BIOLOGICAL INTER-RELATIONSHIPS BETWEEN PARISHES IN EAST KENT:

AN ANALYSIS OF MARRIAGE DUTY ACT RETURNS FOR 1705

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The problems of analyzing and describing patterns of local mobility and of gene flows within populations have long been the concern of local historians and of geneticists. Here we are attempting to apply a method of analysis developed in recent years by geneticists for measuring 'blood' relationships, within a historical context. This technique, examining the surnames of inhabitants of a locality, provides a useful, if gross, measure of 'contact', and by extension of past migratory experience, within that area. The measure is intended to demonstrate the degree to which human communities were biologically related, the extent to which they shared common ancestry.

A number of recent studies have used surnames as markers of ancestry. In an earlier issue of **LPS,** Rex Watson studied the numbers of different surnames shared by parishes in South Cambridgeshire over the period 1538-1840, in which he traced the long-term persistence of names within those parishes, and analyzed names common to the parishes. V. Weiss has estimated similar relationships (relative to those within the communities examined) between cities and towns in the German-speaking areas of Europe.[1] In recent publications, Gabriel Lasker has developed a quantitative technique for estimating relationships through surnames, the technique which we employ here, where we compare surnames between pairs of census listings for a set of parishes.[2]

Underlying this approach are two basic assumptions, which will by no means hold true in all cases but may be used for our present purposes. The method assumes that a specific surname implies descent from a common ancestor, however remote. Of course, we cannot claim that everyone called, say, Smith, or even Butcher, is descended from a single smith or butcher within the remote past. Given the long-established nature of surnames by the period and within the locality with which we are concerned, however, we may not be departing too radically from a 'real' degree of relationship as expressed by having a surname in

common. The technique also assumes that the male lines of descent, through which surnames have almost exclusively been transmitted, are representative of all lines. If one sex migrates more often than the other, and especially if the pattern of migration differs, as is likely because of economic, demographic, or cultural mechanisms, this may further distort our results. Nevertheless, despite its imperfections, this technique appears to represent a compact and relatively quick means of assessing the degree and configuration of migratory and biological contacts within a locality.[3]

The existence of nominative listings for 1705, covering thirty-seven parishes in East Kent, makes possible a survey of inter-relationships within this reasonably extensive area at the beginning of the eighteenth century.[4] Surnames as such had been in increasingly wide use since early medieval times, and by 1705 inheritance of paternal surnames had been essentially universal within southern England for some two centuries. Patterns of mobility over the long run within this region would have produced such a pattern of contact through biological inter-relationship as is to be observed in this study.[5]

Compiled under the Marriage Duty Act of 1694, which instituted a tax on registrations of baptisms, marriages, burials, and upon bachelors over the age of twenty-five, these surviving household censuses for the Wingham division of Kent, made in late 1705, list persons of both sexes and of all ages.[6] Since married women were registered by their husbands' surnames, and single women would constitute a biased sample, all females are excluded from consideration. Furthermore, since data on children are often incomplete, and adults form the genetically significant breeding population, we have extracted from each listing an inclusive list of adult males. The number of adult males per listing varies from 2 to 315. Of the thirty-seven listings, twenty-seven had twenty or more such males, and most of our analysis is based upon the comparisons that may be made between the surname sets in these lists. Figure 1 shows the location of these places in eastern Kent for which listings survive, and other settlements and topographical features of the area.

The measurement for relationship which we employ is a 'coefficient of relationship by isonymy' (which will be subsequently denoted by **Ri**), isonymy meaning 'having the same surname'. It is calculated by comparing surnames between pairs of listings, matching every listing against every other, and its values are gained from matching surnames which are the same ('isonymic pairs'), and relating the number of such identical pairs to the total number of possible pairs in the sample. **Ri** would equal 0 if no males in the first listing had the same surname as any male in the second, and would equal 1 if all males in both places had one and the same surname. Figure 2 demonstrates how this matching of surnames is achieved, between two hypothetical parishes 'A' and 'B'. The surnames shown in fact appear frequently in these listings. Forty-two lines connect the six males in 'A' with the seven in 'B': two of these, the dark lines, connect men with the same surname. 2/42 of the possible links therefore have the same name, and **RI** = 0.04762.[7] Since this is an unwieldy expression, we will subsequently present these

coefficients multiplied by 10^5, i.e. as a rate per 100,000. In this case, **Ri** would be expressed as 4762; if **Ri** had been 0.00018, it would be expressed as 18.

