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# Marital movement and population structure in Gredos (Spain)

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## RESUMO

A população estudada é constituida por 11 pequenas aldeias, com uma localização geográfica linear ao longo do vale de Tormes, a cerca de 150 Km a Oeste de Madrid.

Os dados matrimoniais, correspondentes a uma população de cerca de 6500 habitantes, foram obtidos nos registos paroquiais do período 1850-1985.

A mobilidade marital é, em primeiro lugar, considerada em termos espaciais, ou seja, relativamente à posição de cada aldeia no vale e à distância que a separa das maiores cidades fora desta área. Depois, consideram-se o factor temporal e a variação das facilidades de transporte. Baseados nos valores de «mean first passage time», são também analizados os movimentos inter-aldeias, directos e indirectos, e o grau de assimetria entre povoados.

Conclui-se que existe um padrão geral de movimento, de Oeste para Este.


*Palavras-chave:* Migração; Estrutura da população; Gredos; Espanha.


## ABSTRACT

The population presently studied consists of 11 small villages in a rather linear arrangement along the Tormes valley about 150 Km west of Madrid. Matrimonial data corresponding to a population of around 6, 500 inhabitants were obtained from local parish records for the 1850-1985 period. Marital mobility is first considered in spatial terms, that is, in relation to the position of each village within the valley and its distance to other larger towns outside the area. Second, the temporal factor and the variation in transportation facilities is taken into account. Based on mean first passage time values, also analysed is intervillage exchange movement, both direct and indirect, and the degree of asymmetry between settlements. The existence of a West to East general pattern of movement is conclued.


*Key-words:* Migration; Population structure; Gredos; Spain.

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## INTRODUCTION

This paper deals with the marital movement pattern in a rural mountainous area located about 150 Km west of Madrid. The long term research is focused on the whole «Sierra de Gredos», that is, a territory of about 700 $Km^2$ in which two valleys may be distinguished: the Alberche and the Tormes. Up to now only one anthropological study is based on the same population (FUSTER and CABELLO, 1986). The results here analysed refer to 11 small villages in a rather linear arrangement along the river Tormes Valley, the boundaries of which are determined by East-West mountain tops over 2,000 m in a altitude (Figure 1). For the period studied, 1850-1985, the average number of inhabitants has been close to 6,500, mostly engaged in agriculture and cattle raising. Similar to many other Spanish populations, an intense emigration toward industrialized regions was present in recent years.

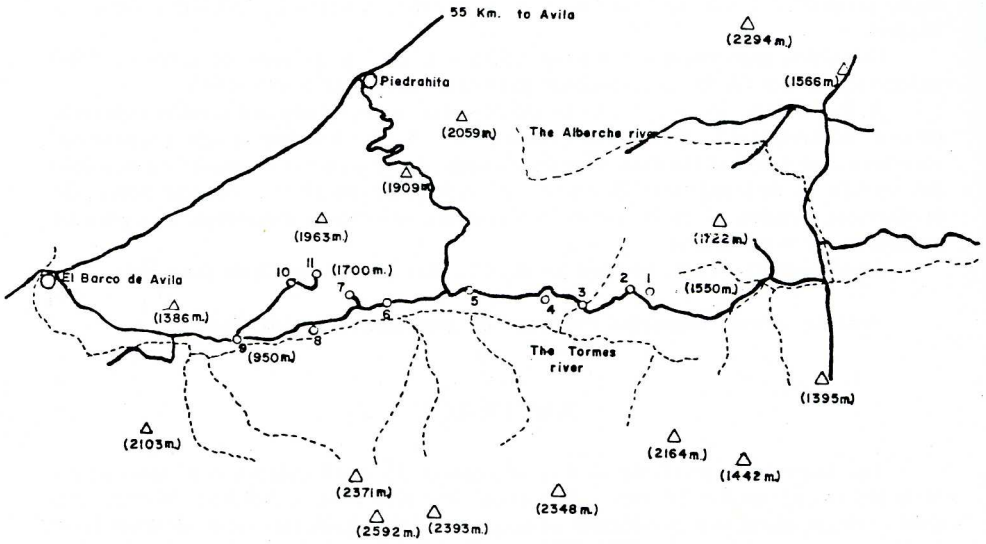


Fig. 1 — The Tormes valley. ○ = Villages under study (1 = Navarredonda, 2 = Barajas, 3 = Hoyos Espino, 4 = Hoyos Collado, 5 = Navacepeda, 6 = Navalperal, 7 = Zapardiel, 8 = Angostura, 9 = Aliseda, 10 = Horcajo, 11 = Navasequilla). ○ = country towns. ——— = road. ····· = river. — = moutain tops. + = limits area III.

