ANTRO PO LOGIA

Portuguesa

Vol. 4-5 · 1986-1987

Inbreeding and endogamy, a comparative study in two parishes of the municipality of Coimbra, Portugal

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RESUMO

No presente estudo é analisada a evolução dos coeficientes de consanguinidade e de endogamia em duas freguesias do distrito de Coimbra (Pereira do Campo, concelho de Montemor-o-Velho e Anobra, concelho de Condeixa-a-Nova), entre 1881 e 1980. Com os resultados obtidos tentou-se comparar as duas freguesias com base na evolução da estrutura sócio-profissional, no desenvolvimento económico, das vias de comunicação e nas variações no número de efectivos. Apesar de possuírem limites coincidentes as freguesias apresentam níveis de consanguinidade e endogamia significativamente diferentes. Verificou-se, ainda, que o número de casamentos entre as duas freguesias é diminuto, o que é provavelmente devido à existência de um paúl que separa as duas freguesias constituindo uma barreira geográfica.

Palavras-chave: Consanguinidade; Endogamia; Biodemografia; Anobra; Pereira do Campo; Portugal.

ABSTRACT

The purpose of this essay is to analyse the evolution of the coefficients of both apparent consanguinity and endogamy in two parishes of the Municipality of Coimbra (Pereira do Campo and Anobra), between 1881 and 1980. With the results obtained an attempt was made to compare the two parishes having as a base the evolution of the social and professional structure, the economical development, the improvement in the means of communication and the changing number of inhabitants. Although they have the same limits, we attested that there is a significant difference in the values of apparent consanguinity and endogamy between the two parishes. It also becames clear that the number of marriages occured between them was very low, being probably due to the existing swamp that separates the two parishes constituting a geographical barrier preventing migrations.

Key-words: Apparent consanguinity; Endogamy; Biodemography; Anobra; Pereira do Campo; Portugal.

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INTRODUCTION

The study of a population's consanguinity, based essentially on the variation of apparent consanguinity levels and on influent facts like the geographical situation, the population's isolation, the difficulties in the communication and the social, economical and cultural backwardness, is an important contribute to the understanding of the genetical structure of the population. Also, the commercial and industrial development with all the subsequent social, cultural and economical changings will modify substancially the relationship between the populations and the exterior and obviously, will influence, a posteriori, consanguinity levels.

On the present study, we covered two parishes, (Anobra and Pereira do Campo). Although being situated in the same region (Municipality of Coimbra) and having coincident geographical limits, separated only by a swamp (Fig. 1), they present different consanguinity and endogamy levels.

Both parishes are constituted by several villages, four in Pereira do Campo and seven in Anobra. Pereira do Campo's parish, as a different social, cultural and economical reality and also thanks to the railway, a cheap and therefore privileged way to contact with the culture and the economy of other regions, benefits from a larger opening to the outside. Meanwhile, Anobra's parish has difficult reachings and was for many years isolated from the great city centers. For this reason, we tried to interpret the results of each one in a period of 100 years and also to compare these results in order to justify the differences found.

MATERIAL AND METHODS

The material that based our study comes from marriages's, christenning's and deaths' registers from 1881 to 1980.

Before 1918, a consanguinity licence was needed to marriages till the fourth degree included. Since then, according to the Canonic Law, only third degree consanguinity was an obstacle. After we had analysed the consanguinity licences of the fourth degree, we noticed that they presented such low rates that we didn't distinguish between C3 and C4 in that period. F coefficient was calculted with basis on the genealogical trees, by the method of Sewall-Wright (in CRUZ, 1976).

The percentage values of each parishe's endogamy were obtained according to:

A — Endogamic marriages: the two consorts live in the same parish.

B — Mixed marriages: only one of the consorts lives in the parish, (independently from the sex).