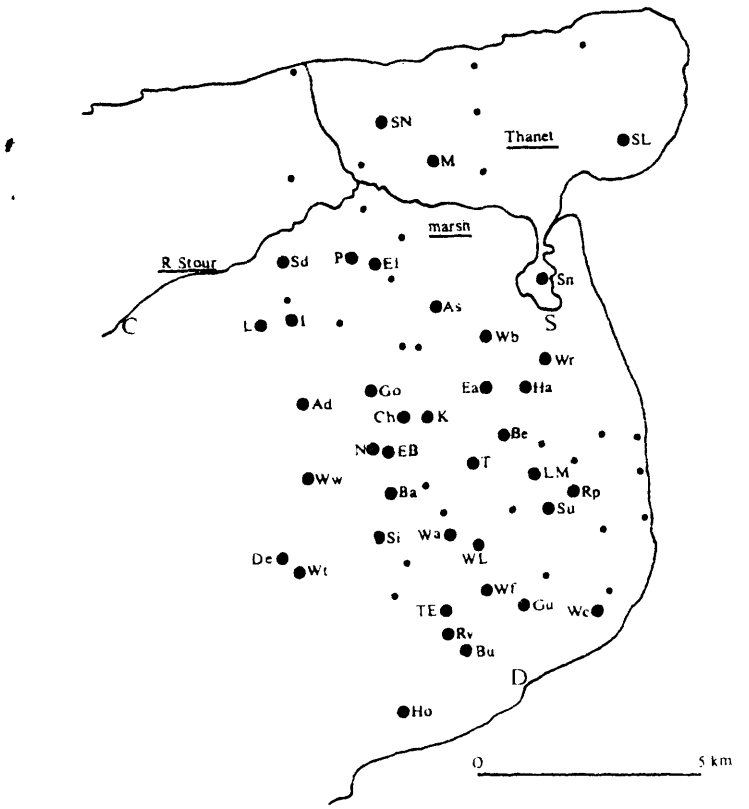

Figure 1: East Kent: parishes with Marriage Duty Act returns analyzed, and other settlements unrepresented.

Key to Figure 1

Ad	Adisham	Rp	Ripple
As	Ash-next-Sandwich	Rv	River
Ba	Barfreston	SL	St. Lawrence in Thanet
Be	Betteshanger (enumerated with Ham)	SN	St. Nicholas at Wade
Bu	Buckland	Si	Sibertswold (or Shepherdswell)
Ch	Chillenden (enumerated with Knowlton)	Sd	Stadmarsh
De	Denton	Sn	Stonar
EB	Easeholeborough (now Easole Street)	Su	Sutton
Ea	Eastry	T	Tilmanstone
El	Elmstone	Wa	Waldeshare
TE	(Temple) Ewell	Wc	Westcliffe
Go	Goodnestone	WL	West Langdon
Gu	Guston	Wf	Whitfield
Ha	Ham	Ww	Womenswold
Ho	(West) Hougham	Wb	Woodnesborough
I	Ickham	Wt	Wootton
K	Knowlton	Wr	Worth
L	Littlebourne		
LM	Little Mongeham	C	Canterbury
M	Monkton	D	Dover
N	Nonington	S	Sandwich
P	Preston		