## MATERIAL AND METHODS

Data were obtained by filming local parish records of marriages. Thus, although the complete information concerning each wedding was available, only dates and places (of birth, residence or wedding) have been taken into account.

Marital structure is first described by endogamy rates and their variation in spatial and temporal terms. Second, for analysing the intervillage exchange movement both direct an indirect, and degree of asymmetry of flow between settlements a measure (The mean first passage time) such as applied by LALUEL and LANGANEY (1976), MIELKE (1981) and FUSTER (1982) is here considered. For this purpose it must be assumed that the migration among sudivisions (villages) constitutes a first order discrete Markov process. Thus, given a matrix of matrimonial migration (for instance origin-residence) a stochastic migration matrix may be obtained in which elements represent the direct flow between subdivisions. According to the model these transition probalities keep constant throughout time. Given a pair of subdivisions i and j, the mean first passage time can be interpreted as the mean time (in generations) necessary for an element (gene) in i to reach j for the first time (MIELKE, 1981). Computational details may be found in IOSIFESCU (1980).

## RESULTS AND DISCUSSION

Concerning the pattern of endogamy, Table 1 represents the temporal variation of the intra-village, within-valley and surrounding area average levels of endogamy. From the above, it seems clear that from 1850 to 1959 intra-village endogamous marriages have not shown any decreasing tendency, which abruptly started after 1960. However, groups II and III do not show lower values for the last period. Thus, a higher mobility mainly affecting previous intra-village couples is present in Gredos rather later than in other Spanish rural populations. Lower endogamy may be here related to a process of quick depopulation and improvement of transportation facilities. The Spanish civil war period (1936-1939) does not seem to have influenced in any way the pattern of endogamy in this community.

When the endogamy rates are refered to each village, results are those in Table 2. The lowest intra-village endogamy corresponds to villages 1 and 2, both at the East end of the Tormes valley. Low rates for this kind of endogamy is balanced by a higher within-valley endogamy, a situation also found in village 4. Maximum rates for this category of endogamy correspond to places 10 an 11 located outside the linear arrangement of the rest of the villages (Figure 1).

Altogether, the influence of the two closer country towns (El Barco de Avila and Piedrahita) has been negligible (0,45% and 0, 29% respectively). Moreover, distance has not determined movement, since 21 over 28 marriages implying one partner from those towns are restricted to three villages (1, 3 and 7). Thus, there has not been present any special interrelation such as described by COLEMAN (1977) in relation to the central place theory.

The inter-village pattern of movement is given by two migration matrices (Tables 3 and 4). They represent the direct flow between subdivisions. The corresponding mean first passage time matrices are reported in Tables 5 and 6. In the first period the higher association (also including indirect flow) exists

TABLE 1. *Rates of endogamy. I= intra-village endogamy average. II= within--valley (1 to 11) endogamy. III= surrounding area endogamy (see Figure 1)*

| PERIOD | N | I | II | III | TOTAL |
|---|---|---|---|---|---|
| 1850-59 | 215 | 71.63 | 17.67 | 3.26 | 92.56 |
| 1860-69 | 286 | 69.93 | 18.53 | 5.59 | 94.05 |
| 1870-79 | 298 | 72.48 | 15.10 | 5.37 | 92.95 |
| 1880-89 | 267 | 68.54 | 17.98 | 6.74 | 93.26 |
| 1890-99 | 348 | 68.68 | 17.24 | 5.46 | 91.38 |
| 1900-09 | 427 | 66.98 | 19.20 | 6.79 | 92.97 |
| 1910-19 | 371 | 74.39 | 12.67 | 6.47 | 93.53 |
| 1920-29 | 328 | 75.91 | 14.94 | 3.05 | 93.90 |
| 1930-39 | 250 | 75.20 | 12.40 | 3.60 | 91.20 |
| 1949-49 | 369 | 69.92 | 14.36 | 5.42 | 89.70 |
| 1950-59 | 323 | 69.35 | 10.53 | 6.19 | 86.07 |
| 1960-85 | 283 | 59.72 | 13.43 | 7.07 | 80.21 |

