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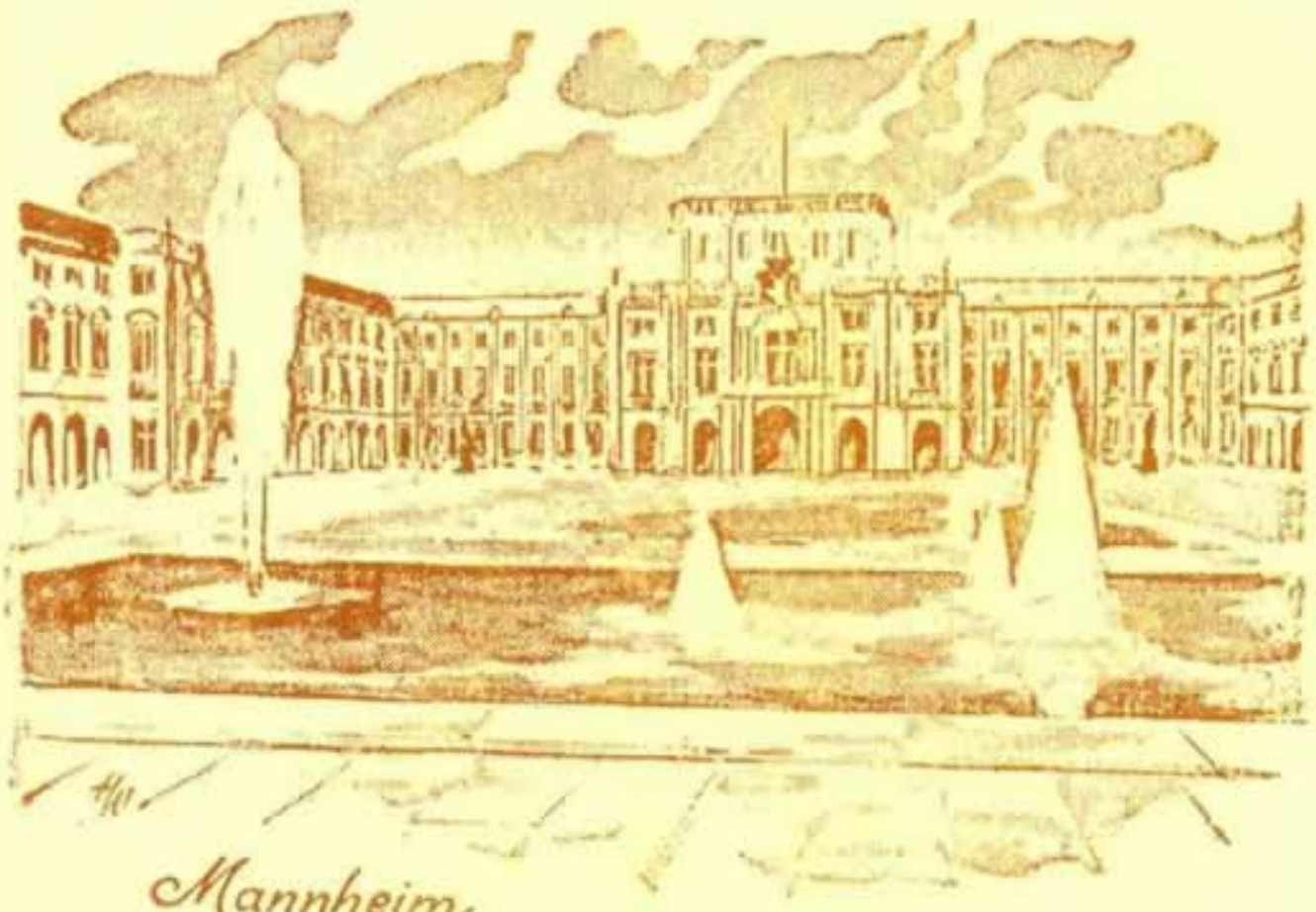

a cura di

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A FIRST ACOUSTIC-PERCEPTUAL STUDY OF THE VOWEL SYSTEMS OF FRASNITA, UNGRA AND SHËN VASILI (COSENZA, ITALY)

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1. *Italo-Albanian vowel phoneme systems.*

Although the present study does not aim at presenting the phonological component of a Grammar of Italo-Albanian dialects with respect to Albanian, nevertheless we shall try to give the articulatory, acoustic and perceptual coordinates of some Italo-Albanian vowel systems in order to specify a suitable features analysis for vowels in such dialects. The dialects chosen are those of Frasnita (Ital. Frascineto), Ungra (Ital. Lungro), Shën Vasili (Ital. San Basile) in the northern part of the province of Cosenza. To test these vowel systems we used four native speakers from each community, each subsample consisting in two male speakers and two female speakers, both males and females differentiated for age grouping, i.e. for each community we have
1 male and 1 female from the 30-40 years age grouping,
1 male and 1 female from the 60-70 years age grouping,
so that the sample would embrace at least two generations and furnish us with eventual differences due to generation lag. In the tables that we use the number 1 indicates speakers from Shën Vasili, 2 speakers from Ungra, 3 the speakers from Frasnita, while letters indicate sex and age, e.g. A and B are females, C and D males, A and C the 30-40 years age grouping, B and D the 60-70 years age grouping. Thus, for example,
A1 = Female, 30-40 years age grouping, native of Shën Vasili,
D3 = Male, 60-70 years age grouping, native of Frasnita, etc. etc. We can take as our maximal vowel system that used by informants from Ungra and Frasnita, as in scheme 1.

Scheme 1 (Vowels)

	Front (— Rounded)	Centre (— Rounded)	Back (+ Rounded)
High	/i:/, /i/		/u:/, /u/
Mid	/E:/, /E/	/ə:/, /ə/	/O:/, /O/
Low		/a:/, /a/	

Minimal opposing pairs are as follows, the examples being in the dialect of Ungra, first for the distinctive length opposition:

/i: ~ i/ ['piɾ:n] 'they drink' vs. ['piɾn] 'pinetree',
['friɾ:m] 'breath' vs. ['friɾm] 'breathe on me';
/E: ~ E/ ['cEɾ:t] 'oxen' vs. ['cEɾt] 'quiet!'.
['ʎEɾ:m] 'we were born' vs. ['ʎEɾm] 'leave me alone!';
/ə: ~ ə/ ['məɾ:n] 'mulberry' vs. ['məɾn] 'eye-rheum'
/u: ~ u/ ['ɟuɾ:n] 'knee' vs. ['ɟuɾm] 'sleep',
['puɾ:ʎ] 'chicken' vs. ['tuɾʎ] 'soft';
/O: ~ O/ ['gOɾ:ʎ] 'throat' vs. ['mOɾʎ] 'sluggish';
/a: ~ a/ ['pa:t] 'you saw' vs. ['pat] 'he had',
['pa:n] 'they saw' vs. ['pan] 'cloth'.

For vowel height and position we have:

/i ~ E/ ['viɾt] 'year' vs. ['vEɾt] 'alone',
/i ~ u/ ['kiɾ] 'this' vs. ['kuɾ] 'where',
/i ~ ə/ ['ziɾ] 'black' vs. ['zəɾ] 'I begin',
/i ~ O/ ['ʎiɾsi] 'the oaktree' vs. ['ʎOɾsi] 'he let loose',
i ~ a/ ['griɾsi] 'he used up' vs. ['grasi] 'the fat'.

This is sufficient to identify /i/. To identify /E/ we already have /i ~ E/, to which we add

/E ~ O/ ['dEɾ:r] 'door' vs. ['dOɾ:r] 'hand',
/E ~ u/ ['vEɾra] 'the wine' vs. ['vuɾra] 'I put',
/E ~ ə/ ['dEɾm] 'bull' vs. ['dəɾm] 'damage',
/E ~ a ['δEɾ:n] 'sheep' (plural) vs. ['δa:n] 'they gave'.

