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# Principles and Problems of Delimitation of

## Electoral Districts

### A Study in the Geography of Elections

### 選舉地區劃分界線的原則與問題

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#### 1. Introduction

Election systems which are based on the spatial division of the country into electoral districts or constituencies<sup>1)</sup> can be described as 'Territorial Representation'. It is quite true that territorial representation provides attractive research topics particularly from the geography point of view. The process of subdividing the country into electoral districts is known by different terminology: The United States of America uses the term 'Congressional (Re)districting', while England and Australia rather call it 'Redistribution of Seats' or 'Redivision/Review of Electoral Districts'. In the majority of developing countries that use the British-based majority system, it is commonly known as 'Delimitation of Constit-

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1) Electoral districts or constituencies must be clearly distinguished from polling divisions. The first term designates a territorial area entitled to return one or several member(s) to serve in the legislature. The second one is merely a subdivision of a constituency for administrative purposes and without geographical relevance. It means an area secured by a returning officer for the taking of the vote on polling day and to which the whole or a portion of the official list of electors for a polling division is allotted.

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uencies' or 'Delineation of Electoral Boundaries'. A large number of countries simply use the principal administrative divisions for electoral purposes, others create artificial territorial divisions for elections ( so-called ' Constituencies' ) whose boundaries are reviewed periodically from time to time ( usually after the decennial census of population ) to give due regard to regional population changes.

It is a truism that any system of 'territorial representation' in general, and the majority system ( without transfer of votes ) <sup>1)</sup> in particular, leads to a distortion of election returns and the voters' will, which is commonly known as 'gerrymander'. We clearly have to distinguish between 'unintentional gerrymander', i.e. not a gerrymander in design, but is implied in the specific electoral system, and 'intentional gerrymander' which is a result of applying unsound principles for the delimitation of constituencies. The 'unintentional gerrymander' ( natural gerrymander ) is created through uneven distribution of the electorate and cannot be eliminated unless the entire election system is changed. A multitude of research has been contributed to the 'unintentional gerrymander' and it shall be therefore outside the scope of this paper.

'Intentional gerrymander' can occur if the following principles for the delimitation of constituencies are not properly observed :

- a) principle of geographical compactness ( continuous electorates ) ;
- b) principle of equal number of population or electors ;
- c) principle of giving additional weightage to area or space ;
- d) principle of grouping together areas of homogeneity with regard to the racial, ethnic, cultural, religious, linguistic or other social structure;
- e) principle of observing topographical and physical conditions;
- f) principle of facilitating administrative procedures;
- g) principle of observing facilities of communication and public convenience; and
- h) principle of having regard to sentimental and historical connections.

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1 ) Also known as 'first-past-the-post system'

A large number of scientific studies have been conducted on the delimitation of territorial electorates and on gerrymander as the appended list of references may prove. Comprehensive bibliographies on 'political redistricting' have been published in the U.S.A. by GOODEY (1968) and TAYLOR (1971)<sup>1)</sup>. This paper therefore does not aim to augment the large number of studies on the 'Theory of political redistricting', but tries to give a comparative analytical view on the matter. A valuable source of informations on the subject is provided in the official reports of various 'Boundary Commissions' ( or 'Electoral Commissions' ) that have been utilized for this research study ( see attached bibliography - primary sources ). The following countries or semi-autonomous states have been considered for this study: In Europa: Federal Republic of Germany, Sleswick-Holstein, United Kingdom, Republic of Ireland and Malta; in Asia: Ceylon ( Sri Lanka ), Malaysia, Sabah, Sarawak, Singapore, Pakistan, Philippines and Taiwan; in Africa: Ghana, Kenya, South Africa, Rhodesia, Mauritius and the Seychelles ; in the Pacific : Papua New Guinea, New Zealand, Australia ( Commonwealth ), Queensland, and South Australia; in North America: U.S.A., Canada ( Federation ) and the provinces of Manitoba, Ontario and Saskatchewan. For a comprehensive global analysis, however, more cases have to be taken in consideration.

## 2. Federal and State Constituencies

Countries with a Federal structure of administration usually provide some interesting research topic with regard to the delimitation of territorial constituencies. In most cases, elections are carried out for the Federal legislature as well as for the regional assemblies and therefore a Federal country is usually covered by two overlapping sets of constituencies: Federal and State ones. Four principal cases can be distinguished:

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1 ) GOODEY, B.R. ( 1968 ) : The Geography of Elections -An Introductory Bibliography; published by the Center for the Study of Cultural and Social Change, Department of Sociology and Anthropology, University of North Dakota; and TAYLOR, P.J. ( 1971 ) : Bibliography of Political Redistribution-First Draft, University of Iowa.

(1) In India and Malaysia, Federal and State constituencies are created in the same manner and by the same Electoral Commission (or Delimitation Commission). Both sets of constituencies are interdependent from each other and boundaries of State constituencies never cut across Federal constituencies. The actual number of seats in the legislative assembly of a member State is therefore determined by multiplying the number of seats given to that State in the Federal Parliament by a certain integral multiple which varies from State to State. Each Federal constituency comprises a maximum of 8 Assembly constituencies in India and a maximum of 6 Assembly constituencies in Malaysia which are also called the "component" assembly constituencies of the Federal constituency. This particular requirement of interdependence between State and Federal electorates further complicates the delimitation process if viewed vis-à-vis the other governing principles of electoral delimitation. The Malaysian Delimitation Report of 1960 remarks in this respect :

"The allocation of seats in a country which has a Federal structure and also somewhat complicated provisions with respect to citizenship, constitutes a problem that is by no means simple. In a unitary State where the vast majority of the populace are citizens it is a comparatively easy matter to divide the country into constituencies each having a nearly equal electorate"

(2) In the large majority of Federal countries, the delimitation of Federal and State constituencies is a completely separate and independent process and State constituencies are in no way bound to follow Federal ones. In West Germany, for instance, the delimitation of the 248 Federal territorial constituencies is entrusted in the Electoral Delimitation Commission which is an independent non-governmental body, whereas the delimitation of State constituencies is undertaken by a State Electoral Committee of the respective Assembly. Tables 1 to 4 showing West Germany's northernmost State of Sleswick Holstein (Schlesig-Holstein) give a clear indication of the relationship between State and Federal electoral boundaries. There are multiple cases of

Federal constituency boundaries lying athwart State boundaries. A recent review of Federal constituency boundaries in Sleswick Holstein reveals that district boundaries (Kreisgrenzen) are not widely followed whereas the boundaries of local self-government communities are strictly adhered to.

In the United States of America the set of problems for delimitation of electoral boundaries is even more complex due to the individuality of certain States, but generally follows the same pattern as in Germany. Congressional districts and State legislature districts are independent from each other. Morrill's paper on Redistricting of Washington State <sup>1)</sup> gives an interesting account on the theoretical basis for apportionment and the Federal/State relationship with regard to elections.

(3) Great Britain, although strictly speaking not a Federation, has a separate regional Assembly for Northern Ireland and the establishment of State legislatures for Scotland and Wales is in the offing. Although a final modus for possible regional assembly elections in the two parts have not been worked out, the future representation is not likely to be based on territorial representation, but will follow the system of proportional representation.

(4) In the Republic of South Africa, general elections for the House of Assembly ( Volksraad ) and the three Provincial Councils ( Provinsiale Raad ) of the Cape of Good Hope, Natal, and Transvaal respectively are based on the same identical constituencies. For instance, the Province of Natal elects 20 members to the House of Assembly and also 20 members to the Provincial Council of Natal. Only the Province of Orange Free State and the Territory of South-West Africa are an exception, since Federal Assembly constituencies are too few to be taken as a basis for the Provincial Council elections. Orange Free State has 14 Federal constituencies and 28 Provincial ones; SWA has 5 Federal constituencies and 18 local assembly ones respectively. But the Union of South Africa ( since 1961 became Republic of South Africa ) although sometimes called a Federation, is not a very typical example, since provincial

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1 ) MORRILL, R. L. (1973): Ideal and Reality in Reapportionment; in: Annals of the Association of American Geographers, vol. 63, pp. 463- 477