TABLE 2. *Village endogamy rates. I= intra-village endogamy. II= within--valley (1 to 11) endogamy*

| VILLAGE | N | I | II | I & II |
|---|---|---|---|---|
| 1 | 509 | 50.88 | 21.61 | 72.49 |
| 2 | 376 | 53.19 | 22.61 | 75.80 |
| 3 | 546 | 73.08 | 14.10 | 87.18 |
| 4 | 165 | 59.39 | 27.88 | 87.27 |
| 5 | 620 | 74.19 | 13.22 | 87.42 |
| 6 | 189 | 72.49 | 11.11 | 83.60 |
| 7 | 192 | 66.67 | 17.71 | 84.38 |
| 8 | 342 | 73.98 | 7.02 | 81.00 |
| 9 | 495 | 84.44 | 8.28 | 92.73 |
| 10 | 148 | 82.43 | 6.08 | 88.51 |
| 11 | 237 | 76.37 | 20.25 | 96.62 |

TABLE 3. *Origin-residence migration matrix. Period 1890-1939*

| VILLAGE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 254 | 33 | 3 | 1 | 4 | 2 | 2 | 0 | 0 | 1 | 0 |
| 2 | 33 | 164 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 13 | 12 | 382 | 5 | 8 | 3 | 0 | 0 | 0 | 0 | 0 |
| 4 | 2 | 4 | 9 | 102 | 7 | 1 | 0 | 1 | 0 | 0 | 0 |
| 5 | 3 | 1 | 8 | 4 | 410 | 3 | 4 | 0 | 0 | 0 | 1 |
| 6 | 3 | 1 | 0 | 0 | 3 | 182 | 7 | 1 | 3 | 0 | 2 |
| 7 | 0 | 0 | 0 | 0 | 2 | 4 | 220 | 5 | 1 | 2 | 1 |
| 8 | 0 | 0 | 0 | 0 | 1 | 0 | 6 | 170 | 7 | 0 | 2 |
| 9 | 0 | 0 | 0 | 2 | 0 | 2 | 1 | 7 | 373 | 0 | 0 |
| 10 | 1 | 0 | 0 | 0 | 0 | 4 | 1 | 1 | 0 | 373 | 11 |
| 11 | 0 | 0 | 0 | 0 | 2 | 3 | 7 | 1 | 0 | 6 | 136 |

TABLE 4. *Origin-residence migration matrix. Period 1940-1985*

| VILLAGE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 91 | 12 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 4 | 66 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 4 | 3 | 205 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 1 | 1 | 3 | 30 | 5 | 0 | 0 | 0 | 0 | 1 | 0 |
| 5 | 8 | 1 | 14 | 1 | 265 | 1 | 0 | 0 | 0 | 0 | 0 |
| 6 | 0 | 0 | 1 | 0 | 2 | 13 | 2 | 0 | 0 | 0 | 0 |
| 7 | 0 | 0 | 0 | 0 | 4 | 2 | 69 | 1 | 0 | 0 | 1 |
| 8 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 87 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 137 | 0 | 0 |
| 10 | 2 | 1 | 0 | 0 | 5 | 1 | 0 | 0 | 1 | 197 | 0 |
| 11 | 4 | 2 | 0 | 0 | 5 | 1 | 4 | 0 | 0 | 0 | 131 |