To identify the mid central vowels we have, apart from /i ~ E/, /E ~ ə/ already given,

/ə ~ u/ ['ʎəɾmi] 'the yard' vs. ['ʎuɾmi] 'the river',
/ə ~ O/ ['bəɾra] 'I made' vs. ['bOɾ ra] 'the snow'
/ə ~ a/ [ʎəɾmi] 'we leave' vs. ['ʎami] 'we wash'.

The back vowel /u/ is identified by the oppositions /i ~ u/, /E ~ u/, /ə ~ u/ and by

/u ~ O/ ['ɟuɾt] 'dung' vs. ['mOɾt] 'weather; time',
['cuɾp] 'poplar tree' vs. ['cOɾp] 'collar',
/u ~ a/ ['r:uɾ:t] 'you lived' vs. ['r:a:t] 'roundworms'.

/O/ is already identified by the oppositions /i ~ O/, /E ~ O/, /ə ~ O/, /u ~ O/ and by

/O ~a/ [ŋ'graf] 'upon' vs. [ŋ'grOɾf] 'warms'.

The phoneme /a/ is already identified by the given opposition /i ~ a/, /E ~ a/, /ə ~ a/, /O ~ a/.

These minimal and near-minimal pairs suffice for all three dialects here discussed.

With respect to literary Albanian (Shqip) front rounded vowels of the /y/ type are missing, historically merged with /i/ type vowels, while the presence of length oppositions between vowel phonemes would seem to link our basically Tosk dialects with Northern Geg dialects which normally present such oppositions, though it must not be forgotten that some South-Western Tosk dialects also present vowel length oppositions (see Byron 1976 pp. 78-80). Although Solano 1979a does not use length oppositions between vowel phonemes to set up diatopic distinctions among Italo-Albanian dialects, both Çabej 1976 (see especially p. 16), Solano 1979a and 1979b mention this archaic feature of the conservation of the V: ~ V opposition between systems that preserve and systems that merge the opposition. The genesis of long vowels in Albanian dialects is a *vexata quaestio*: Beci 1982 (p. 55) suggests that the origin of the opposition is to be searched for in processes of compensatory lengthening, cf. op. cit.

«Dialekti i veriut (gegërishtja) shfrytëzon për qëllime kuptim-dalluese kundërvënien e dy shkallëve të gjatësisë: gjatësinë dhe shkurtësinë: /pla:k/ ''plakë,-a'' /plak/ ''plak,-u''. Kundërvënia e zanoreve të gjata dhe të shkurtra në fillim të fjalës dhe në mes të fjalës në rrokje të hapur nuk realizohet. Në këtë pozicion ato dëgjohen të mesme''.

Other references for the phenomenon and its genesis are to be found in Beci 1979. At the phonetic level we note that not all phoneticians agree on the universality of such compensatory processes as

$$VC\text{ə}\# \rightarrow V{:}C\#$$

(where V = stressed vowel), see e.g. objections in Kohler 1984 p. 165 (he insists on the universality of phonetic oppositions of the type V: + lenis consonant vs. V + fortis consonants etc.).

In fact, historically, not all cases of V:C# structures in Albanian dialects are derivable from VCə# structures and the whole question remains open at the diachronic level. It is not our interest to explore the historical question in the present paper.

1.1. *Long and short vowels and diphthongs.*

As previously stated, the vowel systems of Frasnita and Ungra are conservative, still possessing the maximal contrast system indicated in scheme 1. Shën Vasili, however, merits a few comments apart. Although Solano 1979b seems to indicate that the Shën Vasili dialect possesses a vowel length opposition, we have not noted, either at the level of phonological opposition or of phonetic measurement, any distinctive length in vowels of this dialect. In his example (op. cit. p. 4).

''burr me si të zez'' ['bur: mE si 'tzEẓ]
with reduction of vowel length with respect to
''burr pa si'' ['bur: pa 'si:],
''si'' has a long vowel because it carries phrasal or sentence stress. All stressed vowels in this dialect are phonetically long or half long when they carry phrasal stress, short when they no longer carry this stress. The reduction of distinctive length outside phrasal stress is noted in the other two dialects analyzed, as for example among the phonetic realizations of ''fuqitë'' by a Frasnita informant we have a length of 9.5 cs. with respect to an average length of long vowels of 21.93 cs. in this dialect (short vowels present an average length of 12.07 cs.). Shën Vasili has thus lost distinctive vowel length from its system, though as Solano 1983 shows in his critical edition of the 1834 Shën Vasili Catechism vowel length seems to have once been distinctive, since the vowels of this dialect that correspond to long vowels in conservative dialects are indicated graphically with two vowels in the Catechism, short vowels with one graphic vowel, as was normal written practice from the first written documents up to the end of the last century, cfr. Matrëngë's 1592 Catechism with ''mëë'' (fol. 61), ''bëërë'' (fol. 61) etc. to represent /mə:/, /bə:r/ respectively. Examples from the Shën Vasili Catechism are ''gnerii'' (= ''njeri:''), ''dee'' (= ''dhe:''), ''bɐɐ'' (= bë:''), ''jaan'' (= ''janë''), ''sciuum'' (= ''shumë''), ''judicoogn'' (= ''judhiko:nj'' = ''gjykoj'') etc. (See pages 16, 20, 22, 24 in Solano's edition).

The origin of the merger between long and short vowels in the Shën Vasili dialect may perhaps be sought in Shën Vasili's relationships with surrounding Romance dialects. In fact, the natural relationships of Shën Vasili are not with the nearest Albanian-speaking villages of Ferma (15 kms. away) and Frasnita (12 kms.) but mainly with Castrovillari, a small town (population 20,000-25,000 inhabitants) considered by neighbouring Albanians as their Hora, and nearby Romance-speaking villages such as Saracena (6 kms. away) and Morano (6 kms. distance). In Lüdtke 1979, Trumper 1980 (1978 Congress), Trumper 1987a and b, it is shown that dialects in the archaic Calabro-Lucanian area included between the Agri river in Lucania and the Diamante-Sibari isogloss in the North of Calabria present vowel shifts as in scheme 2, though Lüdtke impressionistically transcribes /I,U/ as [e,o]. Archaic systems and the mixed archaic system of Castrovillari still present a length opposition between vowels bound to variations in F2 values (F2 = second vowel formant), while Saracena, a mixed vowel system, has already neutralized long and short vowels. In other words, in correspondence with forms such as
['pi:t:u] 'chest, breast', ['pIt:a] 'bread', ['mu:d:u] 'wet', ['fUd:a] 'crowd'
in the Castrovillari dialect, we have equivalent Saracena forms
['piɤt:ə] 'chest, breast + 'bread', ['muɤd:ə] 'wet', [fuɤd:ə] 'crowd'.

Although similar mergers of the length opposition in Albanian do occur in some Albanian dialects (Tosk in particular), it would seem to be too much of a coincidence that the nearest village to Shën Vasili is a Romance-speaking village, Saracena, which has also lost distinctive length in its vowel system (and tenseness) with respect to the other Romance-speaking towns and villages such as Castrovillari. We are not suggesting an immediate cause-and-effect relationship but we do suggest that Italo-Albanian dialects enter into a Sprachbund relationship with the Romance world in which they are embedded. A case in point would be at Shën Vasili the loss of diphthongs according to the scheme present in the sorrounding Romance dialects as indicated. Diphthongs are conserved word-finally, e.g. *grua, krye = kria* (the Shën Vasili form), *bie = bia*, and such diphthongs are conserved in the declined forms, as in *grua > gruan, kria > kriat* etc. On the other hand, where there are no paradigmatic alternations, we have diphthong reduction of the type

ye = ie > i, ie > ia > i, ua > u, as in *lyenj > lienj > linj, dyert > diert > dirt, diell > dill, qiell > qill, duar > dur, muaj > muj* etc.