FIGURE 1

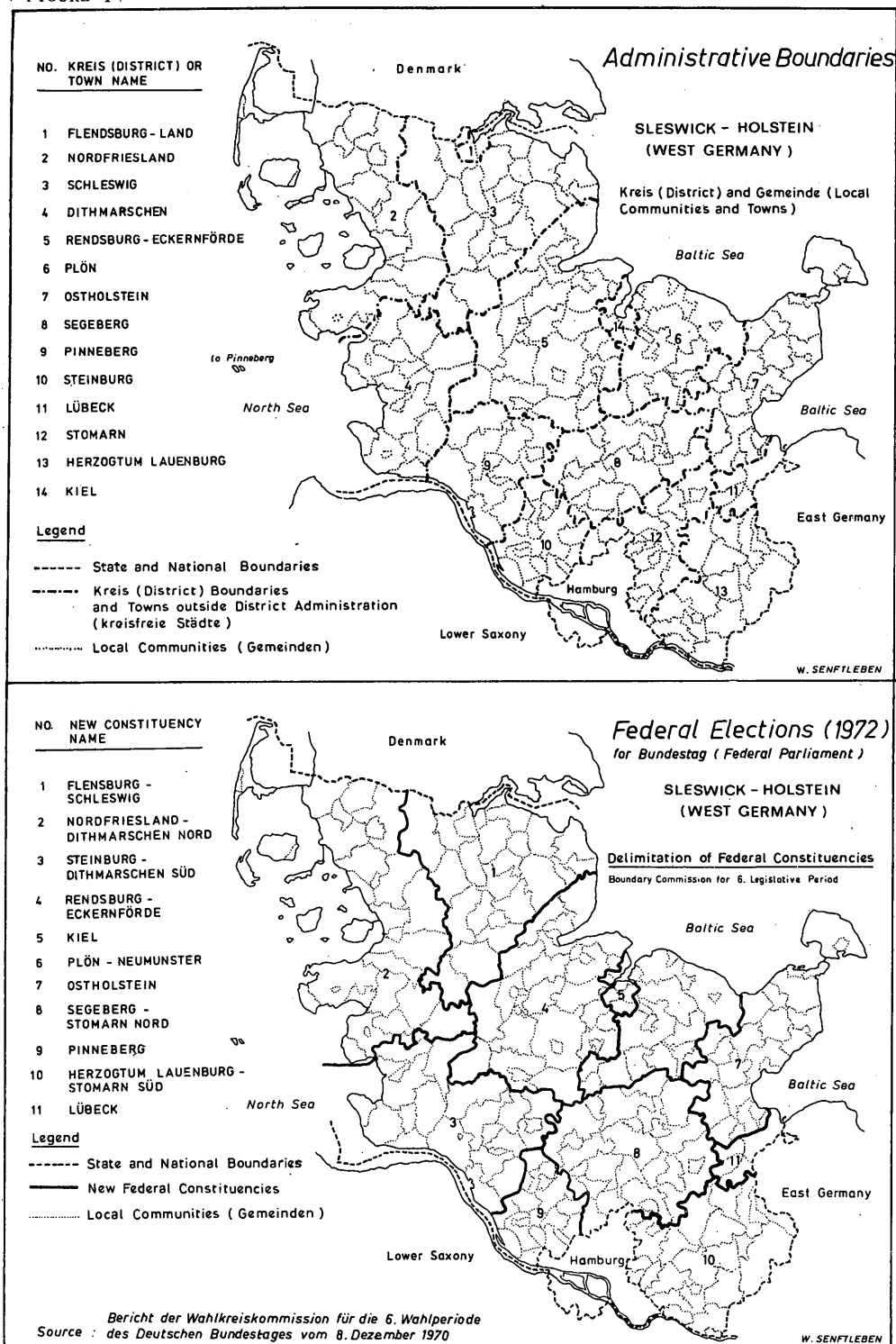


FIGURE 2

FIGURE 3

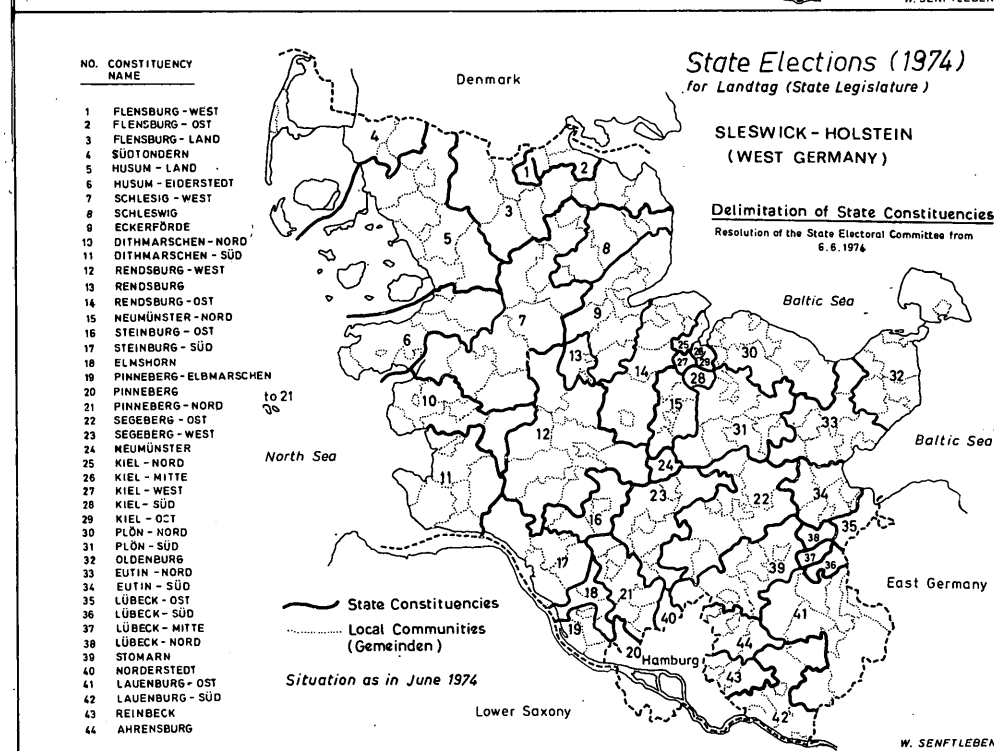
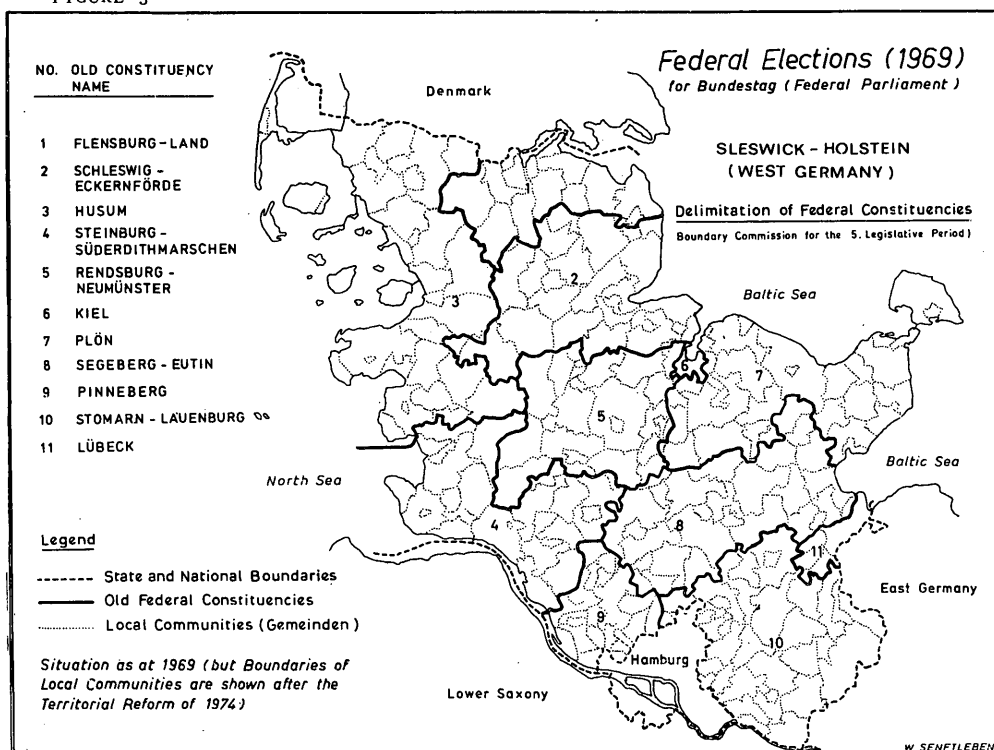


FIGURE 4

authorities, although powerful and distinct, are ultimately subordinate bodies.<sup>1)</sup>

(5) Australia presents a complex and mixed situation of different electoral systems and methods practised for Federal and State elections. The "first-past-the-post" system of voting (where the candidate with the greatest number of votes is elected) was initially used in Australia for Federal and State elections, but has been gradually replaced by the "preferential" system which is now used in elections for the Federal House of Representatives and in New South Wales, Victoria, Queensland, South Australia and Western Australia; this requires single-member geographical constituencies. Proportional representation which involves a complex system of counting is used in the Tasmanian House of Assembly election. In the Federal case, there are 122 constituencies (electoral divisions) spread among the six States, and their boundaries are redistributed from time to time. Tasmania and Victoria use these Federal divisions as a basis for State divisions, but the other States use different divisions and depart fairly widely from the principle of equality of voters per division - country divisions having fewer voters than city ones.<sup>2)</sup>

### 3. Existing Administrative Boundaries

The location of electoral boundaries is usually a compromise solution between several delimitation principles which vary from case to case. Besides the demand for population equality of electorates, existing administrative boundaries of different nature constitute one of the

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1) WHEARE, K. C. (1963): Federal Government; (London: O. U. P. 4th edit.)

Federalism: A form of government in which powers and functions are divided between a Central government and a number of political subdivisions having a significant degree of political autonomy. The realm of authority of the two levels of government is for the most part clearly distinguished. The Federal system of government stands in contrast to a centralized or unitarian system of government, in which all powers lie at the disposal of the Central government, with the political subdivisions merely the creation of the Central government and having no authority other than which the Central government chooses to delegate to them.

2) Although not an electoral study, the following book provides interesting aspects on Federalism: DIKSHIT, R. D. (1975): The Political Geography of Federalism; (New York: Halsted Press).



strongest element for the electoral delimitation process. The following categories of administrative boundaries have to be taken into account when demarcating electoral boundaries:

- (a) State or Provincial boundaries ( principal divisions );
- (b) District or County boundaries ( of lower order );
- (c) Local Self-government Unit boundaries;
- (d) Existing or previous constituency boundaries;
- (e) Polling districts;
- (f) Census boundaries;
- (g) Time zone boundaries.

Some election systems are entirely based on administrative districts and electoral districts coincide with the territorial administrative set-up. It is the Swiss model with Cantonal election divisions which is, with certain modifications, used in the Philippines, Thailand, and Taiwan.

#### (a) State or Provincial Boundaries

It is understood that in countries with a Federal structure of administration, constituency boundaries under no circumstances are allowed to cross the boundary of any constituent State. Relevant provisions are usually contained in the electoral laws; two examples may be cited from India and Malaysia :

##### a ) ( India: Constitution of India )

"Delimitation of Parliamentary and Assembly constituencies must be undertaken in such way that each Parliamentary constituency consists of an integral number of Assembly constituencies - that is each Assembly constituency is so delimited as to fall entirely within one Parliamentary constituency"

##### b ) ( Malaysia : 13th schedule, Federal Constitution )

"Constituencies ought to be delimited so that they do not cross State boundaries and regard ought to be had to the inconveniences of State constituencies crossing the boundaries of Federal constituencies".

Countries with an unitary structure of administration are similarly subdivided into major administrative divisions, i.e. Provinces and Regions. Electoral laws usually stipulate to observe these major divisions for electoral delineation; see Ghana and Kenya :

##### c ) ( Ghana : Constitution of Ghana, 1969 )

"No constituency shall include part of a Region and part of another Region"

d) . ( Kenya : Constitution of Kenya, 1969 )

"No constituency shall to form part of more than one Region".

When Kenya reorganized her Regions in a major territorial reform in early 1963, the new administrative set-up resulted in similar reorganization of electoral divisions. The Constituency Delimitation Commission of Kenya which was appointed already in July, 1962 could not start any substantial work until the Regional Boundaries Commission has finalized its recommendations for a territorial reform.

In Papua Niugini, the following 'open electorates' cut the International boundary between the former Colony of Papua and the Trust Territory of New Guinea: KOROBA-KOPIAGO, KANDEP-PORGERA, KARIMUI-NOMANE, MENYAMYA, HUON-GULF. In those cases, priority has been given to factors of homogeneity of interest, physical features and means of communications, rather than a major political boundary which has been drawn by colonial powers on the conference table.

## **b) District and County Boundaries**

Administrative units of lower order form an important element for electoral redistribution; but many countries also depart widely from the administrative set-up.

In Pakistan, the principle of observing existing administrative boundaries has been given a paramount importance in the delimitation process, but largely at the expenses of population equality within various electorates. Table 1 demonstrates that deviation from the population quota is considerably higher in remote and frontier areas than in the over-populated core-areas. But the overall emphasis on observing administrative boundaries caused several problems:

"While having the principle of equality of population as far as practicable, every effort has been made to keep intact the administrative boundaries of districts, tehsils/talukas and Qanungo Halqas/Supervisory Tapedar Circles. However, even where bifurcation of tehsil/talukas and Qanungo Halqas Circles became inevitable, the Patwar Circles/

Table 1: Pakistan (without Azad Kashmir) - Allocation of Seats of the National Assembly to the administrative Districts (1972)

