems relating to location decisions caused by outside agencies? e.g. failure to obtain planning permission for a particular site; or the imposition of monetary constraints?
- 8) Does the Region itself pose any particular problems? e.g. peculiarities in the population/consumer distribution; or the ratio of industrial to domestic customers etc.
- 9) How much and what type of provision has been made for future office expansion - or is this thought unlikely?
- 10) How satisfied are you with the present situation regarding your office provision?
- 11) Have you undertaken any studies of the effect of changes in office provision (past/present) on office personnel?

d) Organisation

- 1) What is your present organisation? (charts?)
- 2) How do you expect this to change in the future, and why?
- 3) What major changes have taken place in the organisation, and what has motivated these?
- 4) How has the allocation of work to the various offices changed over time?

- 5) What changes have taken place in the allocation of decision-making authority and responsibility?
- e) Office Technology
- 1) What facilities exist in terms of office technology hardware? i.e. computers, VDU's, word processors etc.
 - 2) Where are such facilities located?
 - 3) In what ways are these facilities used?
 - 4) What telecommunications facilities exist? e.g. internal telephone systems, Telex, facsimilie transmission, Dictaphones, etc.
 - 5) Have these had any impact on workforce requirements? If so, what?
 - 6) Has such equipment demanded special office facilities?
 - 7) Is there an internal communications system?

APPENDIX D

PERSONNEL HISTORY SCHEDULES

CASE NO.																		
PRESENT JOB											JOB CODE							
SURNAME										INITIALS			TITLE					
										MAN NO.								
PRESENT ADDRESS																		
EDUCATION																		
SCHOOL											LOC CODE							
QUALIFICATIONS											CSE							
										CEE								
										'O'								
										'A'								
										OND								
										HNC								
										HND								
										CITY & GUILDS								
										RSA								
										DEGREE								
										HIGHER DEGREE								
										OTHER								

EMPLOYMENT HISTORY

CASE NO.									
MAN NO.									
EMPLOYER									
ADDRESS									
		LOC CODE							
JOB		JOB CODE							
PERIOD OF EMPLOYMENT		FROM							
		TO							
		Part/Full							
		Temp/Perm							
EMPLOYER									
ADDRESS									
		LOC CODE							
JOB		JOB CODE							
PERIOD OF EMPLOYMENT		FROM							
		TO							
		Part/Full							
		Temp/Perm							
EMPLOYER									
ADDRESS									
		LOC CODE							
JOB		JOB CODE							
PERIOD OF EMPLOYMENT		FROM							
		TO							
		Part/Full							
		Temp/Perm							