From the endogamy level, it is possible to have an idea about marriages' structuration during the considered period in the two parishes. With that aim, we calculated the endogamy coefficient that had to do with the geographical origin (birthplace $-\lambda$ b $-$ and residence at wedding day $-\lambda$ r) of the

Fig. 1 — Geographic location of the two parishes

nubents, using two matrices, one for each parish. So, for Pereira do Campo, we used a 6×6 matrix (Parishe's populations + Anobra + Others) and for Anobra we used a 10×10 matrix (Parishe's populations + Pereira do Campo + + Others). We consider belonging to «Others» an individual (δ or $\circ$) living in any other parish. The method was introduced by Segalen and Jacquard (1971) to study the social and the professional homogamy in a normand village. Homogamy level is one to the homogamic model and zero to the panmictic model and is interpreted as the tendency of individuals to marry on an homogamic basis.

RESULTS

Tables 1 and 2 present the evolution of the number of inhabitants in the two parishes. As we can see, Pereira do Campo's parish, although having less villages, presents always a larger number of inhabitants. To confirm these results, Tables 3 and 4 and Figures 2 and 3 present the evolution, in periods of five years, of the number of christenings, marriages and deaths and we verify that Pereira do Campo do Campo's parish presents a higher «population mouvement».

Figures 4 and 5 present in periods of five years, the values of apparent consanguinity coefficient — ε — and the percentage of consanguineous marriages — P — during the period under study. On a whole, we can see that Anobras's parish has higher consanguinity levels, with P oscillating till it reaches its highest value in 1941-1946. Since then, it decreases till it almost annulated. In what concerns Pereira do Campo's parish, we can see that C values never rise above 900×10^{-5}, presenting only two highest values, in 1916-1920 and in 1946-1955.

As we can easily verify on table 5 (A and B), presenting endogamy values and the percentage of farm workers, in Pereira do Campo's parish endogamy values are higher than in Anobra's parish, this one being essentially a rural parish.

Finally, on Table 6, we analized the percentage of marriages between the two parishes which is quite low.

DISCUSSION

On the whole, portuguese rural villages present high consanguinity levels, the periods of higher consanguinity succeding and being larger than those of other countries (GAMA, 1983).

Generally, higher consanguinity periods of Anobra's parish (1916-1920 and 1941-1945) and of Pereira do Campo's parish (1916-1920 and 1946-1955) can be explained according to decreasing of births and deaths some years before this two periods of time (see Tables 1 and 2). These facts, together with emmigration, contributed to the general increase of consanguinity in

TABLE 1. *Number of inhabitants (male and female) of Pereira do Campo's parish, between 1890 and 1970, in periods of ten years.*

	total	♂	♀
1890	1638	755	883
1900	1717	799	918
1911	1827	846	981
1920	1724	744	980
1930	2016	943	1073
1940	2242	1090	1152
1950	2289	1115	1174
1960	2322	1117	1205
1970	2327	1161	1166

TABLE 2. *Number of inhabitants (male and female) of Anobra's parish, between 1890 and 1970, in periods of ten years*

	total	♂	♀
1890	914	471	443
1900	880	420	460
1911	967	456	511
1920	1011	477	534
1930	1094	516	578
1940	1188	575	613
1950	1226	619	607
1960	1240	616	624
1970	1129	543	586

TABLE 3. *Number of christenings (C), marriages (M) and deaths (D) in Pereira do Campo's parish, between 1881 and 1980, in periods of five years.*