		A	B	C	D
Province	District	Population (1972)	Population Pop. Quota	(rounded)	deviation (%)
Northwest Frontier	Peshawar	1 711 368	5.26 =	5	+ 5.3 %
	Hazara	2 007 575	6.18 =	6	+ 2.9 %
	Mardan	1 198 000	3.69 =	4	- 7.9 %
	Kohat	581 194	1.79 =	2	- 10.6 %
	D. I. Khan	477 837	1.47 =	1	+ 47.0 %
	Bannu	563 575	1.73 =	2	- 13.3 %
	Swat	934 338	2.87 =	3	- 4.2 %
	Dir	552 058	1.70 =	1	+ 69.8 %
	Chitral	158 976	0.49 =	1	+ 51.1 %
	Malakand P.	182 545	0.56 =	1	- 43.9 %
Federally Administered Tribal Areas	Mohmand Agency	382 922	1.18 =	1	+ 17.8 %
	Kurram Agency	280 234	0.86 =	1	- 13.8 %
	Orakzai Agency	284 759	0.88 =	1	- 12.4 %
	N. Waziristan Ag.	314 489	0.98 =	1	- 3.2 %
	S. Waziristan Ag.	384 702	1.19 =	1	+ 18.3 %
	Bajaur	364 050	1.12 =	1	+ 12.0 %
	Khyber Agency	475 371	1.45 =	2	- 26.9 %
Federal Capital Territory		235 749	0.73 =	1	- 27.5 %
The Punjab	Rawalpindi	1 754 663	5.40 =	5	+ 8.0 %
	Campbellpur	983 355	3.03 =	3	+ 0.8 %
	Jhelum	1 048 032	3.22 =	3	+ 7.4 %
	Gujrat	1 885 364	5.80 =	6	- 3.3 %
	Sargodha	2 093 661	6.44 =	7	- 8.0 %
	Mianwali	1 097 705	3.38 =	3	+ 12.6 %
	Jhang	1 548 646	4.76 =	5	- 4.7 %
	Lyallpur	4 240 224	13.05 =	13	+ 0.3 %
	Lahore	3 772 171	11.61 =	12	- 3.3 %
	Sheikhupura	1 635 831	5.03 =	5	+ 0.6 %
	Gujranwala	2 048 746	6.30 =	6	+ 5.0 %
	Sialkot	2 338 293	7.19 =	7	+ 2.8 %
	Multan	4 011 794	12.34 =	12	+ 2.8 %
	D.G. Khan	1 133 865	3.49 =	3	+ 16.3 %
	Muzaffargarh	1 553 642	4.78 =	5	- 4.4 %
	Sahiwal	2 808 707	8.64 =	9	- 4.0 %
	Bahawalpur	1 072 975	3.30 =	3	+ 10.0 %
	Bahawalnagar	1 078 513	3.32 =	3	+ 10.6 %
	Rahimyar	1 401 667	4.31 =	4	+ 7.8 %
Sind	Sukkur	1 368 595	4.21 =	4	+ 5.3 %
	Jacobabad	694 792	2.14 =	2	+ 6.9 %
	Nawabshah	1 341 706	4.13 =	4	+ 3.2 %
	Khairpur	717 373	2.20 =	2	+ 10.3 %
	Larkana	992 907	2.84 =	3	- 5.6 %
	Hyderabad	1 636 165	5.03 =	5	+ 0.7 %
	Badin	591 260	1.82 =	2	- 9.0 %
	Dagu	803 753	2.48 =	3	- 17.2 %
	Sanghar	681 168	2.10 =	2	+ 4.8 %
	Thatta	635 038	2.02 =	2	+ 0.8 %
	Karachi	3 589 972	11.04 =	11	+ 0.4 %
Beluchistan	Quetta Division	903 024	2.78 =	3	- 7.4 %
	Sibi Division	669 018	2.06 =	2	+ 2.91 %
	Kalat Division	833 112	2.56 =	2	+ 28.1 %
Pakistan (without Azad Kashmir)		65 010 371	200		

Source: Election Commission of Pakistan, Notification of 8.11.1975

Note: Population Quota (P.Q.) # 65 010 371 : 200 = 325 051

Tapedar Circles have been kept intact in all rural constituencies. This principle could not be followed where the limits of municipalities have been extended and the boundaries of Patwar Circles/Tapedar Circles have, therefore, been cut across".

As a result of the low density of population, in Chitral, Dir, Bawalpur, Malakand and Beluchistan it became necessary to combine areas from different districts to form inter-district constituencies.

Figures 5 ( Republic of Ireland ) and 6 ( Mauritius ) give an indication how administrative boundaries and constituency boundaries correspond with each other. In both cases we have multi- member constituencies : Mauritius has three-member constituencies; Ireland has variable-member constituencies. A thick line on the map indicates those administrative boundaries being identical with electoral ones. Since counties in Ireland are larger than constituencies, each county is normally subdivided into several constituencies. This is different in the United States of America where counties are comparatively small administrative units. In the U.S.A., an average of three to five counties combined together form a Congressional District. Some states of the U.S.A. ( like Alabama ) observe county boundaries fairly well; others ( like California ) depart to a high degree. Map 7 shows those counties with two or more Congressional Districts in the State Colorado <sup>1)</sup>.

In Papua New Guinea, electorates are contained wholly within district boundaries. As the Papua New Guinean Committee proceeded with its deliberations it became apparent that this recommendation needed stricter definition. There are two district boundaries, one is the Gazetted District Boundary, and the other, the area actually administered by a District. Investigations by the Committee revealed that 15 of the 18 districts administer areas outside their Gazetted Boundaries. This is generally because of natural obstacles, such as mountains or rivers which isolate pockets of

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1 ) United States of America ( 1973 ) : Congressional District Atlas - Districts of the 93rd Congress; by the U.S. Department Commerce, Bureau of the Census; ( Washington D.C. : U.S. Govt. Printing Office )

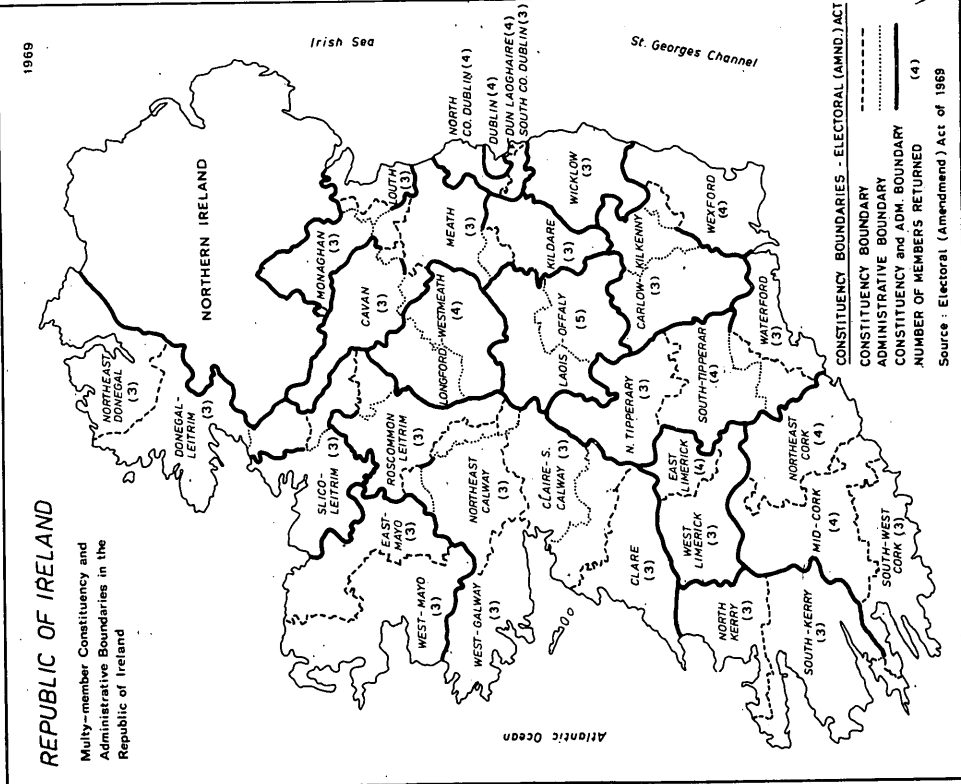
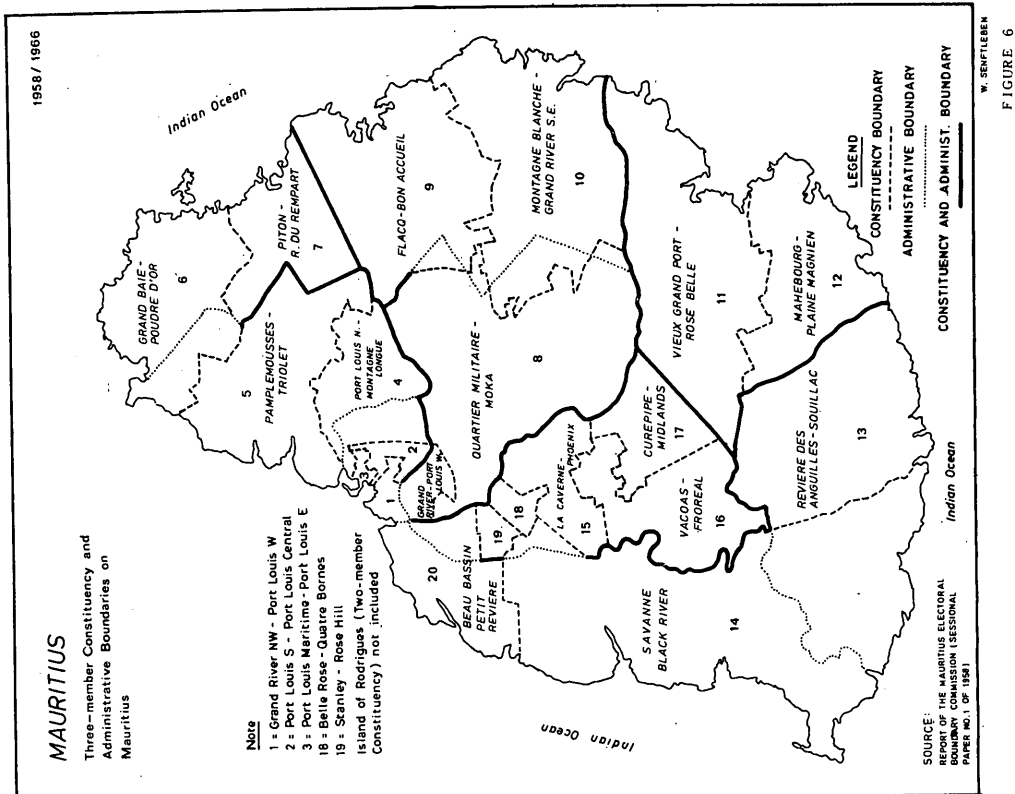


FIGURE 5



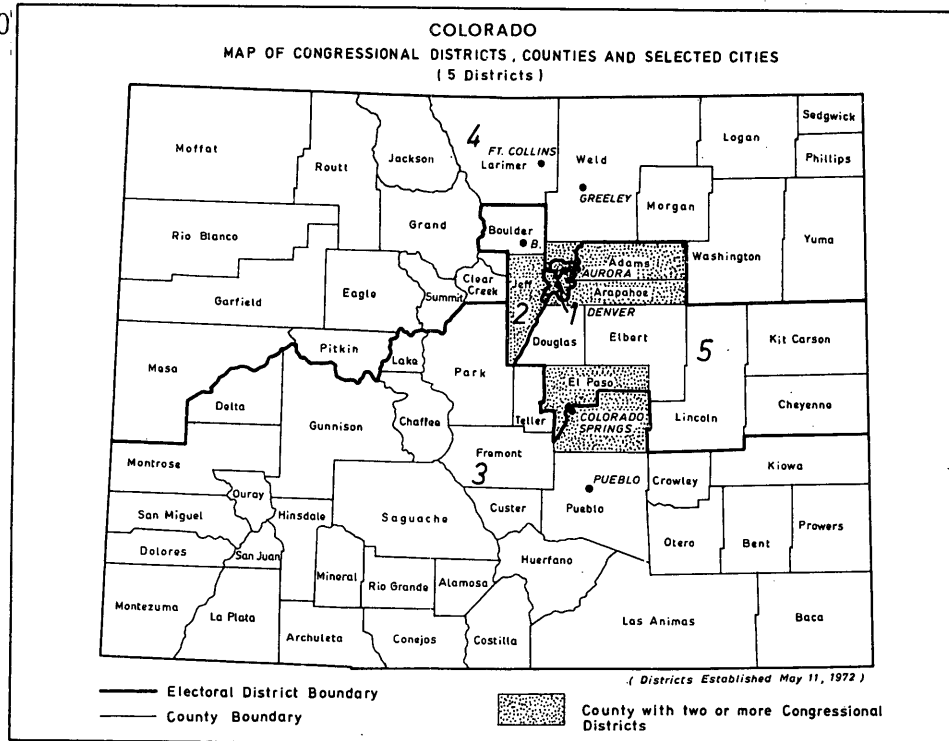


FIGURE 7

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people from the administrative centre of their gazetted district ( from P.N.G. Electoral Ordinance, 1963-1967 ).