TABLE 5. *Mean first passage time matrix. Period 1890-1939*

| VILLAGE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 7 | 46 | 157 | 317 | 102 | 149 | 139 | 246 | 303 | 403 | 318 |
| 2 | 14 | 10 | 153 | 319 | 101 | 154 | 144 | 251 | 308 | 409 | 323 |
| 3 | 55 | 74 | 15 | 284 | 91 | 147 | 144 | 249 | 306 | 415 | 324 |
| 4 | 74 | 91 | 105 | 57 | 76 | 145 | 138 | 236 | 296 | 413 | 318 |
| 5 | 107 | 129 | 141 | 283 | 6 | 139 | 126 | 233 | 292 | 408 | 307 |
| 6 | 151 | 176 | 225 | 343 | 128 | 13 | 85 | 176 | 218 | 378 | 265 |
| 7 | 187 | 211 | 248 | 357 | 144 | 112 | 6 | 137 | 207 | 341 | 249 |
| 8 | 199 | 223 | 257 | 349 | 157 | 140 | 78 | 12 | 137 | 378 | 255 |
| 9 | 201 | 224 | 258 | 322 | 170 | 147 | 115 | 112 | 6 | 413 | 298 |
| 10 | 188 | 213 | 259 | 375 | 158 | 108 | 94 | 186 | 250 | 14 | 126 |
| 11 | 182 | 206 | 245 | 360 | 139 | 106 | 69 | 170 | 236 | 256 | 27 |

TABLE 6. *Mean first passage time matrix. Period 1940-1985*

| VILLAGE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 6 | 17 | 33 | 222 | 87 | 1991 | 4718 | 20295 | 26374 | 2608 | 32760 |
| 2 | 28 | 4 | 33 | 207 | 88 | 1990 | 4717 | 20288 | 26358 | 2593 | 32758 |
| 3 | 42 | 42 | 3 | 243 | 75 | 1983 | 4711 | 20298 | 26394 | 2629 | 32753 |
| 4 | 41 | 43 | 27 | 65 | 45 | 1928 | 4649 | 20169 | 26151 | 2386 | 32691 |
| 5 | 40 | 45 | 26 | 237 | 8 | 1916 | 4646 | 20255 | 26388 | 2622 | 32688 |
| 6 | 51 | 55 | 32 | 250 | 31 | 468 | 2804 | 19104 | 26401 | 2635 | 30846 |
| 7 | 59 | 63 | 45 | 257 | 31 | 1302 | 408 | 17348 | 26408 | 2643 | 28041 |
| 8 | 90 | 94 | 73 | 288 | 60 | 1002 | 3769 | 443 | 26439 | 2673 | 31811 |
| 9 | 108 | 112 | 91 | 306 | 80 | 862 | 2621 | 9148 | 750 | 2691 | 30662 |
| 10 | 59 | 63 | 55 | 260 | 58 | 1662 | 4301 | 19061 | 23765 | 127 | 32343 |
| 11 | 43 | 46 | 43 | 244 | 51 | 1680 | 3405 | 19480 | 26395 | 2630 | 3422 |

between villages 1 and 2, their interflow being rather symmetrical, although slightly favorable to 1. There is also association from 3 to 1 and 2, from 4 to 1 and from 8 and 11 to 7. According to these results, villages 1, 2 and 7 may be considered as central places in the sense attracting immigrants rather than giving partners. Altogether the mean first passage time values suggest a model of a certain homogeneity within the Tormes valley, with a general sense of movement from West to East. After 1940 the pattern changed in some aspects. Villages 1, 2 and 3 continue to be central places, with a rather symmetrical association among them, while from villages 4, 5, 7, 10 and 11 movement is directed to those places, and immigrants born in villages 6, 7, 8, 9, 10 and 11 tend to move to 5. Thus villages 3 and 5 constitute a new point of attraction besides 1 and 2. As another modification flow increased to those villages (1, 2, 3 and 5) while excepting 4, it decreased for the rest of the villages. Although in the first period villages 10 and 11 showed a slightly higher isolation than average, it is after 1940 when the villages such as 8, 9, and 11 appear as extremely isolated, perhaps reflecting a lower effective population size as a result of intense emigration after 1960. Consequently, the association within valley becomes much smaller in recent times since emigration could have modified tradicional pattern of within-valley movement.

In conclusion, even though the non-Markovian nature of migration has been pointed out (KRAMER, 1981; MYERS *et al.* 1982), mean first passage time matrices may be considered, at least for the population here studied, to be a useful method for describing population structure mainly in relation to asymmetry of movement and for determining central places of immigrant attraction.

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