	M	D	C
1881-1885	63	154	255
1886-1890	62	201	289
1891-1895	61	173	284
1896-1900	72	147	286
1901-1905	79	145	302
1906-1910	68	166	304
1911-1915	61	102	179
1916-1920	77	160	219
1921-1925	72	104	229
1926-1930	90	103	268
1931-1935	98	114	297
1936-1940	82	136	303
1941-1945	98	153	273
1946-1950	97	100	219
1951-1955	94	104	221
1956-1960	92	97	199
1961-1965	80	114	179
1966-1970	95	121	173
1971-1975	102	102	202
1976-1980	74	158	185
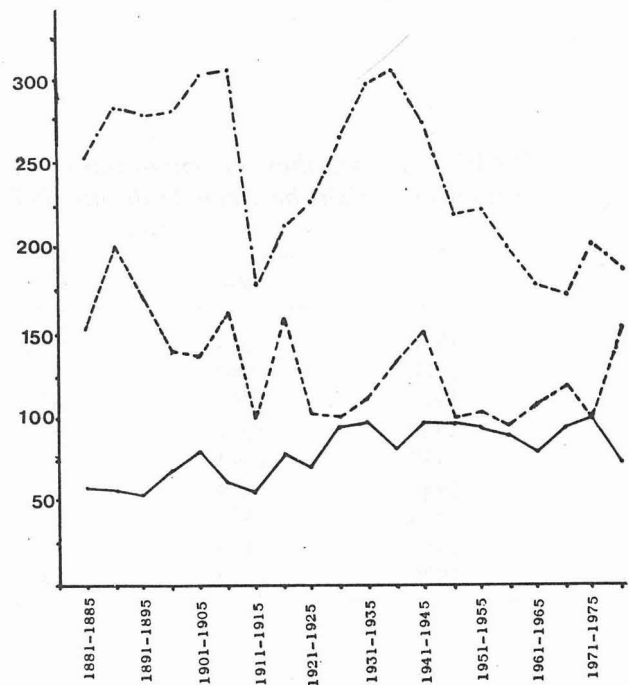
Fig. 2 — Variation in the number of christenings (---------------), marriages (———————→) and deaths (--------------) in Pereira do Campo's parish, between 1881 and 1980, in periods of five years.

TABLE 4. *Number of christenings (C), marriages (M) and deaths (D) in Anobra's parish, between 1881 and 1980, in periods of five years.*

	M	D	C
1881-1885	25	67	117
1886-1890	33	89	117
1891-1895	37	96	111
1896-1900	34	86	141
1901-1905	38	73	143
1906-1910	44	107	157
1911-1915	23	81	128
1916-1920	45	123	146
1921-1925	47	64	126
1926-1930	44	70	138
1931-1935	45	48	111
1936-1940	52	63	112
1941-1945	44	67	92
1946-1950	51	36	127
1951-1955	53	45	105
1956-1960	56	49	80
1961-1965	49	59	99
1966-1970	42	50	94
1971-1975	41	50	95
1976-1980	24	48	89
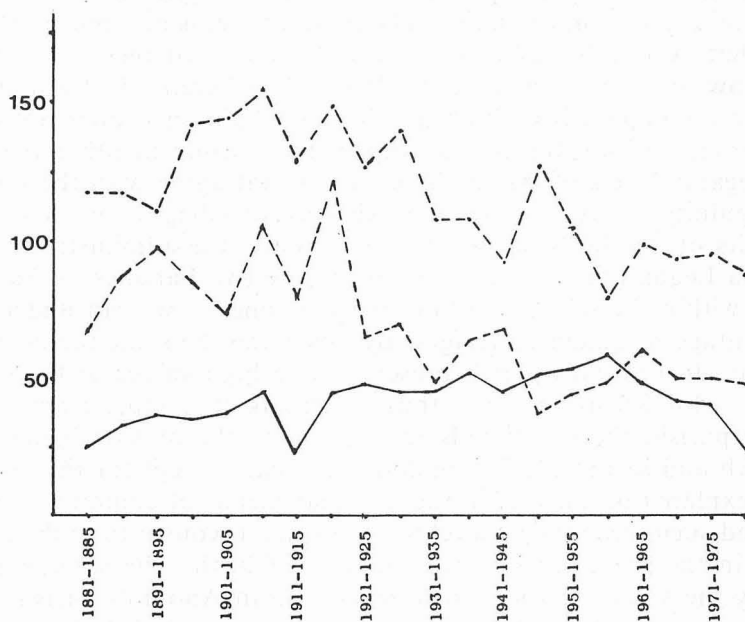
Fig. 3 — Variation in the number of christenings (--------------), marriages (_____) and deaths (--------------) in Anobra's parish, between 1881 and 1980, in periods of five years.