Most European Countries ( see United Kingdom and West Germany ) have experienced an administrative reform aiming to reduce the large number of self-contained local government units ( urban and rural communities ) to be reorganized according to the principles of the Central Place Theory. The delimitation process must take account of the local government areas. The Boundary Commission for England therefore has distinguished between county constituencies and borough constituencies which are drawn along one of the following administrative boundaries : Administrative County; County Borough; Municipal Borough; Urban District; and Rural District.

A large number of electoral boundary reports stress the necessity of minimizing electoral boundary changes. Every such a change means an extra burden to the electoral administration process and electoral rolls and registers have to be transferred accordingly which is a very costly and time-consuming procedure. But more important might be the political implica-

tion that the electorate of the area affected by such a boundary change, has to get unnecessarily acquainted with new faces of political candidates. PRESCOTT ( 1972, p. 82 ) drew attention to the difficulties of comparing election results and electoral trends of a constituency electorate because of the frequent boundary changes and he came to the conclusion that "polling districts" are more persistent than "constituencies". For comparative purposes, "polling divisions" are therefore more practible to be taken as a basic spatial unit for geographical research. It is only unfortunate that few countries, particularly in the "Third World", give a detailed breakdown of election returns on the basis of "polling stations".

Census divisions may be similarly an important element for the demarcation of electoral boundaries. In most cases, however, census divisions are congruent with or entirely based on administrative divisions. The electoral administration is therefore required to cooperate closely with the Census authorities or other sections in charge of population statistics.

In countries with a large East-West extension, time zone boundaries may play an important role in the delimitation process. Each electoral district should lie within the same time zone. Canada may be taken as an example having the following time zones from East to West :

Newfoundland Standard Time .....	3½ hours behind GMT
Atlantic Standard Time.....	4 hours behind GMT
Eastern Standard Time .....	5 hours behind GMT
Central Standard Time .....	6 hours behind GMT
Mountain Standard Time .....	7 hours behind GMT
Pacific Standard Time .....	8 hours behind GMT
Yukon Standard Time .....	9 hours behind GMT

In case that an electoral district is lying in more than one time zone, all operations of electoral administration are usually conducted under one time zone. In Canada, the vast electoral district of NUNATSIAQ ( North-West Territories ) covers four different time zones. In the southern Canadian provinces it is less frequent that time zones

are cutting across electoral districts. In Ontario, for instance, the electoral districts No.34 ( KENORA - RAINY RIVER ), No.78 ( THUNDER BAY-ATIKOKAN ), and No.79 ( THUNDER BAY-NIPIGON ) are an exception from this rule.

#### 4.Size of Electorates

One of the most basic rules for the demarcation of electoral boundaries says that either the number of inhabitants or the number of registered electors of each constituency should be nearly equal to the population quota ( or electoral quota respectively ) as is reasonably practicable. This is to give justice to the principle of "one man - one vote". The demand for equal-sized electorates is either prescribed in the Constitution of a country or in the respective electoral laws. Only three examples may be given from Great Britain, Pakistan, and Rhodesia:

- a ) ( United Kingdom: Second schedule to the House of Commons ( Redistribution of Seats ) Act, 1958; Para.5 ) :  
 "The electorate of any constituency shall be near the electoral quota as is practicable having regard to the foregoing rules; and a Boundary Commission may depart from the strict application of the last foregoing rule if it appears to them that a departure is desirable to avoid an excessive disparity between the electorate of any constituency and the electoral quota..."
- b ) ( Pakistan: Delimitation of Constituencies Act, 1974, Para. 9/2 ) :  
 "As far as may be, the constituencies for election to the same Assembly shall be equal among themselves in population."
- c ) ( Rhodesia: Electoral Act, 1969, No.56, CH.1, Para.6/1 ) :  
 "The European Roll constituencies shall be such that at time of delimitation the number of enrolled European voters in each such constituency is, as nearly as may be, equal to the number of enrolled European voters in the other such constituencies".

The principle of equal sized electorates, however, stands in conflict with other rules of delimitation, i.e. weightage for land area, means of



communication, physical features, existing administrative boundaries, similarity of interest, etc... No delimitation commission therefore can strictly adhere to the principle of equal-sized electorates, but the outcome will be a compromise in favour of one or the other principle. The following comparative analysis shall examine how the different countries or states have tackled this difficult problem of compromising between various rules of delimitation, and in how far they have been allowed to depart from the average population or electoral quota.

One of the best delimitation schemes can be reported from New Zealand ( see Report of the Representation Commission, 1972 ) where the European population of each electorate shall be equal to the respective quotas for the North and South island, subject to a permitted tolerance of plus and minus 5 per cent.

	Electorate	Quota	Allowance	Lower Limit	Upper Limit
North Island	1 812 009	31 242	$\pm$ 1 562	29 680	32 804
South Island	782 305	31 292	$\pm$ 1 565	29 727	32 857

All 83 general constituencies are kept within the five per cent. tolerance; with the largest negative departure being REMUERA constituency ( -4.07% ) and the largest positive departure being TAURANGA constituency ( +4.95% ) .

Large disparities in the size of the electorate with variations of  $\pm$ 50 per cent. and more are reported from the United Kingdom ( 1969 ), Singapore ( 1971 ), Malaysia ( 1974 ), Sarawak ( 1969 ), Ceylon ( 1959 ), and Papua New Guinea ( 1971 ).

In Singapore, HONG LIM constituency had only 7 486 electors, whereas ALEXANDRA constituency had 24 499 voters on the roll. But due to rapid housing construction within the City State and easy population movement, electoral figures are changing very quickly. The Singaporean Electoral Boundaries Delineation Committee of 1971 expressed the view that large housing estates should not be divided for electoral purposes, even if the number of electors exceeds the aimed  $\pm$ 20 per cent. deviation

from the National quota, because it is argued that housing estates form one single homogeneous entity and should therefore be treated as an indivisible unit with one Parliamentary spokesman.

In Great Britain, the Boundary Commission for England ( 1969 ) recommended to apply limits of 40 000 and 80 000 electorates for the redistribution of seats, with the electoral quota of England being at 58-190. Under the new delimitation scheme of 1969, 16 per cent. of all constituencies lie within the 40 000 to 50 000 brackets and only 8 per cent. within the 70 000 to 80 000 brackets respectively. The large variations are a result of the local government structure which requires county and boroughs to be left intact as an indivisible element. A critical comment on the 1969 redistribution of seats in England has been published in the geographical periodical "AREA" with contributions by JOHNSTON ( 1976 ), OSBORNE ( 1975 ), and ROWLEY ( 1970, 1975, 1976 ).

Malaysia has experienced four different delimitations for Federal constituencies in 1954, 1959, 1960, and 1974. The 1960-delimitation scheme which was never used for any elections in Malaysia because of Parliamentary disapproval, was based on very sound principles and could serve as an example par excellence. The original Malayan Constitution of 1957 allowed a 15 per cent. plus and minus variation from the electoral quota:

( Constitution of the Federation of Malaya, Article 116(4) ) :

"Each State shall be divided into constituencies in such manner that each constituency contains a number of electors as nearly equal to the electoral quota of the State as may be after making due allowance for the distribution of the different communities and for difference in density of population and the means of communication; but the allowance so made shall not increase or reduce the number of electors in any constituency to a number differing from the electoral quota by more than fifteen per cent."

In pursuance of a policy of more rights for rural Malays, the Constitution was later changed abolishing the original limitation of a  $\pm 15\%$  variation in favour of a much wider allowance :

( Federal Constitution of Malaysia, 1963, 13th schedule, para. 2/c ) :  
 "The number of electors within each constituency ought to be approximately equal throughout the unit of review except that having regard to the greater difficulty of reaching electors in the country districts and the other disadvantages facing rural constituencies, a measure of weightage for area ought to be given to such constituencies, to the extent that in some cases a rural constituency may contain as little as one half of the electors of any urban constituency".

With effect of 1974, the second part of the foregoing clause of the 13th schedule to the Constitution was deleted ( vide : Constitution Amendment Act, Nr.2, 1973; Act A 206 ) thus lifting all limitations for the size of electorates. The 1974 Malaysian delimitation scheme is a vivid example for an unbalanced and abnormal distribution. Almost one-third of all constituencies are above the  $\pm 40$  per cent. margin, with some case departing as much as  $\pm 80$  per cent. from the electoral quota.

In Rhodesia, it is interesting to compare the "pre - Independence " delimitation scheme ( 1962 ) with the 1970-one. The Rhodesian Electoral Act of 1969 states the Delimitation Commission may depart from the requirement of equality of voters up to a maximum of 20 per cent. either way. Under the 1962-delimitation scheme, only  $1/7$  of all constituencies were beyond the  $\pm 12$  per cent. deviation, compared with  $1/3$  under the 1970-one.

West Germany, as far as territorial constituencies are concerned, allows a possible maximum deviation of  $\pm 25$  per cent. from the Federal average quota, but the overall majority of constituencies never depart so much. The actual distribution follows the ideal type of a Lorenz - curve; the German member states ( except for Berlin ) follow closely the Federal example.

The Northern German State of Sleswick-Holstein has set a maximum limit of  $\pm 25$  per cent. deviation from the average by law, but the actual constituency figures are kept far below this limit. The highest positive

deviation is reported from the LAUENBURG-SUD constituency (+18.9%) and the highest negative deviation from SÜDTONDERN constituency (-14.4%). But the demand to create equal-sized electoral districts, as far as population is concerned, is less important in Germany because of the particularity of a complicated election system which is modelled after the Swedish one. The German system similarly knows 'territorial electorates' where ( 248 ) members are elected directly under the relative majority system. But for the final distribution of mandates the method of d'Hondt is applied and the ultimate composition of the German Parliament ( Bundestag ) is determined by 'proportional representation' based on the second vote cast for a State party list <sup>1)</sup>. Canada also knows a  $\pm 25$  per centum deviation. The population of any electoral district in the province may in no case depart from the electoral quota for that province to a greater extent than 25% either way. This plus minus allowance is applied to Federal constituencies as well as provincial constituencies.

The requirement of having equal population electorates is less relevant to election systems not based on the majority system. Multi-member constituency countries, as we have it in Mauritius and Malta, or countries allowing the transfer of votes are less affected.

The Indian electoral law does not permit any weightage to the geographical size factor and clearly stresses uniformity of size of Federal electoral districts. Each delimitation therefore allows the population of each electoral district to vary between 95 to 105 per cent. ( 5%-margin either way ) from the all-India uniformity level of 100 per cent <sup>2)</sup> , with

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1 ) for further information on the working of the German electoral system see: (a) POLLOCK, J.K. (and others) (1955): German Democracy at work; (New York: University of Michigan Press); (b) How German elections are contested; in: Legislator, vol. 1, Nr. 3, November, 1969, pp. 31-32.

2 ) Two excellent studies have been published on the changing pattern of Indian electorates: (a) CHANDIDAS, R. ( 1968 ) : Changing geography of representation : Parliamentary constituencies from 1951 to 1968; in: Economic and Political Weekly, vol. 3 October 12, 1968, pp. 1581-1590; and (b) The changing Indian electorate : 1970 and beyond, in: Monthly Commentary on Indian Economic Conditions, Annual number, December, 1969, pp. 36-37.

one exception: In regard to electoral districting of parliamentary districts for Union Territories directly administered by the Government of India (i.e. Andaman and Nicobar Islands, Chandigarh, Dadrar, Delhi, Goa and Daman, Lakshadweep, Mizoram, Pondicherry, Arunachal Pradesh), this limit for the uniformity of size does not apply.