Such developments are extremely similar to the surrounding Romance ones, as in

Starting point	Castrovillari	Saracena
muoddu	mu:ddu	muɽɖdə
cielu	ci:lu	cilə
piettu	pi:ttu	piɽttə

and the parallelism seems rather more than casual.

We have also noted in the dialect of Shën Vasili a further merger, in particular of the opposition /ə ~ O/, which Solano 1979b already gives as merged. However, we would add that our research shows that speakers above 50 years of age still preserve the opposition but in phonetic terms as [ʌ ~ 0], i.e. unrounded vs. rounded vowel, while the younger generations have completely merged the opposition. For details see § 3. Examples of this merger are:

Generations 50 yrs +	Generations 50 yrs —
mëllënjë vs. mëllonjë /mlʌ ñ ~ mlOñ/	both /mlOñ/
ngrëhem vs. ngrohem /N'grʌham ~ N'grOham/	both /Ń'grOham/
e bëra vs. e bora /a'bʌra ~ a'bOra/	both /a'bOra/ etc.

We can present this merger as in scheme 3. In the present paper we will not deal with unstressed vowels.

Scheme 2. Romance Vowel Shifts.

Stage 1.	ìə	i	ɛ	a	ɔ	u	ùa
Stage 2.	i:	I	ɛ	a	ɔ	U	u:
Stage 3.	i	i	ɛ	a	ɔ	u	u

Scheme 3. Vowels: Shën Vasili.

	Front	Centre	Back	
			Unrounded	Rounded
High	/i/			/u/
Mid	/E/		/ʌ/	/O/
Low		/a/		

2. *Distinctive vowel length.*

The words used both for the measurement of vowel length and the first four formants of each vowel are usually of the type $C_1VC_2\#$ and carry phrase stress in the phrases (500) proposed to each speaker. In almost all the cases C_2 = /t/ while C_1 varied, except in the case of /ə/ where it was not possible to find words of the type Cət= or Cə:t= in each dialect. However, even in this case we used words such as *i bët* /i'bə:t/ "you did" with respect to words such as *këtë* /'kət/ "this". The words were not extrapolated from running speech as such but were proposed in a questionnaire form. Each word was embedded in a phrase or sentence that each informant was asked to translate from Italian into Albanian, though a strict controll on speech output was exercized by G.M.G. Belluscio, a native speaker of one the varieties tested (Shën Vasili). Notwithstanding possible criticism of the use of such a questionnaire, we kept the syntax and the form of the Italian used as near as possible to Albanian so that speakers would not have grave difficulties in translating the sentences requested. Examples are:

1. "Io lo so come siete scivolati"
   = "U e di si shka:t" (I know how you came to slip),
2. "Non mi hanno aperto la porta per dispetto"
   = "Ngë më haptën derën për shkat" (They didn't open me the door out of spite),

which are sentences that work well in both Italian and Italo-Albanian varieties, as well as

3. "Come va questo ballo così bisogna ballare"
   (= common Italian "Ormai sei in ballo e bisogna ballare")
   "Si vete ky bal, ashtu ke të luash" (when you put your hand to the plough, you don't turn back),
4. "Si sono sbattuti fronte con fronte"
   (= common Italian "Hanno sbattuto la testa l'uno contro l'altro")
   "U zbatirtën ballë me ballë (They knocked their heads together),

where the Italian translated is not strictly in a "standard" form, or examples such as

5. "Per tre settimane restò non lavato"
   (= common Italian "Non si lavò per tre settimane")
   = Për tri javë qëndroj pa larë" (He didn'wash for three weeks),

a sentence which it would be highly unlikely to find uttered by a native speaker of Italian, less improbable when spoken in Italian by an Italo-Albanian.

Although we have used a questionnaire in the sense defined (taking care that the word that interested us carried sentence or phrase stress), we have tried to keep answers as close as we could to the semi-informal/semi-formal style of discourse, avoiding as far as possible the formal approach where we have lexemes uttered without contexts in laboratory conditions (in a silent chamber). The tape-recorder used was an Uher 4000 Report L, at a velocity of 9.525 cms./s., tapes were Basf reels. The majority of the recordings were carried out in quiet rooms in private houses, normally in the informants' own homes, to make each informant feel as much at home as the circumstances allowed; none of the rooms had high ceilings. Two of the recordings, viz. those carried out with C1 and D2, were carried out in a quiet country lane where no traffic passed and in a schoolroom, respectively. Our wish to approximate as much as possible current running speech in more or less natural surrounds as a first approximation, rather than have a large number of unnatural laboratory utterances, has meant that in many cases we have not been able to measure with sufficient accuracy either F3 or F4, e.g. Shën Vasili 15 cases out of 74 lack F3 measurements, 40 cases out of 74 lack F4 measurements, at Ungra 5 cases out of 82 lack F3, 28 out of 82 in the case of F4, at Frasnita 5 cases out of 85 lack F3 and 19 cases out of 85 in the case of F4. This is one of the reasons why we have not used Carlson-Fant-Gramström 1975's approximation of a corrected perceptual F2 using F3 and F4 values in accordance with the expression

$$F'_2 = \frac{F2 + C\sqrt{(F3, F4)}}{1 + C}$$

where

$$C = (F1/500)^2 . (F2\text{-}F1/F4\text{-}F3)^4 . (F3\text{-}F2/F3\text{-}F1)^2 .$$

These and related problems will be discussed in the following paragraph, since here we wish only to discuss distinctive vowel length.

The only author so far who analyzes distinctive vowel length in Albanian dialects is Beci 1979 where he gives measured values for distinctively long/short vowels in cs., Beci 1981 where long/short vowel durations are given a second time (only average values) and Beci 1982 where he gives *en passant* durational values for long/short vowels in a study dedicated to nasalized vowels.

Unfortunately these initial experimental studies are restricted to Northern Geg dialects. No studies whatsoever have been carried out on South-western Tosk dialects which would be strictly comparable with our own results for the three Italo-Albanian dialects analyzed, whose common core is obviously Tosk, though with the corollary mentioned in § 1, which takes up comments in Çabej 1976, that the Italo-Albanian dialects partecipate, as far as the archaicity of their features go, in both dialect groupings. The first comment that one might make of Beci's otherwise admirable work is his use of only two native speakers to base his measurements on and the lack of adequate statistical parameters (insufficient measurements, often incomparable from vowel to vowel, no standard deviations given). From Beci's data and Trubeckoj's observations (see English version 1969, 1972² p. 180: a criticism of Lowman 1932) one might conclude that the three phonetic vowel lengths of Northern Geg may be thus arranged:
Short = oral short stressed vowels.
Mid-Long = oral long stressed vowels and nasalized short stressed vowel.
Overlong = nasalized long stressed vowels, cfr.

/i/ $\bar{x} = 11$ cs., $\sigma = 3$;
/i:/ $\bar{x} = 17.8$ cs., $\sigma = 4.9$;
/î/ $\bar{x} = 17.4$ cs., $\sigma = 7.4$;
/î:/ $\bar{x} = 29.4$ cs., $\sigma = 9.4$;

It is obvious that, given values of σ as above, there is no statistically significant difference between durational values for short nasalized vowels and long oral vowels. We thus have a situation of the type

Phonological	Phonetic
/i/	[i]
/î/	[î:]
/i:/	[i:]
/î:/	[î::].

However, given the small number of cases involved, we will ignore for comparative purposes the specified words pronounced by the two initial speakers and con-

centrate instead on the results Beci gives for 130 words exhibiting the long/short vowel opposition but using a sole informant. In this latter case we have the following results (calculating σ from Beci's averages).