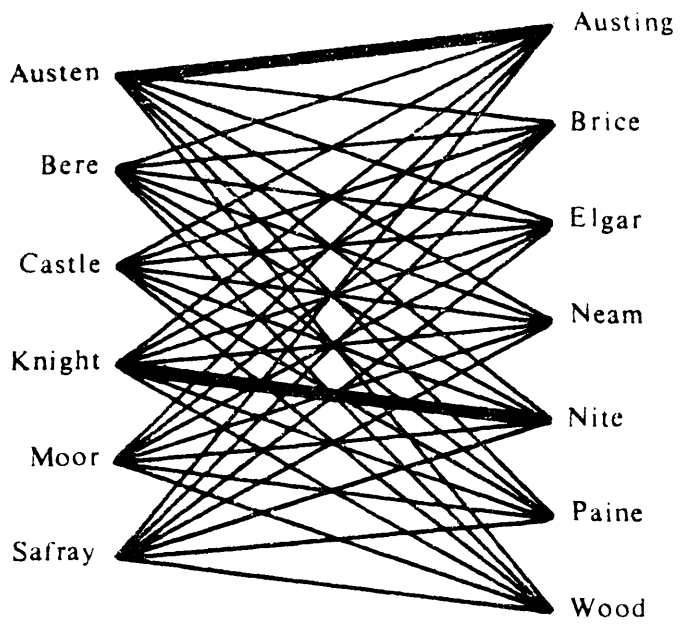

Figure 2: Matching surnames between two hypothetical settlements.

In practice the example value of **Ri** is high, and in studies undertaken to date only very closely related localities achieve a value for relatedness at such a high level.[8] The numbers involved in the example are small, so that the problems of pure randomness producing these results is particularly acute. By restricting our attention most closely to listings with twenty or more adult males, we hope that this problem may be in part overcome. Testing every listing against every other listing produces 351 values of **Ri** for the twenty-seven parishes concentrated upon.

Spelling was by no means standardized in the eighteenth century, so that two names were considered as being the same if they would have been pronounced in the same way. Thus, for example, Austin, Austen, and Austing were taken as being the same name, as were Elger and Elgar; Hogben and Hodgbin; Hamon and Hammond; Knight, Night, and Nite; Lawrence, Laurence, Laurance, Larence and Larance. The data were analyzed on a reasonably strict, and on a more liberal, view as to what constituted identity of surname. In the latter category we included such names as Deane, Denne and Dane; Corling and Garling; Neame and Nearne; Burvell and Bornell. This category may include names which were once the same, but which had changed over time. The localized clustering of some of these pairs might support this: the names Neam(e) and Nearne are only found in the northern part of the area studied, with Nearne in places on the south and east fringes of that portion, Neame in the centre. The results of this second, more 'liberal' analysis were very similar to those derived from the first; they are not reported here in detail.[9]

Among these 351 calculations of the coefficient of relationship between pairs of these parishes with twenty or more adult males, values of **Ri** range from 0 to 1400. The mean value of **Ri** is 184; this represents in effect one person in a list of thirty having the same surname as two persons in a list of thirty-five. Calculating a correlation coefficient between

values of **Ri** and distance (measured as the crow flies) between parishes produces a value of — 0.29, with a standard error of 0.3. The negative value of the correlation demonstrates the expected decay of association over distance; however, the very large standard error shows there to be considerable variance about this value, and that there is no relationship between association as measured by **Ri,** and distance.