The Republic of South Africa as well as Ghana knows a  $\pm 20$  per cent. departure from the National quota, although these margins are not specifically mentioned in the terms of reference for the delimitation process. In Ghana, the largest city constituency has a population of 77 544 and the smallest has 58 298; the largest rural electoral district, on the other hand, has a population of 69 149 and the smallest has 40 000.

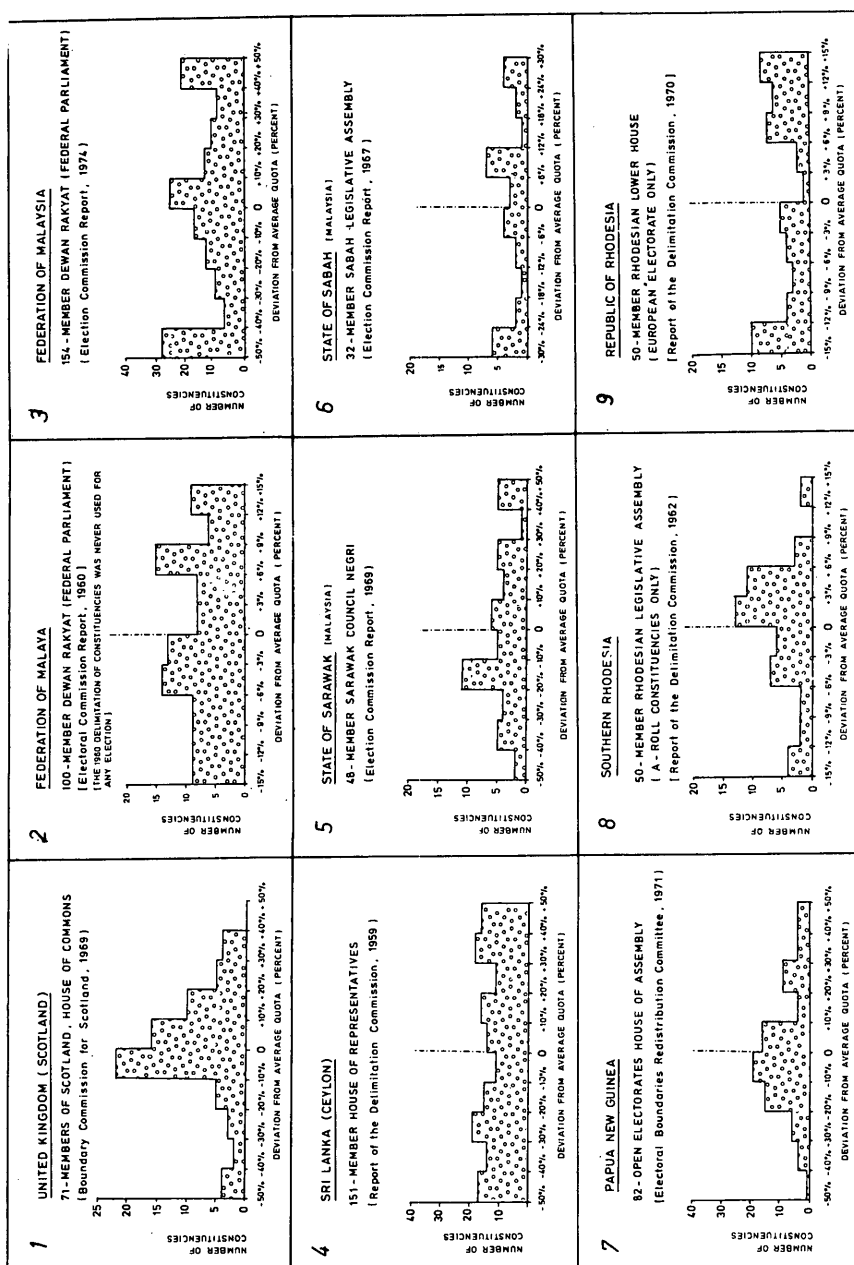
Australia presents a complex picture regarding electoral districting. For Federal elections, the size of electorates tend to be grouped closer together, whereas some States depart fairly widely from the principle of equality of voters per constituency. This is generally due to the method of "representation by zoning" (different electoral quotas for various geographical zones). In the State of South Australia, a plus or minus 10 per cent. for the metropolitan area of Adelaide, and a plus or minus 15 per cent. for the country area, with the following upper and lower limits, is laid down in the Electoral Districts Act:

Area	Electors	Seats	Quota	Allowance	Lower Limit	Upper Limit
Metropolitan	183 310	19	9 647	$\pm 1\ 446$	8 201	11 093
Country	432 055	28	15 055	$\pm 1\ 505$	13 550	16 560

In Queensland, the Electoral Commissioner may adopt a margin of allowance to be used whenever necessary, for each zone separately, but the quota shall not, in respect of any electoral district, be departed from to a greater extent than 20 per cent. either way.

It is in Ceylon (Sri Lanka) that equality of population for each electoral district never played an important role in the terms of reference of various delimitation commissions. The First Delimitation Commission

( 1964 ) in paragraph 51 of their report drew attention to the disparity in population strengths of electoral districts between provinces; and this disparity was further aggravated under the 1959-delimitation .



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FIGURE 8a

As it can be seen from Table 4 (see columns F and G), the percentage deviation from the average National quota has been considerably increased when having added regional electorates. Strictly speaking, however, it is not the area factor that accounts for a positive or negative weightage, but the introduction of regional electorates must be seen on the background of tribal connections, island regimes and economic importance of a region ( see Bougainville ). If the area factor played a more important role, the Western Region ( adjoining Irian Jaya ) would have been given a higher negative deviation.

## 6. Representation by Zoning

In Australia and South Africa remote and rural areas are heavily over-represented which is done through "representation by zoning". The Australian State of Queensland may serve as an example in this respect. For the election to the Queensland Legislative Assembly, the State is subdivided into four zones each of which fixing a separate electoral quota.

Table 5a: Queensland - Representation by Zoning, based on the Electoral Districts Acts of 1971

No.	Zonal Name	Seats	Electoral Population	Zonal Quota
1	South - Eastern Zone	47	594 879	..... 12 657
2	Provincial Cities Zone	13	162 585	(a) Bundaberg Area 12 086 (b) Cairns Area 12 967 (c) Centr. Queensland 12 820 (d) Mackay Area 15 087 (e) Mt. Isa Area 10 569 (f) Townsville Area 12 091
3	Western and Far Northern Zone	7	53 487	..... 7 641
4	Country Zone	15	149 640	..... 9 976
Queensland Total		82	960 591	( 11 715 )

Thus, strictly speaking, the division is not among rural and urban constituencies, since the City of Brisbane and the rural areas of Fassifern and Somerset are grouped together in the same zone. It is rather a

b) In *Ceylon*, the 1959 delimitation of constituencies awarded each Province one electoral district for each group of 75 000 people plus an additional electoral district for each 1 000 square miles of area.

c) *Papua New Guinea's* two-tier system of "open electorates" and "regional electorates" has a similar effect. The open electorates are created on the basis of equal population size following the approximate electoral quota of 30 000, although several electorates deviate considerably from the average. Superimposed on the open electorates are so-called regional electorates giving each region one additional representative, with the effect of assigning more weight to the archipelagic regions of Manus, New Britain, New Ireland and Bougainville.

Table 4: Papua New Guinea - Population quota per Region (1971) \*

		A	B	C	D	E	F	G
No. Des.	Region	Number of Electorates Open A+1		Total Populat. Region	$\frac{C}{A}$	C A+1	Percentage Deviation from D E	
A	Bougainville	3	4	85 240	28 423	21 310	- 8.2	- 16.0
B	Central	5	6	174 171	34 834	29 139	+ 12.6	+ 14.8
C	Chimbu	7	8	186 376	26 625	23 297	- 13.9	- 8.2
D	East H'lds	7	8	229 376	32 773	28 677	+ 5.9	+ 13.0
E	E. New Britain	4	5	229 414	31 208	24 967	+ 0.8	- 1.6
F	E. Sepik	6	7	124 833	30 993	26 565	+ 0.2	+ 4.7
G	Gulf	2	3	68 057	34 028	22 685	+ 10.0	- 10.6
H	Madang	6	7	183 188	30 531	26 170	- 1.3	+ 3.1
I	Manus	1	2	21 951	21 951	10 976	- 29.0	- 56.7
J	Milne Bay	3	4	107 258	35 732	26 815	+ 15.5	+ 5.7
K	Morobe	8	9	271 675	33 959	30 186	+ 9.8	+ 19.0
L	New Ireland	2	3	54 886	27 443	18 295	- 11.3	- 27.9
M	Northern	2	3	60 257	30 128	20 085	- 2.6	- 20.8
N	S. H'lds	7	8	205 397	29 342	25 675	- 5.2	+ 1.2
O	Western	2	3	65 478	32 739	21 826	+ 5.8	- 14.0
P	W. H'lds	11	12	336 655	30 605	28 055	- 1.1	+ 10.6
Q	W. New Britain	2	3	62 290	31 145	20 763	+ 0.7	- 18.2
R	W. Sepik	4	5	114 034	28 508	22 806	- 7.9	- 10.1
	Papua New G.	82	100	2537 118	30 940	25 371	-	-

\* Source: Boundaries Distribution Committee Report of 1971



by giving an additional weight of 10% for area. The distribution of seats between the administrative regions is therefore in the ratio of one point for land mass to nine points for population :

Table 2: Ghana - Distribution of 140 Parliamentary seats on the basis of population and area (1967) \*

	A		B	C		D	E
Region	Population 1966		Seats by popul.	Land Area		Seats by Land Area	$B(0.9) \times D(0.1)$ (rounded)
	number	%		square miles	%		
Western	724 258	9.2	13	9 236	10.0	14	13
Central	872 731	11.1	16	3 815	4.1	6	15
Eastern	1275 833	16.3	23	7 698	8.4	12	22
Volta	916 315	11.6	16	7 943	8.6	12	16
Ashanti	1293 249	16.5	23	9 417	10.2	14	22
Brong Ahafo	685 514	8.8	12	15 273	16.6	23	13
Northern	621 104	7.9	11	27 175	29.5	41	14
Upper	881 737	11.3	16	10 548	11.5	16	16
Great Accra	573 821	7.3	10	995	1.1	2	9
Ghana	7835 562	100	140	92 100	100	140	140

\*Source : Report of the Commission of Enquiry into Electoral and Local Government Reform, 1967, p. 117

Table 3: Ceylon - Number of Electoral Districts on the basis of Population and Area (1959) \*\*

	A		B	C	D	E
Province	Total Population (1959)		Number of Elect. District on the basis 75 000 persons	Additional Area Weightage	(B+C) Total Number E. District	$\frac{A}{D}$ Provincial Quota
Western	2547 500		34	1	35	72 786
Central	1552 600		21	2	23	67 504
Southern	1258 700		17	2	19	66 247
Northern	664 300		9	4	13	51 100
Eastern	496 200		7	4	11	45 109
North- Western	1000 900		13	3	16	62 556
North- Central	275 100		4	4	8	34 388
Uva	549 900		7	3	10	54 980
Sabaragamuwa	1016 100		14	2	16	63 506
Ceylon	9361 300		126	25	151	-

\*\*Source: Report of the Delimitation Commission, 1959, p. 11

## 5. Weightage for Land Area and Remoteness

Several election systems give additional weightage to area or land mass, with the result that constituencies in remote and under-populated regions have usually fewer number of electors. It can be argued that these remote and large-sized constituencies with low density of population are seriously handicapped in many respect. This is particularly true for the majority of developing countries in Africa and Asia where remote areas are characterized by poor means of communication, high rates of illiteracy and low standard of economic development. It is argued that candidates in remote areas need to spend more effort and time for campaigning and elected representatives encounter more difficulties in serving their electorate. In Sabah's Kinabatangan constituency ( Malaysia ) for instance, government officials and political deputies have to spend a fortnight when travelling along the river from the district headquarter to their constituency.