Europe during the XIXth century (SUTTER, 1968), but they still influenced consanguinity in Portugal during our century (AREIA, 1981). In the particular case of Anobra, we noticed the absence of a sudden decreasing in the number of inhabitants, which could fully explain the extremely high values of consanguinity corresponding to the second highest point. However, we must also admit the possibility of an emmigration without quantified data, not only for foreign countries (specially Brazil), but also to the great cities, wich would necessarily lead to an increase on consanguinity. On the other hand, if we analyse the villages' distribution on the parish, we notice their isolation and the small number of their inhabitants, the members of each village being related on their great majority. If we consider the bad reachings and the fact that Anobra is an essentially rural parish — therefore being a non-attraction to potencial immigrants, an incentive to its inhabitants' departure and looking for a better way of living — we can easily understand the high values of consanguinity, in comparison with other examples of the country (see CRUZ, 1973; BRANDÃO, 1980; ABADE, 1983; GAMA, 1983). In what concerns Pereira do Campo's parish, we must consider that if, on one hand, some villages have good ways of communication, as the railway provides them with a frequent and cheap mean of transport, on the other hand, other villages of the parish (Casais Velhos and Casal da Légua) are quite isolated.

Through an accurate analysis of the rate of endogamous marriages [Table 5 (A and B)], we see that Anobra's parish values are significantly lower, though oscillating, when compared to those of Pereira do Campo's parish. Moreover, the percentage of mixed marriages is higher in Anobra's parish than in Pereira do Campo's parish. The reason for this difference results from the fact that Anobra's parish is formed by more villages, each one them having a low number of inhabitants. Meanwhile Pereira do Campo, being a parish with a comparatively high number of inhabitants, does not present a great tendency to look for partnership in the outside in other regions. But these endogamy levels of Anobra's parish do not agree with the high values of consanguinity. If we consider the existence of villages nearby the geographical limits of Anobra's parish and, even more, the administrative division of Casal da Légua's village, that belongs to the two parishes — that is, some marriages within the village are inter-parishes ones — we can understand the high percentage of mixed marriages. By observing the same tables, we notice that Pereira do Campo's parish presents quite high values of the endogamy coefficient — for λb as for λr — thus indicating that most marriages occur within the parish, the individuals that marry in the outside being few. The values of λb and λr are oscillating and very near, except for the last generation. The explanation may lie in the fact that means of communication development and socio-economical level takes pregnant women to look for medical assistance in the great cities at the moment of birth. The same explanation may justify the values of the fourth generation in Anobra's parish. Finnally, on Table 6, we noticed that the number of marriages between the two parishes is quite low, this being probably due to ancestral rivalries and, moreover, to the existing swamp — Arzila's swamp — that separates the two parishes cons-
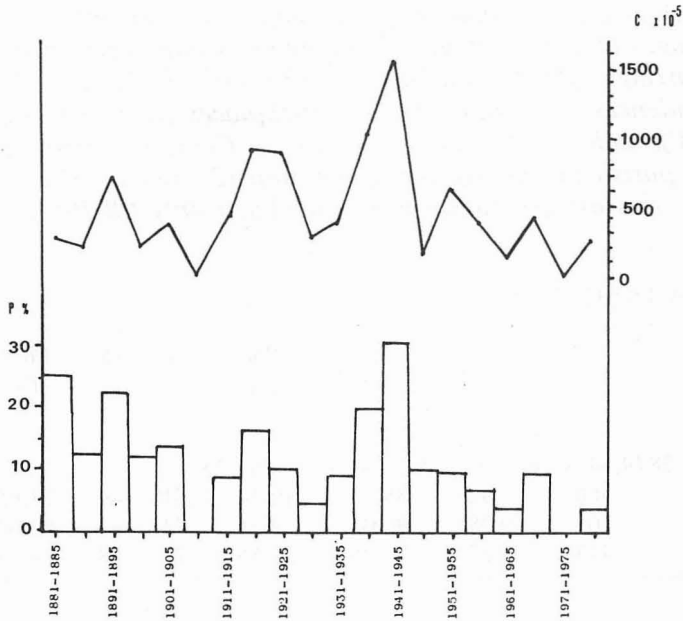
Fig. 4 — Variation in the apparent consanguinity coefficient (ε) (line) and in the percentage of consanguineous marriages (P) (bars) in Anobra's parish, between 1881 and 1980, in periods of five years.
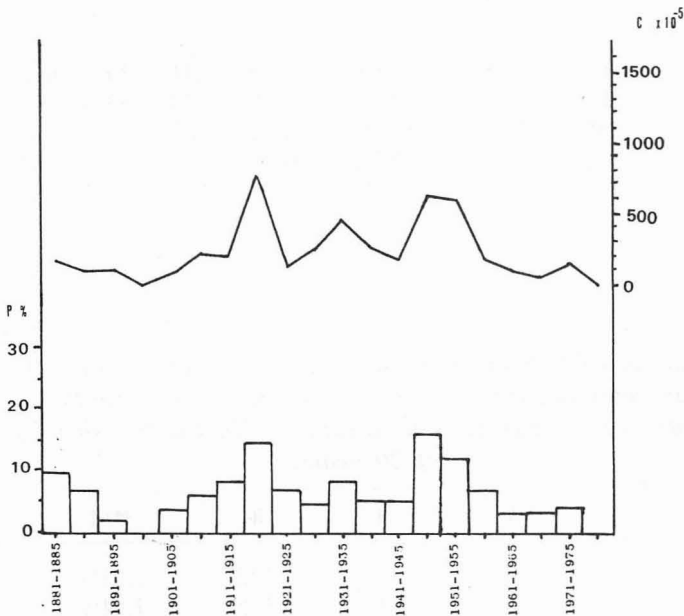