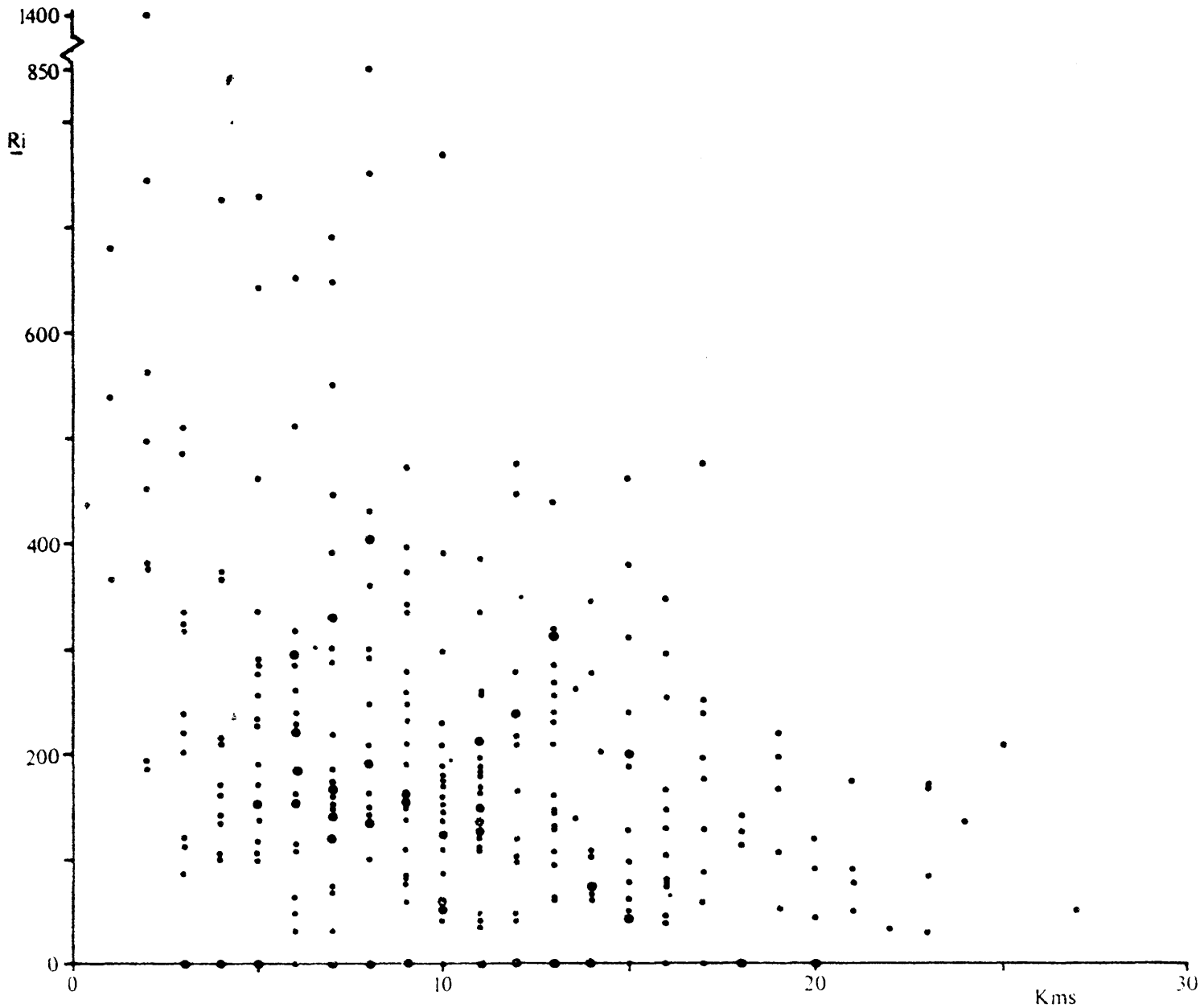

Figure 3: Plot of relationships between Ri and distance. (Shared values marked by larger points).

Figure 3 plots this relationship between **Ri** and distance. There are a number of striking features which emerge from this. There appears to be little or no association with distance within a range of ten to eighteen kilometres. Only at the upper and lower extremes of the range of values for **Ri** do clear associations (both negative and positive) with distance occur — that high values of **Ri** only occur between parishes within ten

kilometres of each other, and that over eighteen kilometres parishes are only weakly associated. Further evidence of this attenuation of the distribution, with some extremely high values of **Ri** between neighbouring parishes, is provided by a further 315 calculations, for those pairs of parishes where one or both lists contained less than twenty adult males (and which are neither graphed in Figure 3 nor reported here in detail). Five estimates of **Ri** exceed 1200, ranging up to as high as 2800, and all five are for places within five kilometres of each other.

By testing our method on further data within the set, we may validate the levels of **Ri** we obtain. Two small tests are possible, on those parishes with less than twenty men named, and on those names which are similar but not considered as being equivalent. The four lists with between fourteen and eighteen adult males yield an additional 114 values of **Ri,** amongst themselves and with larger parishes: these values have a mean of 258, not greatly different from the mean of the main 351 values, 184. Theoretically, the mean value of **Ri** should be independent of sample size; however, as one would expect, given the heightened possibility of randomness producing these results, the additional values show far greater variability. Again, there is a negative correlation between these values of **Ri** and distance, — 0.26. After expanding the list of equivalent surnames by including those from the more liberal definition of identity, the mean values of **Ri** are slightly higher, that for the primary 351 calculations rising from 184 to 208, and that for the additional 114 values from 258 to 294.