On the contrary, it has been argued that special consideration should be given to economic wealth of a region, or areas of future potential development. Most Electoral Commissions have rejected this principle of over-representation of "prosperity areas", but rather insist on the application of strict numerical entitlement according to population. Several countries, however, anticipate future development resulting from population migration, like West Malaysia's Jengka Triangle region, or Singapore's resettlement program which takes also in consideration the prognostication on shifts of population as a result of rehousing in housing and development blocks and urban renewal.

Statistical methods have been developed to combine population size and the land area factor. Three examples of countries may be cited where remote underdeveloped areas have received a special favourable weightage regardless whether urban or rural : Ghana, Ceylon and Papua New Guinea.

a) *Ghana* ( under civilian rule of P.M. Busia ) distributed the 140 Electoral Districts in such way that the population principle was modified

A more detailed picture of the size variations of electorates in various countries can be obtained from the attached figure 8a/8b (see charts. Nr. 1 to 18).

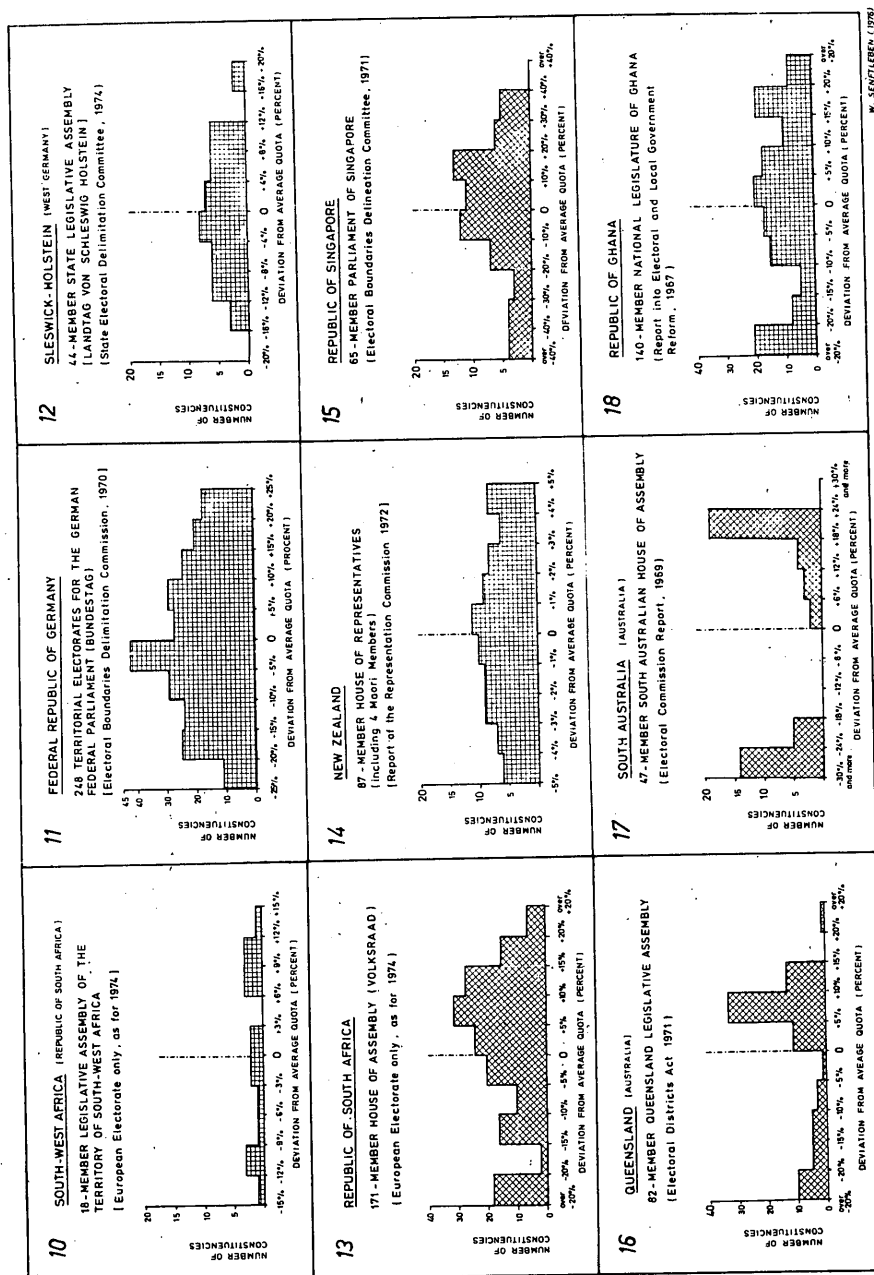


FIGURE 8b

weightage in favour of remoteness and under-population. Figures 9a and 9b show the location of the four electoral zones vis-à-vis the major geographical regions of Queensland. The State of Western Australia applies a similar method of zoning. The 1972-delimitation scheme distinguish between three zones : (1) Metropolitan Area; (2) Agricultural, Mining and Pastoral Area; and (3) North-West-Murchison-Eyre Area, with the following particulars :

Table 5b : Western Australia - Representation by Zoning, based on the Electoral Districts Act of 1947 - 1965

No.	Zonal Name	Seats	Electoral population	Zonal Quota
1	Metropolitan Area	23	356 429	15 497
2	Agricultural, Mining and Pastoral Area	24	179 759	7 490
3	North-West-Murchison-Eyre Area	4	14 715	3 679
Western Australia Total		51	550 903	10 802

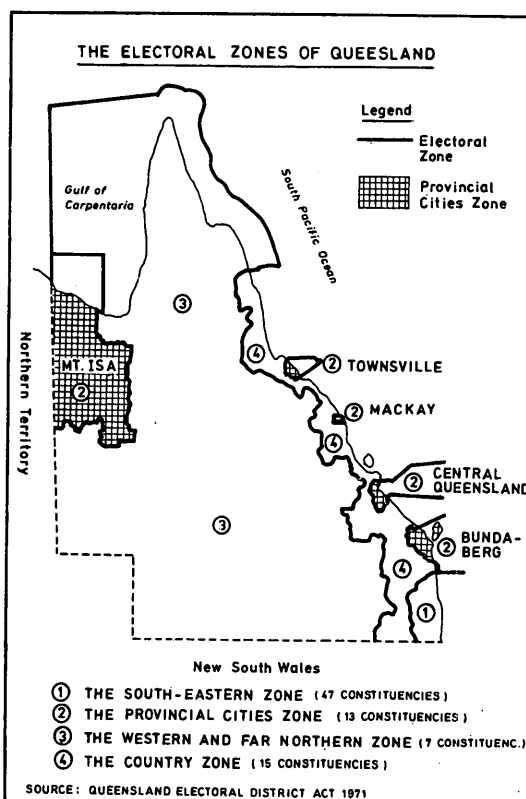


FIGURE 9a

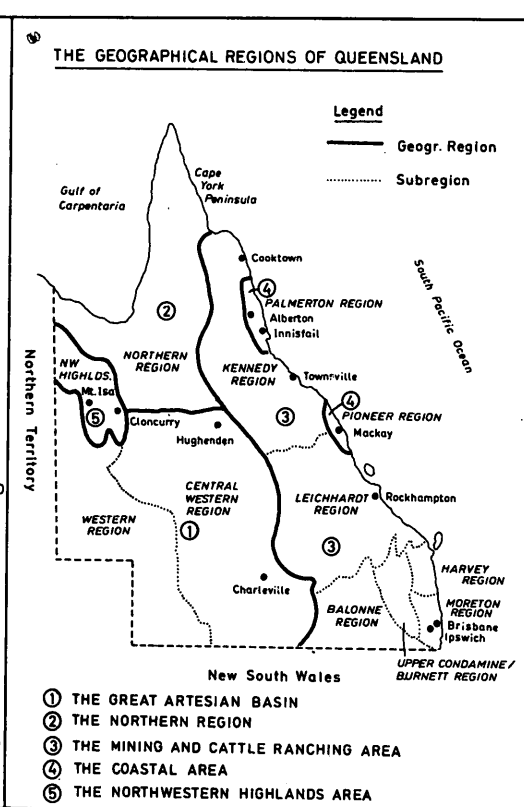


FIGURE 9b

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## 7. Urban and Rural Electorates

Giving heavy weightage in favour of rural electorates can be noticed in many countries, particularly in Australia and South Africa whose economies are based on the primary sector of agriculture and mining. In many cases, rural constituencies have only a small fraction of the electorate of urban ones. There is much disagreement on whether to apply such a weightage in favour of rural areas. The common argument is that rural and underdeveloped areas are naturally disadvantaged and therefore deserve stronger representation. On the other hand, social disparities and structural problems are more pronounced in urban areas. Therefore in modern societies the rural over-representation seems to be unjustified. The Boundary Commission for England ( 1969, page 6 ) remarks in this respect :

"It can be argued that extensive rural constituencies with possibly poor communications present problems for the Member of Parliament in representing his constituency, for the public in meeting their Member, and for local political party organizations. These problems, however, may not be so great today as in the past. On the contrary, it has been argued that a Member representing a borough constituency, more accessible as he is to the electorate, may be faced with more community problems than a Member for a county constituency. Our discussions with the chief officers of the political parties led us to the view that the arguments were evenly balanced and that there were no obvious case for deliberately seeking to create constituencies with smaller electorates in the rural areas...".

The following analysis shall examine how different countries have treated the urban and rural electorates. New Zealand and Rhodesia, for instance, do differentiate between urban and rural electorates, but desisted from giving preference to rural areas. In New Zealand, the Representation Commission ( 1972 ) proceeded to classify the 83 European electorates in accordance with the Parliamentary Salaries Order, 1970 into five categories:

- (a) A wholly urban electorate;
- (b) A substantially urban electorate;
- (c) A partially urban and partially rural electorate;
- (d) An ordinary rural electorate; and
- (e) A predominantly rural electorate.

For example, out of the seven predominantly rural electorates ( see table 6 ), three have positive deviations, and among the 33 wholly urban electorates are 13 with a negative deviation. With other words, the rural or urban character of a constituency has basicly no influence on the size of the electorate.