Fig. 5 — Variation in the apparent consanguinity coefficient (ε) (line) and in the percentage of consanguineous marriages (P) (bars), in Pereira do Campo's parish, betwéen 1881 and 1890, in periods of five years.

TABLE 5. *(A and B)— Number of marriages (N), percentage of consangui-
neous marriages (P), percentage of endogamous marriages (EM), percentage
of mixed marriages (MM), endogamy coefficient calculated with basis on the
nubent's residences (λr), and on their birthplaces (λb), percentage of farm
workers (FW), male and female, in Pereira do Campo's parish (Table A) and
in Anobra's parish (Table 'B), per generation (25 years). The FW values in
the last generation were calculated only till 1965.*

A — PEREIRA DO CAMPO

	N	P [%]	EM [%]	MM [%]	λr	λb	FW ♂ [%]	FW ♀ [%]
1881-1905	337	4.28	79.64	19.76	.66	.60	81.11	91.25
1906-1930	368	7.92	88.79	10.14	.51	.49	73.65	98.03
1931-1955	469	9.08	90.00	9.58	.74	.64	59.60	99.78
1956-1980	443	3.22	76.25	22.66	.73	.58	39.05	97.66

B — ANOBRA

	N	P [%]	EM [%]	MM [%]	λr	λb	FW ♂ [%]	FW ♀ [%]
1881-1905	167	16.52	54.65	40.85	.41	.39	90.21	89.87
1906-1910	203	7.90	64.06	33.28	.38	.33	93.48	98.98
1931-1955	245	15.36	54.70	35.22	.27	.37	88.19	99.17
1956-1980	212	4.98	62.12	34.54	.32	.27	76.47	99.03

TABLE 6. *Number of marriages occured between the two parishes (M), total
number of marriages occured in the two parishes (N), number of marriages
in which at least one of the nubents didn't live in the parish (N'), in periods
of 20 years.*

	M	N	N'	M/N	M/N'
1881-1900	7	387	122	1.81%	6.25%
1901-1920	7	435	125	1.61%	5.60%
1921-1940	13	530	106	2.45%	12.26%
1941-1960	8	585	150	1.37%	5.33%
1961-1980	14	507	169	2.76%	8.28%

tituting a geographical barrier preventing migrations and significant genetic exchange between them. The percentages belong specially to marriages occured in Casal da Légua's villages. However, there is not a full explanation for the values of 1921-1940.

ACKNOWLEDGMENTS

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