APPENDIX E

PLATES



1. Snelling House, Cardiff, Wales Gas Headquarters.



2. Snelling House and Bute Terrace, Cardiff, Wales Gas Headquarters.



3. Victorian Facade, Bute Terrace, Cardiff, Wales Gas.



4. Grangetown, South Area Office, Wales Gas.



5. Llandarcy, West Area Office, Wales Gas.



6. Interior, South Area Office, Wales Gas.



7. Interior, West Area Office, Wales Gas.



8. Rivermill House, London, British Gas Corporation Headquarters.



9. Regional Headquarters, Solihull, West Midlands Gas.



10. Nottingham East Depot, Great Freeman Street, Nottingham, East Midlands Gas.



11. Altrincham Showroom, North West Gas.



12. Regional Headquarters, Leicester (Phase I), East Midlands Gas.



13. Regional Headquarters, Leicester (Phase II), East Midlands Gas.



14. Regional Headquarters, Leicester (Phase IV), East Midlands Gas.



15. Aylestone Road Service Centre, Leicester, East Midlands Gas.



16. Central Landscaping, Aylestone Road Service Centre, East Midlands Gas.

17. Telephone Bureau, Aylestone Road.





18. Tanner Street Service Centre, Northampton (Under Construction), East Midlands Gas.



19. Planning Section, Tanner Street Service Centre, East Midlands Gas.



20. Interior, Tanner Street Service Centre, East Midlands Gas.



21. Interior, Regional Headquarters, Solihull, West Midlands Gas.



Telephone Exchange Telephone Bureau, Regional Headquarters, West Midlands



23. Typing Section, Including Audio Facilities, Regional Headquarters, West Midlands Gas.



24. Planning Section, Regional Headquarters, West Midlands Gas.



25. Reception/Rest Area, Regional Headquarters, West Midlands Gas.



26. Car Parking Facilities, Regional Headquarters, Leicester, East Midlands Gas.

GLOSSARY

- C.A.D.** - Customer Accounts Department. The section of the Finance function of BGC which processes billings for gas consumption by customers.
- C.S.C.** - Customer Service Centre. These are office centres in which activities are centralised controlling all aspects of customer service within their areas of responsibility. In some Regions their role is fulfilled by Area offices, but in others these are themselves grouped into Areas and controlled by an Area office workforce. Sometimes called Area Service Centres (A.S.C.).
- CO-SITING** - The siting together of offices at different levels in the office hierarchy, largely to obtain benefits of shared facilities. Also termed shared-purpose sites.
- DEPARTMENT** - The organisational sub-divisions of British Gas identified by activity. The term is used rather indiscriminately to describe both the largest activity divisions, the Functions, and the sub-divisions of these Functions.
- DEPOT** - The smallest units of the BGC office hierarchy. Depots are reporting centres for operative personnel at which their work is issued, and where vehicles are left overnight. They often contain imprest stores.
- DISTRICT** - A geographical sub-division of the former Gas Boards, formed from an amalgamation of a number of gas undertakings. Generally these Districts were themselves grouped into Groups, Divisions or regions. The term is retained by some Regions for the definition of Engineering geographical areas of control.
- DIVISION** - A term applied to the major geographical sub-divisions of the former Gas Boards, alternatively described as regions or Groups. They consisted of a number of gas undertakings, sometimes governed by a separate Divisional office.
- FUNCTION** - The main organisational sections of BGC, defined by the type of work for which each is responsible, for example Finance, Marketing and Personnel. These are frequently termed departments, although this term is used also for sub-sections of these Functions, for example the Distribution department and Transmission department, which are within the Engineering Function/department.
- GRADE** - British Gas recognises five main categories of employees, three of which are classed as office grades (*Higher Management, Senior Officers and Staff*). Within these main grades a remuneration scale of some six or seven different levels is operated on the basis of responsibility and experience. These have been grouped to give seven work levels, based on distinctions in responsibility and specific work task.
- GRID CONTROL CENTRE** - These control the storage and distribution of gas via the gas grid by telemetry (termed the transmission system). The major BGC centre is at Hinckley, but each Region has its own centre for the control of gas within its area.

- GROUP** - Groups formed the major geographical sub-divisions of some Gas Boards, alternatively known as regions or Divisions. They consisted of groups of gas undertakings, under a group management structure. Within the Gas Regions these are generally Areas or C.S.C.'s.
- IMPREST STORES** - Small stores, generally associated with operational centres or reporting/service centres which issue spare parts etc. to manual employees (notably fitters) on a daily basis in order to maintain their stock issue at monitored levels.
- L.N.G.** - Liquefied natural gas. Produced by liquefaction of natural gas at very low temperature (-161°C), in which form its volume is only 1/600th of that in gaseous form at normal pressure. This greatly simplifies transportation, especially by ship.
- L.P.G.** - Liquid propane gas. An alternative form of gas to methane, used for bulk supply purposes, notably in areas not serviced by the national gas grid. Butane is used similarly as a 'bottled gas'.
- NATURAL GAS** - This is found in a natural state both alone and associated with oil deposits. Its main component is methane. Unlike town gas it is non-toxic and odourless, whilst its calorific value is approximately double that of town gas.
- O.C.C.** - Operational Control Centre. Although these embrace the operational functions served by operational centres, these also contain much larger office staffs, responsible for the administration of each centre's area of control, including customer liaison. These responsibilities include that for customer enquiries concerning service matters and accounts.
- OPERATIONAL CENTRE** - These serve similar operational functions to reporting depots. They may be mono-or multi-functional.
- OPERATIONAL DEPARTMENTS** - Those Functions which deal directly with the primary responsibilities of British Gas. These are the Sales/Marketing, Finance and Engineering Functions. Non-operational or administrative Functions are responsible for the internal organisation of British Gas : they provide a service to the operational departments. Non-operational Functions include Management Services, Personnel and Corporate Planning. Manual personnel (operatives) are employed by operational departments.
- P.M.I.S.** - Personnel Management Information System. A British Gas computerised records system containing current information about every employee, designed for manpower planning use.
- R.D.P.** - Regional Development Plan. A specific programme drawn up for the improvement of Regional operations and administration, generally with specific implications for the office stock. The notable example is that of North West Gas.

- REGION** - The major geographic divisions of British Gas, responsible for all aspects of gas supply within their geographical areas of control. Prior to the 1972 Gas Act these same areas were served by the autonomous Gas Boards. Also prior to the 1972 Act the term region was regularly used for the main sub-divisions of the Boards : their overall geographical areas of responsibility were described as their Areas (indeed, they were known as Area Gas Boards). Thus, since 1 January 1973 the use of these terms has been reversed in definition.
- S.N.G.** - Substitute natural gas. This may be produced by a variety of means, but is produced in commercial quantities by BGC at the Westfield Development Centre from coal. Unlike town gas, it has similar qualities to natural gas and may be integrated directly into the natural gas supply system.
- SWEB** - South Western Electricity Board. Also the recognised abbreviation for the South Wales Electricity Board, but is not so used in this thesis.
- SEEBOARD** - The recognised abbreviation for the South Eastern Electricity Board.
- SEGAS** - The abbreviated term for South East Gas. A number of Gas Regions are known by such terms, for example Negas, Norgas, Emgas. Wales Gas also uses the name Nwy (the Welsh term for gas).
- TELEMETRY** - Automatic control systems based on the use of radio waves which monitor and direct the gas supply and storage system. Each Gas Region controls its own telemetry system from a grid control centre, but overall control of the high pressure grid is exercised from Hinckley control centre.
- TOWN GAS** - The generic name for a mixture of gases, derived initially from coal, but later manufactured by oil gasification processes. Its main component is hydrogen; as a result it has rather different properties to natural gas.
- TRANSMISSION SYSTEM** - The high pressure pipeline network through which gas is supplied to the local gas grids of the Regions. There are both Regional transmission systems and a national transmission system. The pipeline networks which supply gas directly to consumers are termed distribution systems. These are the responsibility of two different departments of the Engineering Function.
- UNDERTAKING** - The primary operating unit in the pre-natural gas period. These were the gas production units, which were largely independent operating companies in the pre-nationalisation period.
- VESTING DATE** - The day upon which the entire gas production and distribution industry of Britain (with a few exceptions) was vested in the Gas Boards under the terms of the Gas Act, 1948. This being 1 May, 1949.

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