The Rhodesia electoral law distinguishes between rural and urban constituencies and requires the Delimitation Commission to provide for not less than 18 rural constituencies out of the total of 50 "A" Roll or European electorates. Although rural constituencies in Rhodesia are marginally smaller in average than urban ones, there are multiple cases of rural constituencies being above the electoral quota, at least during the 1962-delimitation scheme (examples : BORROWDALE, +4.5% ; GWEBI, +1.4%, LOMAGUNDI, +12% ; MAZOE, +12% ; UMZINGWANE, 1.5% ; WANKIE, +1.6% ). On the other hand, in 1971 only one rural constituency (VICTORIA, +17.1%) was above the electoral average. The Constitutional requirement to create 18 rural constituencies is in conflicting nature with the size limitation, i.e. not to depart more than minus 20 per cent. from the average number of voters. The 1971 Delimitation Commission ( on page 2 ) states in this respect :

"The 1962 Delimitation Commission warned that it might prove impossible to comply with this provision without infringing the departure principle. A departure of 20 per cent. either way from the average number of voters is now permissible, but there are already signs that the next Commission might have great difficulty in complying with this requirement of the Act, in spite of the greater percentage departure now allowed (previously limited to 15 per cent. either way). Since the last Commission reported, two rural constituencies ( MARLBOROUGH and GWELO )

Table 6: New Zealand - Classification of European Electorates into Rural and Urban Constituencies with Percentage Difference from Population Quota (1972)

Classification	Name	negative deviation	Name	positive deviation
Predominantly Rural Electorates	South Canterbury	-0.81 %	West Coast	+ 0.08 %
	Wallace	- 1.30 %	Hobson	+ 0.23 %
	Tasman	- 2.21 %	Otago Central	+ 4.35 %
	Marlborough	- 4.88 %		
Ordinary Rural Electorates	Coromandel	- 0.26 %	Gisborn	+ 0.38 %
	Wairarapa	- 0.82 %	Taupo	+ 0.95 %
	Raglan	- 0.49 %	Rodeey	+ 2.17 %
	Pahiatua	- 1.62 %	Oamaru	+ 2.55 %
	Clutha	- 2.82 %	Hawke's Bay	+ 2.04 %
	Rangiora	- 2.63 %	King Country	+ 3.12 %
	Rakaia	- 2.91 %	Bay of Plenty	+ 4.73 %
	Awarua	- 3.22 %		
	Rangitikei	- 3.93 %		
	Waikato	- 4.73 %		
	Stratford	- 4.77 %		
	Egmond	- 3.25 %		
Partially Urban and Partially Rural Electorates	Ruahine	- 0.50 %	Lyttelton	+ 1.15 %
	Waitemata	- 2.47 %	Whangerei	+ 1.48 %
	Auckland Central	- 3.16 %	Manawatu	+ 1.56 %
	Franklin	- 4.35 %	Piako	+ 2.07 %
	Kapiti	- 4.49 %	Rotorua	+ 4.30 %
Substantially Urban Electorates	Manukau	- 0.86 %	Henderson	+ 0.08 %
	Mangere	- 1.07 %	Western Hutt	+ 0.48 %
	Timaru	- 1.82 %	Pakuranga	+ 2.01 %
	Petone	- 2.41 %	Dunedin North	+ 2.72 %
	Karori	- 2.80 %	St. Kilda	+ 3.28 %
	Heretaunga	- 2.84 %	Wigram	+ 4.74 %
	Nelson	- 3.52 %	Manurewa	+ 4.80 %
Wholly Urban Electorates	Palmerston North	- 0.03 %	Grey Lynn	+ 0.13 %
	Onahunga	- 0.10 %	Sydenham	+ 0.31 %
	Otahuhu	- 0.10 %	North Shore	+ 0.86 %
	Invercargill	- 0.69 %	Roskill	+ 0.92 %
	Riccarton	- 1.31 %	New Plymouth	+ 1.25 %
	Birkenhead	- 1.38 %	New Lynn	+ 0.98 %
	Christchurch C.	- 1.46 %	Eden	+ 1.20 %
	Tamaki	- 1.48 %	St. Albans	+ 1.29 %
	Mt. Albert	- 1.86 %	Avon	+ 1.40 %
	East Coast Bays	- 2.54 %	Wellington Cent	+ 1.80 %
	Island	- 3.49 %	Porirua	+ 1.94 %
	Miramar	- 3.72 %	Napier	+ 2.20 %
	Remuera	- 4.07 %	Hamilton West	+ 2.36 %
			Dunedin Central	+ 3.06 %
			Hastings	+ 3.10 %
			Hamilton East	+ 3.36 %
			Wanganui	+ 3.96 %
			Hutt	+ 4.56 %
			Papanui	+ 4.72 %
			Tauranga	+ 4.95 %

Source: New Zealand: Report of the Representation Commission 1972

have become urban by reason of the creation of a town council and the extension of municipal boundaries respectively .... In special instances the Commission has had to arrange rural constituencies so that the number of urban voters is only just less than the number of rural voters. In the time available to it the Commission has not been able to discover a solution to the problem, but it humbly recommends that before the next delimitation, Government should take appropriate steps to have the whole position investigated".

The practice of giving favourable weightage to rural constituencies can be noticed in many countries, but the rural/urban ratio is usually confined to 1:2. In South Africa, the smallest constituency with an electorate of 9 147 is VRYBURG ( near the border to Botswana ) compared to the BOKSBURG constituency ( a suburb of Johannesburg ) with an electorate of 16 205. In Canada, with a few exceptions provided for in the Constitution, the population of Federal constituencies varies from 51 000 to 98 000 according to their rural or urban character; the largest electoral district being 97 590 ( LONGUEUIL in Quebec Province ) and the smallest one being 51 386 ( WESTMORELAND-KENT in New Brunswick province ). Although urban electorates usually have a considerably larger number of voters on the registers, the law does not make an official distinction between rural and urban. For elections to the provincial Assembly of Manitoba ( Canada ), the distinctions between "rural area" and "urban area" and between "rural electoral division" and "urban electoral division" which had existed under the Electoral Divisions Act of 1957, had been abolished in 1968.

The Boundary Commission of England ( 1969 ) similarly distinguishes between 'county constituency' ( rural ) and 'borough constituency' ( urban ), but the size of the electorate differs only insignificantly between them. The Commission emphasized on not deliberately seeking to create constituencies with small electorates in the rural areas. Although borough and county constituencies do not represent an exact division into urban and rural constituencies; figures in Table 7 give a general impression of the differing sizes of such constituencies over the past fifteen years:



Table 7: England - Average Electorates in Borough and County Constituencies, 1953 - 1968\*

Constituencies	1953	Existing Constituencies			Recommended Constituencies	
		1955	1965	1968	1965	1968
Borough	57 883	58 201	56 208	55 314	58 824	58 500
County	56 093	54 952	62 081	65 698	57 283	60 315
Difference (Borough - County)	+1 790	+3 249	-5 873	-10 384	+1 541	-1 815

\*Source: Boundary Commission for England - Second Periodical Report, (1969), page 68 (Table 5).

One of strongest disparities between rural and urban constituencies can be found in Malaysia. Although the average ratio in the size of electorate between urban and rural tends to be around 2 - to - 1, there are also multiple case as high as 4-to-1 or 3-to-1. This has mainly political considerations and the matter has been sufficiently discussed by the author in his previous publications ( SENFTLEBEN, 1974;1975;1976 ).

The Dauer-Kelsay Index of Representativeness has been developed as a measurement to termine the disparity of the size of electorates, but unfortunately, the Index can only be applied evidentially to compare legislatures with an almost equal number of seats. To quote an example, the Index would not give any conclusive evidence if the 613-member British Parliament is compared with the 69-member Parliament of Singapore. KALSER (1968)<sup>1)</sup> therefore suggests the application of another Index for the comparison of cases where legislatures have a different strength in membership, but the procedure of culculating this Index is much more complicated and time-consuming than the Dauer-Kelsay Index, and the computation of Kaiser's index requires the application of computer techniques. Kaiser ( 1968; pp.212f. ) effectively pointed out that, although strictly speaking it is not appropriate to compare the Dauer-Kelsay indices for legislatures of different sizes, for  $k$  ( = number of electoral districts ) being large, the correlation between  $k$  and  $d$

1 ) Kaiser, H.F. (1968): A measure of equality of legislative apportionment; in:Am. Polit. Sci. Review, vol .62,pp. 208-215

TABLE 8: Indices of the Quality of Electoral Apportionment of various Legislatures at Federal and State Level

COUNTRY (STATE / PROVINCE)	YEAR OF REFERENCE	LEVEL	k	d <sup>3</sup>	Dauer-Kelsay Index		QUALITY OF DISTRIBUTION
					max.	d	
South-West Africa	1974	S	18	0.4625	0.5555	0.5189	good
Sabah (MALAYSIA)	1967	S	32	0.4049	0.5313	0.4375	fair
Kelantan (MAL.)	1974	S	36	0.3928	0.5278	0.4220	poor
Perak (MALAYSIA)	1974	S	42	0.3747	0.5238	0.3963	terrible
Sleswich Holstein	1974	S	44	0.4650	0.5227	0.4876	good
South Australia	1969	S	47	0.3992	0.5106	0.4120	poor
Sarawak	1969	S	48	0.3999	0.5208	0.4193	poor
Rhodesia	1970	U	50	0.4416	0.52	0.4614	good
Western Australia	1972	S	51	0.3196	0.5098	0.3240	terrible
Cape Province (RSA)	1974	S	55	0.4225	0.5091	0.4321	fair
Manitoba (CANADA)	1968	S	57	0.4467	0.5088	0.455	good
Saskatchewan	1973	S	61	0.4746	0.5082	0.4831	excellent
Singapore	1971	U	65	0.4058	0.5077	0.4141	fair
Great Britain (Part of Scotland)	1969	F	71	0.3885	0.5070	0.3959	poor
Transvaal (RSA)	1974	S	76	0.4668	0.5132	0.4801	good
Papua New Guinea	1971	U	82	0.4156	0.5122	0.4275	fair
Queensland (AUS.)	1972	S	82	0.4503	0.5122	0.4633	good
New Zealand	1972	U	83	0.4887	0.5060	0.4948	excellent
Malaya	1960	F	100	0.4629	0.51	0.4728	good
Ghana	1967	U	140	0.4377	0.5071	0.4449	fair
Ceylon [Sri Lanka]	1970	U	151	0.3870	0.5033	0.3901	poor
Malaysia	1974	F	154	0.3596	0.5065	0.3662	terrible
South Africa	1974	F	170	0.4473	0.5059	0.4534	good
West Germany	1970	F	248	0.4473	0.5040	0.4513	good
Canada	1976	F	281	0.4284	0.5018	0.4302	fair

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k = Number of electoral Districts [or size of legislature]

d<sup>3</sup> = Minimum proportion of the population able to elect half the legislators

d = Minimum proportion of the population able to elect an absolute majority of the legislators (= Dauer-Kelsay index)

max. = Maximum possible value of the Dauer-Kelsay index defined as  $(k+2)/2k$  for k even, and  $(k+1)/2k$  for k odd

F = Federal legislature; S = State or Provincial legislature; U = Unitarian legislature.

( = Dauer-Kelsay index ) is fairly sufficient for a normal comparison.

Kaiser introduced another measure (  $d^*$  ) which is defined as " the minimum proportion of the population able to elect half the legislators" ( in contrast to  $d$  which is defined as "the minimum proportion of population able to elect a majority of the legislators" ) and he proved that the correlation between  $k$  and  $d^*$  is almost perfect.

Table 8 gives the Dauer-Kelsay indices and  $d^*$ -indices for different legislatures in ascending order of  $k$  ( = size of legislature ) . When calculating the Dauer-Kelsay indices, the corresponding maximum possible values are also shown in the Table above, which are defined as  $(k+2)/2k$  for  $k$  even, and  $(k+1)/2k$  for  $k$  odd; from these formulas it is seen that the Dauer-Kelsay index becomes spuriously inflated for  $k$  being small. The index  $d^*$  is calculated in the same manner as the Dauer-Kelsay index, but for  $k$  odd, half the population ratio of the middle district ( i.e. the  $(k+1)/2$  district ) is included in computing  $d^*$ . Table 8 thus compares measures for population equality of the following countries and semi-autonomous states : South West Africa, Sabah, Kelantan, Perak, Sleswick Holstein, South Australia, Sarawak, Rhodesia, Cape Province ( R. S.A. ), Manitoba, Saskatchewan, Singapore, Great Britain ( part of Scotland ), Transvaal, Papua New Guinea, Queensland, New Zealand, Malaya, Ghana, Ceylon ( Sri Lanka ) , Malaysia, Republic of South Africa, West Germany, Canada and Western Australia.

## 8.Period of Review

To satisfy the principle of population equality among constituencies, the boundaries of electoral units are to be subject to a periodical review. The three principal reasons necessitating such a review are: (1) population changes and internal migration; (2) alterations in the demographic and ethnic structure, and (3) increase of the membership strength of the legislature. The strict application of the majority system requires that there are as many constituencies as seats in the legislature. To determine the "Size of an Assembly" most suitable for a country, is an intricate problem based primarily on aspects of population size of a country and financial ability.