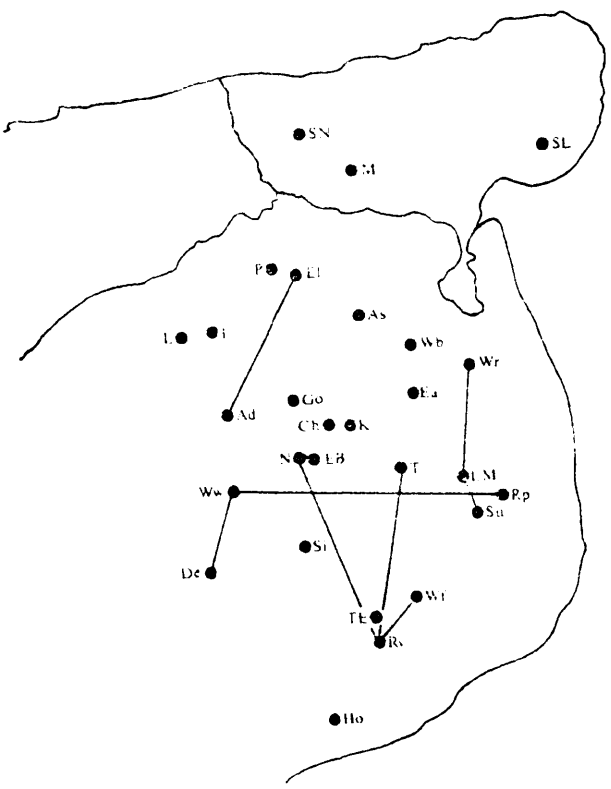

Figure 4: Relationships between parishes with the eight highest values of Ri.

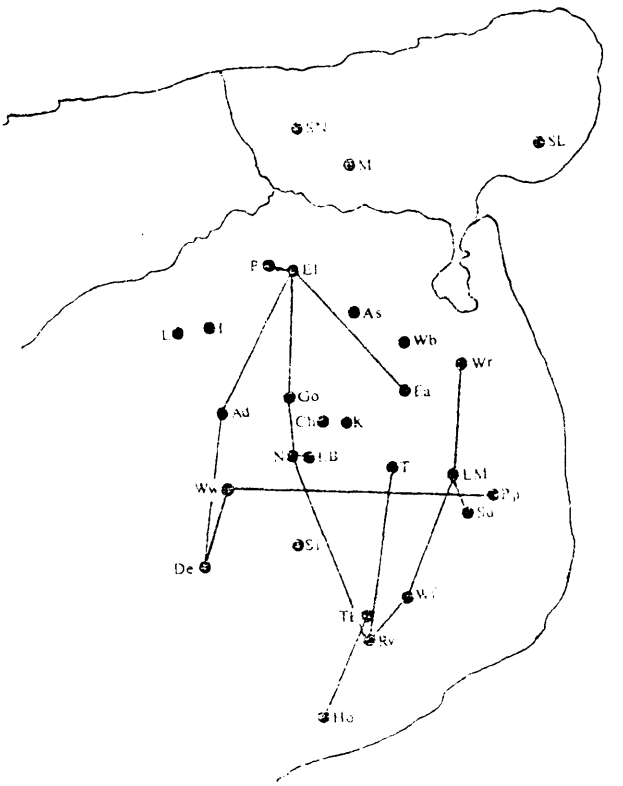

Figure 5: Relationships between parishes with the sixteen highest values of Ri.