Long Vowel	Length (cs.)	Short Vowel	Length (cs.)
/i:/	21	/i/	12
/y:/	26	/y/	11
/e:/	23	—	—
/ø:/	35	—	—
/æ:/	35	/æ/	16
/a:/	28	/a/	13
/u:/	34	/u/	16
/o:/	21	—	—
/î:/	34	/î/	20
/ŷ:/	23	/ŷ/	12
/æ̂:/	33	/æ̂/	11
/â:/	27	/â/	15
/û:/	32	/û/	16
Average Score	28.62		14.2
σ	5.47		2.9

In other words /V:/ : /V/ :: 2.02 : 1.

Given the relatively low values of σ, the two results differ significantly and we have a durational relationship of roughly 2:1 between distinctively long and short vowels. It is worth noting that overall length values for some nasalized short vowels are not significantly different from those of corresponding oral long vowels (this is noticeably the case for /î/ and /i:/).

Our own measurements for distinctively long and short vowels in the dialects of Ungra (4 speakers) and Frasnita (4 speakers) are given in centiseconds in tables 1 and 2. Unfortunately we have not given values for long and short vowels in the case of /O/ for the dialect of Ungra and /u,O/ in the case of Frasnita because α. we had no minimal or subminimal pairs available for analysis, β. we did not wish to force informants to use Albanian words they were not completely familiar with. We could, of course, have used measurements for vowels in completely different phonetic contexts, but for the moment we have decided not to use such examples, though such cases are already available for further analysis. We note that our results are not significantly different from those presented by Beci and that the overall relationship between distinctively long and short vowels is approximately of the nature 2:1, though in detail we found in our cases 1.81:1, in Beci's 2.02:1. This underestimate of length in our case would seem to be natural enough,

since Italo-Albanian vowel systems do not present *overlong* nasalized vowels while Beci's Geg dialects do. Italo-Albanian speakers' perception of distinctive vowel quantity seems therefore quite reliable and is matched by our experimental findings, which we consider to be comparable to Beci's, given the differences stressed above. As one can readily see from tables 1 and 2, the Frasnita vowels are generally longer than the corresponding Ungra vowels, but durational differences between long vowels in the two dialects, as that between corresponding short vowels, are not significant, given the values of σ for each set of vowels.

Distinctive vowel length seems to be important for a correct evaluation of Italo-Albanian vowel systems and the conservation vs. merger of this significant opposition might well be used as a defining feature in further typological and classificatory analyses of such dialects within Albanian dialectology as a whole.

Table 1

Village	Speaker	V:	Word	Length	V	Word	Length
Ungra	A2	/i:/	kushqi:t	25	/i/	butit	10.5
»	B2	»	»	23	»	»	7
»	B2	»	shpi:t	22	»	shkit	6
»	C2	»	»	20	»	»	12
»	C2	»	kushqi:t	20	»	butit	12
»	D2	»	shpi:t	12	»	shkit	9
»	A2	/E:/	shke:t	12.5	/E/	tet	10.5
»	A2	»	qe:t	6	»	qet	4
»	C2	»	»	12	»	tet	9.5
»	C2	»	shke:t	12	»	shkupet	8.5
»	D2	»	»	17	»	tet	5.5
»	D2	»	qe:t	11	»	qet	10.5
»	A2	/ə:/	bë:t	23	/ə/	sat'ëm	10
»	C2	»	»	25	»	»	13
»	D2	»	bë:m	21	»	dëm	7
»	A2	/a:/	pa:t	14	/a/	pat	8.5
»	A2	»	shka:t	25	»	dhishkat	17.5
»	B2	»	pa:t	23	»	pat	13.5
»	B2	»	shka:t	15	»	dhishkat	7
»	C2	»	pa:t	30	»	pat	10
»	C2	»	shka:t	32	»	dhishkat	14.5
»	D2	»	pa:t	21	»	pat	10
»	D2	»	shka:t	21.5	»	dhishkat	11.5
»	A2	/u:/	dru:t	20	/u/	but	11

»	A2	/u:/	rru:t	21	/u/	kput	13
»	B2	»	dru:t	16	»	but	11.5
Average Score				19.23			10.12
Standard Deviation				6.16			3

/V:/ : /V/ :: 1.9 : 1.

Table 2

Village	Speaker	V:	Word	Length	V	Word	Length
Frasnita	A3	/i:/	shpi:t	32.5	/i/	shkit	19.5
»	B3	»	».	25	»	»	12.5
»	B3	»	shkulqi:t	25	»	butit	11
»	C3	»	shpi:t	19	»	shkit	15
»	C3	»	pi:t	22	»	butit	15
»	A3	/E:/	qe:t	45	/E/	qet	25
»	B3	»	»	17.5	»	tet	10
»	C3	»	»	31	»	qet	12.5
»	D3	»	shke:t	15	»	qet	6
»	A3	/ə:/	i bë:t	45	/ə/	kët	21
»	B3	»	»	25	»	»	9
»	C3	»	»	25	»	»	16.5
»	D3	»	»	15	»	»	13
»	A3	/a:/	shka:t	36	/a/	dhishkat	22
»	B3	»	pa:t	28.5	»	pat	16
»	B3	»	shka:t	26.5	»	dhishkat	14.5
»	C3	»	»	20	»	»	16.5
»	D3	»	pa:t	17	»	it at	12.5
»	D3	»	shka:t	16	»	pariqat	10
Average Score				25.45			14.62
Standard Deviation				8.88			4.67

/V:/ : /V/ :: 1.74 : 1:

Total Average	21.93	12.07
Total σ	8.01	4.39

Total /V:/ : /V/ :: 1.81 : 1.

3. *Formant analysis of Italo-Albanian vowel systems.*

From the taperecordings of our questionnaire sentences and phrases we have isolated the words that interested us and have measured F1, F2, and where possible F3, F4, for the relevant vowels in the series /i:,i/, /E:,E/, /ə:,ə/, /a:,a/, /u:,u/, /O:,O/.

The formant values have been calculated from the spectral analysis effected by a GEN. RAD. 2512 Spectrum Analyzer (temporal frame: 40 msecs.) in the laboratories of the F.U.B. at Rome.

Relevant measurements are given in tables 3, 4, 5. In each table will be found values for F1, F2 and F3 in Herz, the corresponding logarithmic formant value (log 10), as also the values of F1, F2 and F3 in Mels. The first thing we note is that, while in the case of the Frasnita dialect, frequency values for F1, F2, F3 are not significantly different between distinctively long and short vowels, this is not the case as far as the Ungra dialect is concerned. Here, while F1 and F3 are not significantly different between long and short vowels, i.e. vowel height does not differ significantly between the length pairs, there are significant differences between the F2 values for each pair when we apply the t-Student test for small samples, e.g.

Ungra	/i:/		/i/	
$\bar{x}$ F2	1948		2155	
σ	319		334	
σ/i:/,/i/		354		$t_{12} = -1.0838$ $\leqslant t_{12}\ 0.90$
	/ə:/		/ə/	
$\bar{x}$ F2	1296		1503	
σ	207		165	
σ/ə:/,/ə/		218		$t_{5} = -1.2395$ $\leqslant t_{5}\ 0.90$
	/u:/		/u/	
$\bar{x}$ F2	952		742	
σ	76		98	
σ/u:/,/u/		98		$t_{11} = 3.75$ $\leqslant t_{11}\ 0.99$

Obviously, the values given are in Herz.

This implies that in the case of the highest vowels of each series (front, centre and back) the long vowels are shifting with respect to the short vowels. It would seem with the decrease in F2 for front and central vowels and the increase of F2 for the back vowel that we have a centralizing process which may well be associated with ongoing diphthongization processes, a process which is well under way in the case of /u:/, less so in the case of /i:/ and /ə:/. What we have, then, is perhaps

/u:/ > [Uu], with following processes
/i:/ > [Ii], /ə:/ > [əï].

It may well be the case that we are assisting at a shifting of long vowels which is only just beginning in the dialect of Ungra, while there is no sign of such a shift in the dialect of Frasnita.