Each change in membership strength of an Assembly requires a fresh delimitation process for the entire area, unless some special electoral device is used ( nomination, multi-member electorates, etc... ). Cases where the membership of legislatures have been increased are manifold; only to mention the Republic of Singapore whose Parliament had originally 51 Members; in 1967 the membership was increased to 58; in 1971 to 65, and in 1976 to 69 Members.

To take account of alterations of the demographic structure, a redistribution of seats ( or review of electoral boundaries ) becomes mandatory even if the membership strength of an Assembly remains unchanged.

Several highly advanced countries with a sophisticated demography undertake a review of constituencies during each legislative period. In the U.S.A., Congressional Redistricting is carried out every four years, but most boundary changes are only of minor importance and the overall electoral framework is usually left intact. Boundary changes of all U.S. States for Congressional elections are compiled and published in the "*Congressional District Atlas*". The West German case is almost similar with a quadrennial review, and each delimitation scheme is in force for one legislative period ( four years ). Such a frequent review is only possible in a country with a highly advanced statistical recording of population data, especially by extrapolating population estimates beyond the decennial census of population. The use of computerized districting methods have been suggested by several authors, but the application would be limited to European and Northern American States with a sophisticated demography system <sup>1)</sup>. Small City States ( like Singapore ) require a frequent review due to the high mobility of the population.

The most common case is a review every ten years which is based on the last preceeding census officially published. A few examples may be mentioned: Under the Canadian Constitution, representation in the House of Commons must be review at ten-year intervals-i.e. after each decennial

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1 ) see HESS, S. & WEAVER, J. ( 1964 ) : Non-partisan Political Redistricting by Computer, in: Operational Research, vol.13, pp. 998-1006.

census. Ghana and the Seychelles recommend a review of electoral divisions at intervals of not less than seven years or within 12 months of the publication of the enumeration figures after the holding of a census. Malaysia and Kenya prescribe an interval of not less than eight and not more than ten years or whenever directed by an Act of Parliament. In the United Kingdom, a Boundary Commission's report to recommend changes of the electorates shall be submitted not less than ten or more than fifteen years from the date of the submission of the Commission's last report. The "First Periodical Report of the Boundary Commission for England " in post-war times was produced in November 1954 ( Vide: Cmnd. 9311), the "Second Periodical Report" in June 1969 ( vide: Cmnd. 4084 ) respectively, i.e. after a lapse of fifteen years; but minor boundary corrections are being carried out in the meantime.

Although most countries require the constant review of electoral boundaries, usually after each decennial census of population, such a review may be postponed or cancelled if the Commission considers that the changes in the distribution of population reported in the census do not justify an alteration in the boundaries, so the report conducted will be without entering upon a review of boundaries of constituencies. There are multiple cases for this: for instance, Mauritius experienced the last delimitation in 1958 which was used for all subsequent elections including the 1976-one.

## 9.Special Island Cases

This study laid particular emphasis on those countries following the majority system of election based on single-member constituencies. Many island states, however, do not find the majority system particularly suitable to fit the island character, but nevertheless are dependent on regional electorates. Since the application of conventional methods for the demarcation of single - member constituencies in island states with a long coastline prove difficult, modifications or derivations of the main electoral systems can be found. The five major alter-

natives are <sup>1)</sup> :

- (1) Single transferable vote ( or preferential vote ) ;
- (2) Party - list proportional representation ;
- (3) Limited vote ;
- (4) Multi - member constituencies with election by simple majority ;
- (5) Various possible mixed systems in which a simple - majority method of election is accompanied by a further allocation of seats according to some other principle.

Multi - member constituencies are most frequently used by island states. In the Republic of Malta, for instance, the 55 members of the House of Representatives are elected upon the principle of proportional representation by means of the single transferable vote from ten electoral divisions. Thirty members are elected in equal proportions from the second, third, seventh, eighth and ninth electoral divisions ( so-called six-member constituencies ) and twenty-five members are elected in equal proportions from the first, fourth, fifth, sixth and tenth electoral divisions ( so-called five-member constituencies ).

Mauritius presents a colourful example of changing electoral systems to suit the special conditions of this small Indian Ocean island state with a multi-racial population. The 1885 representation scheme included ten elected members; two representing the capital city of Port Louis and the remaining eight representing rural districts. Constituencies were regrouped in 1947, including 1 six-member constituency, 1 four-member constituency and 3 three-member constituencies. In 1958 the Mauritius Electoral Boundary Commission <sup>2)</sup> was instructed to create 40 single -member constituencies each returning one candidate by simple majority, but this system did not prove successful in a multi-racial State. When Mauritius was on the brink of independence, the Banwell Commission was instituted to investigate into

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1 ) Mauritius ( 1966 ) : Report of the Banwell Commission on the Electoral System... , page 8

2 ) Mauritius ( 1958 ) : Report of the Mauritius Electoral Boundary Commission, by Eve Malcolm Trustram; ( Sessional Paper No. 1 of 1958 ).

the change of the election system being most suitable for the island. It recommended the creation of 20 three-member constituencies with certain correctives and special allocation of so-called "additional best-loser-seats". The existing constituencies were regrouped in this way that two existing single-member constituencies were joined together to form one three-member constituency; which system was later adopted by the government. On the other hand, the 'Independent Forward Block' opposition party proposed grouping the existing 40 constituencies in 12 combinations of three constituencies and 1 of four. The left-wing 'Parti Mauricien Social Democrate', however, was in favour of treating the whole island as one large constituency with elections being held under a system of proportional representation. In 1976, the Mauritius Electoral Boundary Commission undertook a fresh delimitation of constituencies to ensure greater equality of population among constituencies, but the recommendations of the Commission were rejected by the Legislative Assembly on political grounds.

The newly independent Republic of the Seychelles in the Indian Ocean has a mixed system with eight regional electorates returning each one member and having such boundaries as may be determined by an Electoral Boundaries Commission, and 17 general electorates with the Seychelles consisting of one single National constituency, whose members are elected by proportional representation according to a "party-list system".

In Taiwan ( Republic of China ), constituencies for the elections to the Legislative Yuan ( Legislature ) are based on the boundaries of administrative units - i.e. Hsien boundaries. For the first election to the Legislative Yuan being held in 1948 on the mainland, 760 legislators were chosen, but the membership diminished to only 434 at March, 1975. During the last partial election in December, 1975, however, only 51 representatives were actually elected directly by the population, and out of this only 28 members from territorial electorates.

Although the Taiwan partial elections do not provide much interest for an analysis from the political point of view, the spatial set-up of territorial electoral districts gives rise to some interesting observations

FIGURE 10

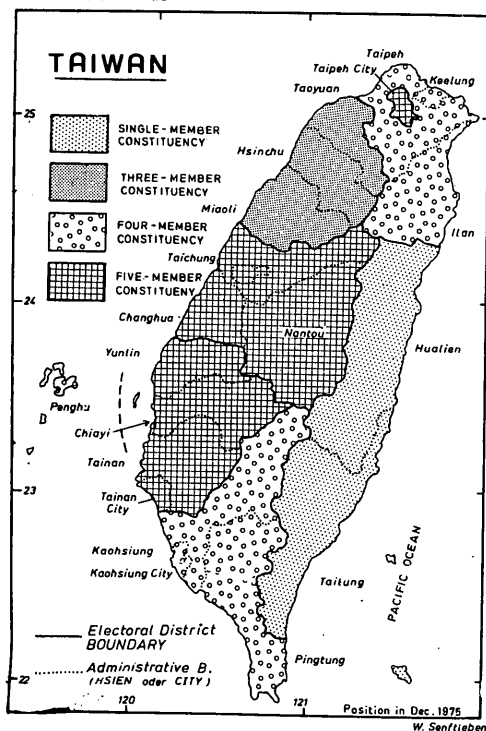
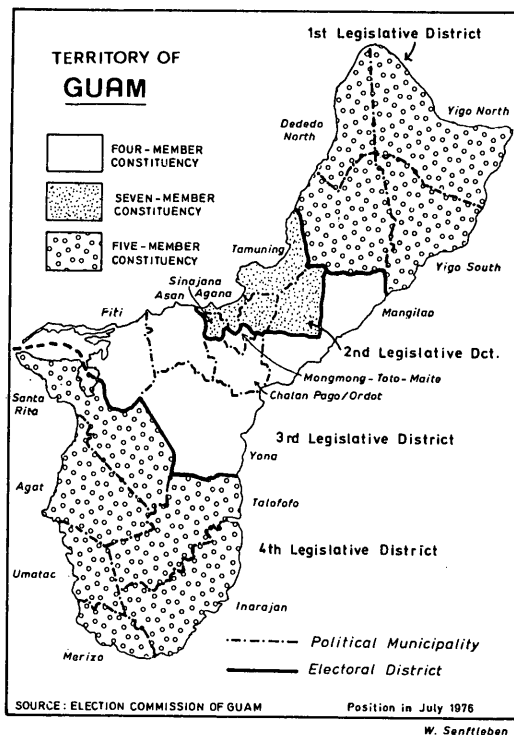


FIGURE 11



from the geographical point of view. The area under administration of the Nationalist Chinese government is sub-divided into eight electoral districts, six for the Province of Taiwan, and one each for the Taipei Special Municipality and the Fukien islands of Kinmen and Matsu respectively. Districts VI (Hualien & Taitung) and VIII (Kinmen & Matsu) are voting according to the majority system returning one member each; whereas all other districts are based on proportional representation and multi-member constituencies. Several Hsien are grouped together to form an electoral district with the following distribution - see Table 9.

The deviation from the electoral quota is kept within the permitted limits, generally not exceeding  $\pm 20$  per cent (except for Taipei Special Municipality and the Fukien islands of Matsu and Kinmen). Figure 10 shows the relationship between administrative divisions and electoral districts in the Republic of China, as at 1975. Prior to that Taiwan was divided in only two electoral districts - the Southern part and Northern part. An additional of 9 members are elected from the aborinines and professional groups with Taiwan forming one single National constituency.



Table 9: Taiwan-Distribution into Electoral Districts (as at 1975)

Nr.	Administrative Division	Number of electors		Number of seats	District Quota	Deviation f. Quota
		per Hsien	per District			
I	Taipei County Keelung City Ilan County	729 938 146 438 201 033	1 077 411	4	269 353	+0,6 %
II	" Taoyuan County Hsinchu County	381 612 288 685	903 959	3	301 186	+12,6 %
III	Taichung City Taichung County Changhua County Nantou County	261 885 399 300 501 516 238 539	1 404 240	5	280 848	+5,0 %
IV	" Yunlin County Chiayi County Tainan County Tainan City	411 828 385 535 499 901 278 957	1 576 221	5	315 244	+17,8 %
V	Penghu County Pingtung County Kaoshiung County Kaoshiung City	52 797 345 943 461 344 396 549	1 256 633	4	314 158	+17,4 %
VI	Taitung County Hualien County	97 967 131 751	299 718	1	299 718	- 14,1 %
VII	Taipei Special Municipality	1 013 279	1 013 279	5	202 655	-24,3 %
VIII	Kinmen Island Matsu Island	24 280 5 591	29 871	1	29 871	-88,8 %
Total Republic of China		7 491 332	7 491 332	28	267 550	

The clear preference of small island states to choose the multi-member proportional representation system can be also noticed in the U.S. Territory of Guam. In contrast to the U.S. mainland, representatives for the Guam Legislature were elected through proportional representation with the whole island of Guam forming a single constituency ( vide : The Organic Act of Guam, 1950-1971 ). In 1976, however, the method of representation was changed from the "at-large" system to "districting" to effect at the 1978 general election ( vide : Guam Public Law No. 13-152 ). The division of the island into four multi-member electoral districts ( 21 seats ) is shown in Figure 11.

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