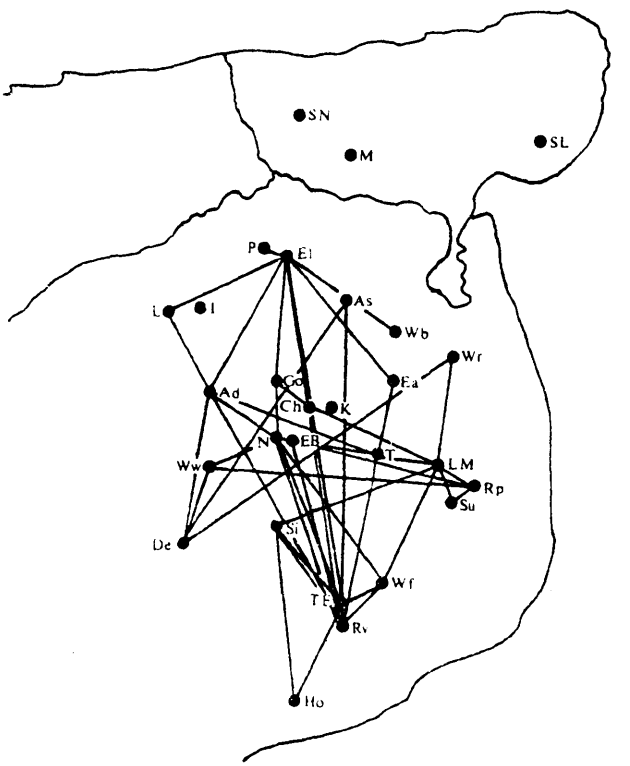

Figure 6: Relationships between parishes with the thirty-two highest values of Ri.

As Figure 3 shows, great variation occurs within the set of values of **Ri.** Part of this variation may be explained by reference to the situation on the ground. Figures 4, 5, and 6 map high relationships between the parishes studied. Figure 4 shows those pairs of parishes with the eight highest values of **Ri** linking them, Figure 5 those with the sixteen highest values, and Figure 6 those with the thirty-two highest values of **Ri.** A number of observations may immediately be made: the overwhelming trend of relationship appears to be north-south in axis, with the southern parishes of Temple Ewell and, particularly, River having a large number of often wide-ranging contacts. The highest value of **Ri** within these 351 calculations, .1400, is between the parishes of River and Whitfield, two kilometres apart. This method of analysis does not determine the direction of relationship; however, the fact that River and Ewell are a short way upstream from Dover, and firmly within Dover's hinterland, would seem to suggest that at least part of the movement observable was towards the attraction of Dover. Perhaps even more clear is the isolation of the parishes within the Isle of Thanet. Extensive areas around the River Stour were marshland, so that movement between the Isle and the 'mainland' cannot generally have been easy.[10] The closest link across the Stour is between Monkton and Adisham, where **Ri** = 312. The mean value of **Ri** for the three Thanet parishes represented by surviving Marriage Duty Act returns, Monkton, St. Lawrence, and St. Nicholas at Wade, were 136, 122, and 124 respectively; this compares with the mean value of **Ri** for River of 344.

There would appear to have been relatively few physical barriers to movement in this area apart from the Stour and the marshes. Apart from the southern portion, the land is relatively flat. The general pattern of roads, however, tends to lie north-south, in part determined by the main routes between Dover and Canterbury, and between Dover and Sandwich.

The techniques demonstrated here have been applied to other populations, both historical and contemporary, with often interesting results. English geneticists, for example, have long been studying the population, past and present, of the Otmoor region of Oxfordshire and Buckinghamshire.[11] Analysis of the historical marriage registers and of contemporary electoral registers has produced a pattern of relationship as measured by **Ri** broadly similar to that described here. Values of **Ri** for the marriage data were nearly 100 per cent higher for marriage partners within the same parish than between two parishes, and values of **Ri** measured between the eight Otmoor parishes were higher than for these parishes with others outside the immediate Otmoor region. **Ri** can be shown to be positively correlated with marital migration as shown by the place of residence information for spouses within the marriage registers; **Ri** is negatively correlated with distance.[12]

Extremely high values of **Ri** have been reported for a somewhat isolated valley in the Italian Alps. Kaplan **et al.** found the highest values between clusters of houses **(frazioni)** lying very close to each other, somewhat lower values between more distant **frazioni** of the same community, and still lower values between different communities, particularly where they were not adjacent.[13]

This paper has set out to demonstrate the way in which a reasonably simple technique, using materials quite widely available, may produce a plausible pattern of 'contact,' and by extension, of past migration, within a local area. However imperfect, the method appears to be a robust one and, where it can be validated by comparison with other measures, a reasonably reliable one. Even within a single country, however, the actual values computed for **Ri** may not be directly comparable. Much depends on both the size of the pool of surnames within the particular locality. and the age of the surnaming conventions operating within an area.[14]

Given these constraints, this technique would appear to be one capable of extension to other localities, and of further helping us describe and explain the local 'migration fields' within which so much of the physical mobility of the past took place.[15]