We have plotted F1 against F2 to be able to discriminate vowel spaces at the acoustic level for all three dialects in figs. 1, 2, 3. The scale is logarithmic to ensure a more readable version of acoustic spaces and a more readily interpretable vowel arrangement. The vowel spaces seem more symmetrically arranged in the case of the Frasnita system (see fig. 1), and the /ə:,ə/ vowels occupy a distinctively central space with regard both to /O/ and /E/ and are well alligned with /a:,a/. In the case of the Ungra dialect there is evident crowding and overlapping between the spaces occupied in the two acoustic dimensions by the front and central vowels. The /ə:,ə/ vowels have considerable overlap on both the /a:,a/ and /E:,E/ vowel spaces, so that we might define them phonetically as a more fronted central vowel of the [ɜɪ] type as in English RP 'bird', but slightly lower, rather than the pure central type [ə] as in the Frasnita dialect (see, however, § 3.1 for more precise details). We might then set up the following phonetic correspondences:

	Frasnita	Ungra
/ə:/	[ə:]	[əɪ: ≃ əɪ ï]
/ə/	[ə]	[əɪ]

Another fact worthy of note is that while, as can easily be seen from Fig. 1, the /i,E/ type vowels are relatively higher than the vowels in the back series (F1 are lower, cf. /i:,i/ x̄ F1 = 325, /E:,E/ x̄ F1 = 457 with respect to /u:,u/ x̄ F1 = 363, /O:,O/ x̄ F1 = 495) in the Frasnita dialect, in accordance with known theories on differences in height between the two series, this is not the case in the dialect of Ungra (see Fig. 2). While it is true for Ungra that /i:,i/ are higher than /u:,u/ (F1 values are lower, cf. /i:,i/ x̄ F1 = 348 with respect to /u:,u/ x̄ F1 = 423, /E/ seems to be considerably lower than /O/ (F1 values are higher, cf. /E:,E/ x̄ F1 = 498 with respect to /O:,O/ x̄ F1 = 480) and, as we have noted, the /E:,E/

space overlaps with the /ə:, ə/ space, some values of /E:,E/ being decidedly 'central' for a front vowel, just as some /ə:,ə/ values show a more 'fronted' central vowel. Some sort of shift is going on in the Ungra dialect, though the precise details of such a vowel movement will have to be studied in more detail.

In the case of the Shën Vasili dialect we note that, although there is not a great deal of difference in F1, F2 values for the /O/ and /ʌ/ vowels, values for σ are sufficiently small for the relatively small differences in average values to be significant, cfr.

	/O/ [ɔ]	/ʌ/ /ə/ [ʌ]	
F1	592	529	
σF1	78	97	σF1 /O,ʌ/ = 88
F2	1058	1135	
σF2	97	60	σF2 /O,ʌ/ = 93

Using t-Student tests for small samples we have in the case of F1 $t_{20} = 1.5 \leqslant t_{20,}0.90$, while in the case of F2 we have $t_{20} = -1.71 \leqslant t_{20,}0.05$.

Although these slight differences *are* significant at more than the 90% level, given that there is slightly less than 1σ difference between the average values, with values for /ə/ = [ʌ] that show a decidedly back vowel, we have decided to label this vowel /ʌ/, an unrounded back vowel in the case of the Shën Vasili dialect, which therefore presents a vowel arrangement as in scheme 3 (see § 1). With respect to the other two dialects Shën Vasili presents a much lower variety of /O/ which in this case might well be transcribed [ɔ]. More will be said of the precise realizations in the following section.

3.1 *The vowel systems in perceptual terms.*

For a more reliable comparison of the three vowel systems analyzed and to give a more reliable picture of the relative vowel spaces we have decided, rather than use straightforward frequency counts (in Hz.) of F1, F2, in which the contribution of the first formant to human perception of vowel height is underestimated with respect to other formants, to use a perceptual scale in Mels. Rather than the straightforward calculation in terms of technical Mels (see Fant 1962) which uses the expression

$$F(\text{Mels}) = 3322 \log_{10} (1 + F(\text{Hz})/1000),$$

correspondences follow the more precise tables based on experimental curves gi-

ven in Stevens 1975. In both cases there is perfect correspondence at 1 KHz, for in both 1000 Hz = 1000 Mels.

This choice offers advantages over all other methods of comparing frequency values, including the calculation of a corrected perceptual F'2 (see § 2), though we will not go into the details of this problem here: see Disner 1983 pp. 4-5 for a general discussion. The relative vowel areas for the three dialects are given in figs. 4 (Frasnita), 5 (Ungra) and 6 (Shën Vasili). Previous impressions are confirmed: Frasnita presents a more perceptually symmetric system, values for /i:,i/ and /u:,u/ show more peripheral vowels than in the case of the other two dialects. Shën Vasili shows perceptually lower back vowels, while Ungra shows a system with considerable overlapping and vowels that seem to be shifting in perceptual as well as in acoustic space. Phonetic correspondences can be given as follows, on the basis of figs. 4-6:

	Frasnita	Ungra	Shën Vasili
/i:/	[i:]	[iᵀ: ~ Iiᵀ]	---
/i/	[i]	[iᵀ]	[iᵀ]
/E:/	[E:]	[Eᵀ: ~ ɛ:]	---
/E/	[E]	[Eᵀ ~ ɛ]	[E]
/ə:/	[ə:]	[ɜᵀ ~ ɜï]	---
/ə:/	[ə]	[ɜᵀ]	[ʌ]
/a:/	[a:]	[a: ~ æ:]	---
/a/	[a]	[a]	[a]
/u:/	[u:]	[uᵀ: ~ Uuᵀ]	---
/u/	[u]	[uᵀ ~ U]	[u ~ uᵀ]
/O/	[O]	[O]	[ɔ].

It must be remarked that [i, u] do not represent precise cardinal 'i,u' but slightly lower vowels, and that [E,O] represent vowels situated more or less between cardinal 'e, o' and 'ɛ, ɔ' respectively.

To give a more precise description of vowel height we have plotted F1 (in Mels) against F3 (in Mels), the two formants that contribute most to our perception of vowel height, and the results for three dialects are given in figs. 7-9. From even a cursory examination of these figures we can easily see that the Frasnita high and mid vowels /i,u,E,ə,O/ are higher than corresponding vowel phonemes in the other two dialects. We have an interesting reversal of height scales for the mid vowels in the three dialects, i.e.

Relative Height Scale	1 (highest)	2	3 (lowest)
Frasnita	[E] /E/	[O] /O/	[ə] /ə/

Ungra	[Oт] /O/	[Eт] /E/	[əт] /ə/
Shën Vasili	[Eт] /E/	[ʌ] /ɐ/ /ə	[ɔ] /O/

In other words the three dialects use different height scales to distinguish vowels at the phonetic level. It must also be observed that, while in the Frasnita dialect the three vowels /E, ə, O/ are more or less separate for height and backness, there is an extreme overlap between the /E, ʌ, O/ phonemes of Shën Vasili, and in the case of the Ungra dialect we even have overlapping between the high vowel /u/ and the mid vowel /O/, indicating an extremely low variety of /u/ = [uт ~ U]. The details offered in figs. 4-9 confirm a widely differing use of the acoustic and perceptual vowel space even for three such genetically and typologically closely related dialects. From the point of view of vowel height it must be stressed that the only vowel space in common to all three dialect systems is that occupied by the vowel /a/, while not even the height of the /i/ vowel is comparable in all three cases, even less so that of the /u/ vowel.

The interlanguage comparison of vowel spaces remains a thorny problem to which Disner 1983, following suggestions in Terbeek 1977, Lindau 1978 and others, has addressed herself, posing important questions such as

α. are vowels commonly transcribed in the same way the same vowels?

β. are the overall phonetic size and shape of vowel systems strictly comparable? etc.

One of the the important experimental questions raised by this author is the acoustic and perceptual overlapping or non overlapping of vowel spaces between languages having the same phonemic vowel inventory such as Yoruba and Italian, with extremely significant results. As Disner uses Ferrero 1972's data, we have used the same measurements in our Albanian-Italian comparison of vowel spaces and in the case of the Italian Tuscan results we are grateful to Dr. F. Ferrero who has kindly supplied us with the details of his experiments carried out on a population of 25 Florentine males: his results converted by us into Mels are given in table 6. The vowel spaces for Frasnita (fig. 10) and Ungra (fig. 11) are traced with thin lines, those for the corresponding Florentine vowels of Italian with thick lines (figs. 10, 11). In the case of figs. 10 and 11, as in the case of figs. 1-9, the vowel ellipses have been drawn with radii of 1 standard deviation (σ), since what interested us immediately was not to include all the real points of our various subsamples but to plot a first approximation of all the vowel spaces involved which would permit us to identify more readily the space occupied by each single vowel. This is because this is the first time that such comparisons within Albanian dialect systems or cross-comparisons with other languages (Italian) have been attempted, and more justifiedly the cross-comparison with Italian since our Italo-Albanian informants are proficient in this second language, i.e. in their own particular version of it which does not correspond to Calabriam regional Italian but is heavily influenced by this regional variety.

The comparison between the Frasnita and Italian vowel spaces in fig. 10 seems to show an apparent sharing of the extreme spaces in the system, viz. /i, u, a/, while it must be noted thata α. the Italo-Albanian vowel spaces for /E, O/ are intermediate with regard to the Italian vowel spaces /e,o/ and /ɛ, ɔ/ respectively, which bears out our transcriptions [E, O] as vowels which are neither mid-high nor mid-low, β. there is a greater use of the central vowel space along the axis [E - ə - O] in the case of the italo-Albanian system, and it must be remarked that all the Italian vowel areas are more 'peripheral' than the corresponding Italo-Albanian ones.

More differentiated seem to be Ungra and Italian vowel spaces as in fig. 11. As in the case of the Frasnita dialect the vowel areas here are even less 'peripheral' and more central than corresponding Italian vowel areas. Vowels seem to be lower on the whole than their corresponding Italian ones, e.g. Ungra /i/ overlaps on to Italian /e/, /E/ on to /ɛ/, /u/ on to /o/, the only exception being /O/ which remains intermediate with regard to Italian /o/ and /ɔ/, while, as one can easily see, there is a certain amount of overlap between /u/ and /O/ in this particular Italo-Albanian dialect. The differences observed between Frasnita and Ungra warranted an intra-language comparison different from the inter-language one already carried out and the results are schematized in fig. 12 (the two axes of F1 and F2 are always expressed in Mels). The biggest differences are between the two varieties of the vowels /E/ and /u/, though differences do not seem to be as big as we had expected. What seems to be emphasized is the more central position of Ungra's /E/ = [Ëᴛ] or even [ë] and certainly the lower vowel height of Ungra's /u/ = [U] or even [o].

To be more precise in our inter- and intra-language vowel comparisons we have carried out an analysis of variance on each vowel as suggested in Disner 1983, using Fisher's F discriminant (relationship between two variances) to see whether vowel pairings showed significantly different vowel areas in each case (areas are defined in perceptual terms). Differently from Disner op. cit. we have not accepted the 0.05 level of significance but only the 0.01 level, for reasons of caution in these as yet preliminary conclusions. Examples of the variance analysis are

F1 tested: Ungra /i/ vs. Italian /i/

	Ungra	Italian		
	(1) 485	(1) 409		
	.	.		
	.	.		
	.	.		
	(14) 421	(25) 379		
ΣX	6,401	10,168	ΣX_{ij}	16,569
n	14	25	N	39
$\bar{x}$	457	408	μ	425

	Sum of squares	DF's	Variance	F	Significance
General	70,615	38			
External	22,881.7	1	22,881.7		
Internal	47,733.3	37	1,290.1	17.74	$p < 0.001$

F2: tested: Frasnita /u/ vs. Italian /u/

	Frasnita	Italian		
	(1)966	(1)724		
	.	.		
	.	.		
	.	.		
	(12)743	(25)791		
ΣX	9,406	19,378	ΣX_{ij}	28,784
n	12	25	N	37
$\bar{x}$	784	775	μ	780

	Sum of squares	DF's	Variance	F	Significance
General	112,112	36			
External	615	1	615		
Internal	111,497	35	3,185.6	0.19	---

Overall results of our comparison are given in schemes 4 and 5 where, as stated, only the 0.01 level is considered as being significant. We note that, with regard to the height axis (F1 comparisons), there is much more inter-language skewedness between vowel areas occupied than intra-language asymmetry and that at the inter-language level only the height difference between the two i's reaches significance: we are thus justified in transcribing Ungra's /i/ phoneme as [iᵻ] or [I]. As far as the back-front axis is concerned (F2 comparisons) there are considerable differences due to the language effect, i.e. different languages *do* use the back-front space in different ways, bearing out some of Disner 1980's conclusions on systematic skewedness, though the surprising result is that at the intra-language level the two Italo-Albanian dialects only differ significantly in their realizations of the /E/ vowel, i.e. the Ungra dialect shows a consistently more centralized /E/ vowel than the other two Italo-Albanian dialects which we have analyzed. It is therefore more a question of /E/ = [ë] than of /ə/ = * [ɜ] as we hadh previously assumed. We might then correct our scheme of phonetic correspondences already given in this paragraph as follows:

	Frasnita	Ungra	Shën Vasili
/i:/	[i:]	[iт:]	---
/i/	[i]	[iт ~ I]	[iт]
/E:/	[E:]	[ë:]	---
/E/	[E]	[ë]	[Eт]
/ə:/	[ə:]	[ə:]	---
/ə/	[ə]	[ə]	[ʌ]
/a:/	[a:]	[æ: ~ a:]	---
/a/	[a]	[a]	[a]
/u:/	[u:]	[uт: ~ U:]	---
/u/	[u]	[uт ~ U]	[uт]
/O/	[O]	[Oт]	[ɔ]

We repeat that the inter-language effect is quantitatively much more important than the intra-language pattern effect.

Scheme 4: test for F1 differences.

	Language effect	Pattern effect	Significant differences	Non-significant differences
Frasnita vs. Italian (F1)	YES	YES	i, E/e, E/ɛ, u, O/o, O/ɔ	a
Ungra vs. Italian (F1)	YES	YES	i, E/e, u, O/ɔ	E/ɛ, O/o, a
Frasnita vs. Ungra (F1)	NO	YES	I	E, ə, a, u, O

Scheme 5: test for F2 differences.

	Language effect	Pattern effect	Significant differences	Non-Significant differences
Frasnita vs Italian (F2)	YES	YES	i, E/ɛ, a, O/o	E/e, u, O/ɔ
Ungra vs. Italian (F2)	YES	YES	E/e, E/ɛ, a, u, O/o, O/ɔ	i
Frasnita vs. Ungra (F2)	NO	YES	E	i, ə, a, u, O

4. *Distinctive features*

Our first presupposition is, following Disner 1980 (see page 77 et seq.), that vowel ranking is preferentially

$$\left\{ \begin{matrix} i \\ a \end{matrix} \right\} > \left\{ \begin{matrix} e \\ o \end{matrix} \right\} > u$$

rather than the generally assumed a > i > u > e > o. This would seem to imply that Wang 1968 is more correct in supposing binary features of the type [high] and [mid] rather than the pure height features [high] and [low] suggested in Chomsky-Halle 1968. However, if we wish to take into account the types of phonetic difference at the intra- and inter-language levels that we have pointed out and analyzed in the previous paragraphs we might just as well consider these oppositions as being part of a unique n-ary height scale, as Hyman 1975 (see § 5.3) suggests, each dialect and each language choosing its own positions along that scale, which would mean, of course, a nicer relationship between phonological and phonetic levels in a grammar and would account for the differing patterns of vowel height between dialects and languages that we have evidenced.