NOTES

1. Rex Watson, 'A study of surname distribution in a group of Cambridgeshire parishes, 1538-1840', **LPS,** 15, 1975, pp. 23-32; V. Weiss, 'Die Verwendung von Familiennamehaufeigkeiten zur Schatzung der genetischen Verwandtschaft', **Ethnografische-Archäologische Zeitschrift,** XV, 1974, pp. 433-451. Methods of analysis of genetic relationship, using not only surnames but also genealogical pedigrees are described and discussed in the contributions to G. A. Harrison and A. J. Boyce (eds.), **The structure of human populations,** Oxford, 1972.
2. G. W. Lasker, 'A coefficient of relationship by isonymy: a method for estimating the genetic relationship between communities by isonymy', **Human Biology,** XLIX, 1977, pp. 489-493; G. W. Lasker, 'Increments through migration to the coefficient of relationship by isonymy between communities', **Human Biology,** forthcoming.
3. Many of the assumptions underpinning studies of surnames and their transmission may appear cavalier. However, if the data are regarded with sufficient caution, and emphasis is correctly placed upon the broad rather than the very detailed results, we hope to show that this is a viable technique which may be of wide application for measuring general levels of contact within a locality.
4. Kent Archives Office, Q/CTz2, under 6 & 7 William and Mary, c.6, and 8 & 9 William III, c.20.
5. The history of surnames is discussed in P. H. Reaney, **A dictionary of British surnames,** revised ed., 1976, p.xi and throughout.
6. The position of servants within the lists is not always entirely clear. Some lists (particularly in the group of lists with fewer than twenty adult males) do not name servants, whilst some other lists appear to name servants although their status is not indicated explicitly. These occasional omissions would lead us to mis-estimate coefficients in a few cases, but would not appear to be of great seriousness unless servants were especially numerous and had a different spatial pattern of migration from others.
7. Technically, since only half an individual's genes are transmitted from each parent, the value as used by geneticists would be half this: they make the division of **Ri** by two so that values will correspond with values for relationships calculated from genetic traits traced through pedigrees. However, this is a complication which we may disregard for present purposes, since the relationships between the actual values remain unchanged.
8. See B. A. Kaplan, G. W. Lasker and B. Chiarelli, 'Communality of surnames: a measure of biological inter-relationships among thirty-one settlements in upper Val Varaita in the Italian Alps'. **American Journal of Physical Anthropology,** forthcoming.

9. Some rules for deciding or not on the identity of particular surnames are to be found in D. Steel, **National index of parish registers,** I, 1968, pp.88-98. The logical problems of linking names in the context of historical studies of genetics are discussed in C. P. Rawling, 'A study of isonymy' in D. F. Roberts and E. Sunderland (eds), **Genetic variation in Britain,** Symposia of the Society for the Study of Human Biology, XII, 1973, pp.83-93, esp. pp.85-86.
10. Ash-next-Sandwich covered 28.5 square kilometres, for example, of which half was still marshland in 1800.
11. Some of that study is summarized in G. A. Harrison and A. J. Boyce, 'Migration, exchange, and the genetic structure of populations' in Harrison and Boyce (eds.), **The structure of human populations,** pp.128-145.
12. C. F. Küchemann, G. W. Lasker and D. I. Smith, 'Changes in the coefficient of relationship by isonymy among the populations of the Otmoor villages', unpublished paper, 1978.
13. Kaplan **et al.,** 'Communality of surnames. . . '. For a further, Peruvian, study, see Lasker, 'A coefficient. . .', and Lasker, 'Increments through migration. . .'.
14. So that, for example, the study by E. F. Buckatzsch, 'The constancy of local populations and migration in England before 1800', **Population studies,** V, 1951-2, pp.62-69, may be criticized for not taking into account the widely differing sizes and origins of the surname sets in Suffolk and Westmorland respectively when comparing the disappearance and turnover of surnames.
15. We wish to thank the National Science Foundation, grant number BNS76-10027, for financial support, and the SSRC Cambridge Group for the History of Population and Social Structure, Oxford University Department of Biological Anthropology, and Oxford University Computing Laboratory for advice and facilities. The complete matrices of values for **Ri** between specified parishes will be placed on file in the library of the SSRC Cambridge Group.