We have noticed in our own particular study greater shifting along the back-front axis (this represents F2 variation) in these Italo-Albanian dialects than in the Tuscan variety of Italian, which might be difficult to account for in terms of binary features of the [back] or [front] type; we also notice that this shifting ties in with the 'rounding' feature in the dialect of Shën Vasili. Rather than binary features of the Chomsky-Halle type we might propose a 'peripherality' dimension of the type

2. peripheral. – 1. peripheral. – 0. peripheral. – 1. peripheral. – 2. peripheral.

E – Ë – ə – Ö/ʌ – O,

which interrelates with the 'rounding' feature. Our proposals might be schematized as in scheme 6 which would give us the following vowel specification

	/i/	/E/	/ə/	/a/	/O/	/u/
Height	5-4	3-2	3-2	1-0	3-2	5-4
Peripherality	2-1	2-1	0	0	2-1	2-1
Rounding	—	—	—	—	+	+
Length	±	±	±	±	±	±

However, before this preliminary scheme can be further developed we would need to analyze in greater depth more Italo-Albanian vowel variation at the intra-language level and attempt to programme in our model not only this pattern variation between dialects but also the type of morphonological patterning and

alternations that Albanian as a whole present (literary language cum dialects).

Scheme 6.

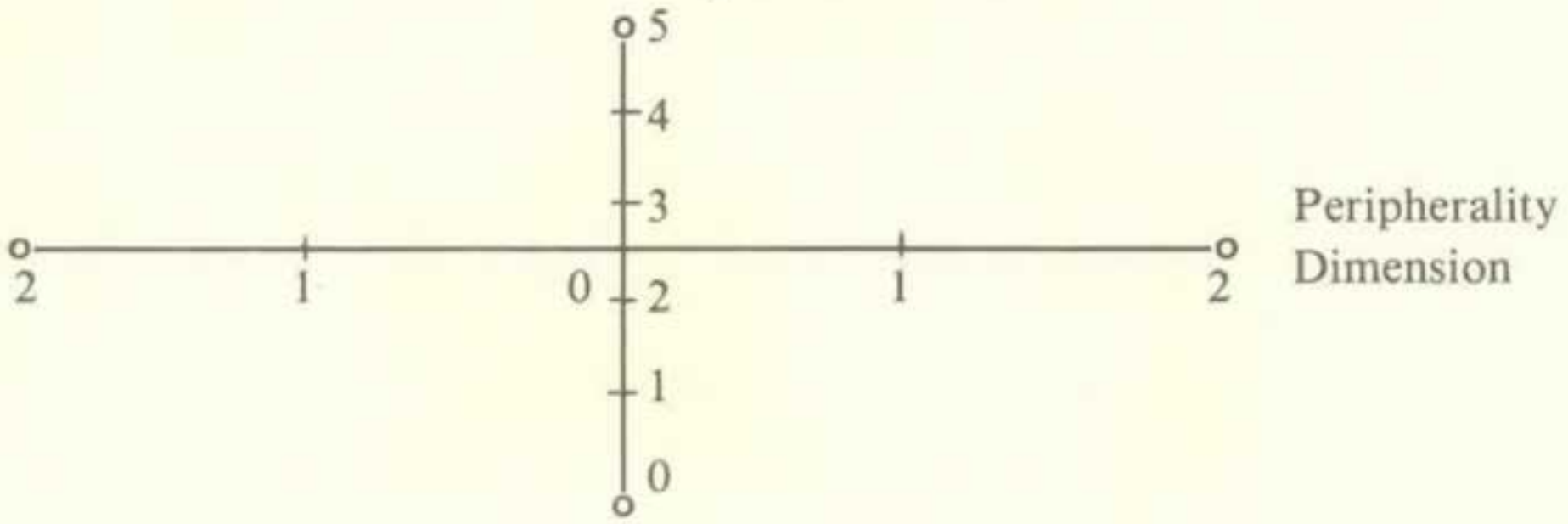

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TABLE 3.

Village	Vowel	F1	F2 (Herz)	F3	logF1	logF2	F1	F2 (Mels)	F3
Frasnita	/i/:	312	2275	2662	2.4942	3.3570	421	1670	1838
»	»	312	2275	2862	2.4942	3.3570	421	1670	1914
»	»	312	2287	2750	2.4942	3.3593	421	1676	1872
»	»	312	2425	3000	2.4942	3.3847	421	1738	1962
»	»	300	2500	3912	2.4771	3.3979	409	1771	1932
»	»	325	2425	3050	2.5119	3.3847	435	1738	1979
»	»	362	2425	2850	2.5587	3.3847	472	1738	1910
»	»	350	2587	2987	2.5441	3.4128	460	1808	1958
»	»	337	2462	2787	2.5276	3.3913	447	1755	1886
»	»	387	1850	2312	2.5877	3.2672	496	1477	1687
»	»	400	1987	2437	2.6021	3.2982	508	1540	1744
»	»	337	2062	2600	2.5276	3.3143	447	1573	1813
$\bar{x}$		337	2297	2758					
σ		32	223	232					
Frasnita	/i/	325	2175	2650	2.5119	3.3375	435	1624	1833
»	»	287	2312	2775	2.2579	3.3640	396	1687	1881
»	»	300	2375	2850	2.4771	3.3757	409	1715	1910
»	»	287	2600	3000	2.4579	3.4150	396	1813	1962
»	»	362	2487	2837	2.5587	3.3957	472	1766	1905
»	»	337	2576	2875	2.5276	3.4108	447	1803	1919
»	»	350	1900	2475	2.5441	3.2788	460	1500	1760
»	»	350	2000	2475	2.5441	3.3010	460	1545	1760
$\bar{x}$		325	2303	2742					
σ		30	260	192					
Total $\bar{x}$		332	2299	2757	2.5196	3.3594	440	1680	1871
σ		31	232	210	0.0400	0.0455	34	105	82
Frasnita	/E:/	487	2050	2725	2.6875	3.3118	590	1568	1862
»	»	437	2350	2900	2.6405	3.3711	544	1704	1928
»	»	475	2387	2762	2.6767	3.3779	579	1720	1876
»	»	475	1900	2450	2.6767	3.2788	579	1500	1750
»	»	437	2287	2600	2.6405	3.3593	544	1676	1813
$\bar{x}$		462	2190	2687					
σ		24	211	170					
Frasnita	/E/	487	2050	2625	2.6875	3.3118	590	1568	1823
»	»	500	2050	2650	2.6990	3.3118	602	1568	1833
»	»	512	2137	2587	2.7093	3.3298	613	1606	1808
»	»	450	2237	2650	2.6532	3.3409	556	1653	1833
»	»	450	2162	2900	2.6532	3.3349	556	1618	1928
»	»	400	2250	2912	2.6021	3.3522	508	1659	1932
»	»	375	2350	2637	2.5740	3.3711	485	1704	1828

»	»	475	2327	2762	2.6767	3.3687	575	1699	1876
»	»	400	2325	2850	2.6021	3.3664	508	1693	1910
»	»	450	1637	2400	2.6532	3.2140	556	1372	1726
»	»	487	1700	2437	2.6875	3.2304	590	1403	1744
»	»	475	1775	2412	2.6767	3.2492	579	1441	1731
$\bar{x}$		455	2084	2656					
σ		43	252	179					
Total $\bar{x}$		457	2117	2665	2.6586	3.3229	562	1597	1835
σ		38	240	172	0.0373	0.0512	36	111	69
Frasnita	/ə:/	550	1425	2587	2.7404	3.1538	647	1253	1808
»	»	525	1487	2737	2.7202	3.1723	625	1289	1867
»	»	575	1725	2537	2.7597	3.2368	669	1416	1788
»	»	450	1387	2387	2.6532	3.1421	556	1232	1720
$\bar{x}$		525	1506	2562					
σ		54	152	144					
Frasnita	/ə/	600	1137	2762	2.7782	3.0558	690	1085	1876
»	»	550	1475	2875	2.7404	3.1688	647	1287	1919
»	»	637	1625	2950	2.8041	3.2109	722	1365	1945
»	»	500	1600	2687	2.6990	3.2041	602	1350	1848
»	»	475	1750	2550	2.6767	3.2430	577	1428	1793
»	»	500	1412	2387	2.6990	3.1498	602	1246	1720
$\bar{x}$		544	1500	2702					
σ		64	214	209					
Total $\bar{x}$		536	1502	2646	2.7271	3.1737	634	1295	1828
σ		58	182	191	0.0466	0.0548	51	101	77
Frasnita	/a:/	662	1212	2875	2.8209	3.0835	743	1131	1919
»	»	887	1412	2375	2.9479	3.1498	846	1246	1715
»	»	850	1625	2637	2.9294	3.2109	891	1365	1828
»	»	737	1575	2787	2.8675	3.1973	805	1337	1886
»	»	675	1475	2312	2.8293	3.1688	755	1282	1687
»	»	650	1225	2262	2.8129	3.0881	732	1139	1664
$\bar{x}$		744	1421	2541					
σ		102	173	260					
Frasnita	/a/	762	1187	2762	2.8820	3.0745	826	1116	1876
»	»	725	1287	3100	2.8603	3.1096	795	1176	1994
»	»	812	1162	2700	2.9096	3.0652	862	1100	1852
»	»	812	1387	2862	2.9096	3.1421	862	1232	1914
»	»	875	1625	2687	2.9420	3.2109	910	1365	1842
»	»	700	1737	2787	2.8451	3.2398	775	1422	1886
»	»	762	1650	2637	2.8820	3.2175	826	1378	1828
»	»	700	1525	2412	2.8451	3.1833	775	1310	1731
»	»	662	1737	2412	2.8209	3.2398	743	1422	1731

»	»	637	1675	2300	2.8041	3.2240	722	1391	1681
»	»	612	1150	2412	2.7868	3.0607	701	1093	1731
»	»	625	1225	2337	2.7959	3.0881	712	1139	1699
$\bar{x}$		724	1446	2617					
σ		83	263	245					
Total $\bar{x}$		771	1437	2592	2.8606	3.1530	793	1258	1804
σ		156	212	245	0.0511	0.0650	64	119	100
Frasnita	/u:/	350	950	2525	2.5441	2.9777	460	966	1782
»	/u/	325	712	2387	2.5119	2.8525	435	784	1720
»	»	325	762	2237	2.5119	2.8820	435	826	1653
»	»	375	775	2462	2.5740	2.8893	485	836	1755
»	»	412	600	2850	2.6149	2.7782	520	690	1910
»	»	400	725	2937	2.6021	2.8603	508	795	1940
»	»	375	625	----	2.5740	2.7959	485	712	----
»	»	375	712	----	2.5740	2.8525	485	785	----
»	»	350	650	----	2.5441	2.8129	460	732	----
»	»	375	737	2450	2.5740	2.8675	485	805	1750
»	»	337	650	2400	2.5276	3.8129	447	732	1726
»	»	362	662	2412	2.5587	2.8209	472	743	1731
Total $\bar{x}$		363	713	2518	2.5593	2.8502	473	784	1774
σ		27	93	228	0.0327	0.0531	27	73	93
Frasnita	/O/	512	825	----	2.7093	2.9164	613	872	----
»	»	487	925	2500	2.6875	2.9661	590	948	1771
»	»	537	975	2812	2.7300	2.9890	635	984	1895
»	»	475	937	1875	2.6767	2.9717	579	955	1489
»	»	462	987	2400	2.6646	2.9943	567	992	1726
»	»	537	1062	2412	2.7300	3.0261	635	1039	1731
»	»	487	725	2475	2.6875	2.8603	590	795	1760
»	»	462	837	----	2.6646	2.9227	567	882	----
Total $\bar{x}$		495	909	2412	2.6938	2.9558	597	933	1729
σ		31	108	303	0.0266	0.0530	28	79	133

TABLE 4.

Village	Vowel	F1	F2	F3	logF1	logF2	F1	F2	F3
			(Herz)					(Mels)	
Ungra	/i:/	375	1637	2075	2.5740	3.2140	485	1372	1579
»	»	325	2237	2787	2.5119	3.3497	435	1653	1886
»	»	362	1775	2312	2.5587	3.2492	472	1441	1687
»	»	275	1800	2462	2.4393	3.2553	384	1453	1755
»	»	437	2450	2937	2.6405	3.3892	544	1750	1940
»	»	362	1787	2625	2.5587	3.2521	472	1447	1823
$\bar{x}$		356	1948	2533					
σ		54	319	316					

Ungra	/i/	362	1750	2250	2.5587	3.2430	472	1428	1659
»	»	362	1937	2237	2.5587	3.2871	472	1517	1653
»	»	337	2275	2850	2.5276	3.3570	447	1670	1910
»	»	312	2600	2900	2.4942	3.4150	421	1813	1928
»	»	362	1800	2375	2.5587	3.2553	472	1453	1715
»	»	275	1987	2400	2.4393	3.2982	384	1540	1726
»	»	412	2312	2912	2.6149	3.3640	520	1687	1932
»	»	312	2575	2925	2.4942	3.4108	421	1803	1936
$\bar{x}$		342	2155	2606					
σ		42	334	316					
Total $\bar{x}$		348	2066	2575	2.5378	3.3100	457	1573	1795
σ		46	332	306	0.0582	0.0688	46	152	127
Ungra	/ɛ:/	437	1712	2312	2.6405	3.2335	544	1409	1687
»	»	487	1762	2212	2.6875	3.2460	590	1434	1641
»	»	462	1400	2450	2.6646	3.1461	567	1240	1750
»	»	487	1812	2662	2.6875	3.2582	590	1459	1838
»	»	512	1925	2437	2.7093	3.2844	613	1511	1744
»	»	487	1787	2225	2.6875	3.2521	590	1447	1648
»	»	562	1712	2187	2.7497	3.2335	657	1409	1630
$\bar{x}$		491	1730	2355					
σ		39	163	172					
Ungra	/E/	512	1487	2225	2.7093	3.1723	613	1289	1648
»	»	487	1500	2312	2.6875	3.1761	590	1296	1687
»	»	412	1775	2300	2.6149	3.2492	520	1441	1681
»	»	475	1800	2225	2.6767	3.2553	579	1453	1648
»	»	512	1525	2450	2.7093	3.1833	613	1310	1750
»	»	525	1673	2275	2.7202	3.2140	625	1372	1670
»	»	525	1775	2512	2.7202	3.2492	625	1441	1777
»	»	550	1762	2337	2.7404	3.2460	647	1434	1699
»	»	537	1712	2175	2.7300	3.2335	635	1409	1624
$\bar{x}$		504	1664	2312					
σ		42	129	109					
Total $\bar{x}$		498	1693	2331	2.6959	3.2270	600	1397	1695
σ		40	144	137	0.0356	0.0381	36	75	61
Ungra	/ə:/	637	1087	2137	2.8041	3.0362	722	1052	1607
»	»	587	1300	2425	2.7686	3.1139	679	1183	1738
»	»	537	1500	2662	2.7300	3.1761	635	1296	1838
$\bar{x}$		587	1296	2408					
σ		50	207	263					
Ungra	/ə/	475	1337	2162	2.6767	3.1261	579	1204	1618
»	»	500	1437	2312	2.6990	3.1575	602	1260	1687

»	»	500	1512	2500	2.6990	3.1796	602	1302	1771
»	»	650	1725	2462	2.8129	3.2368	732	1416	1755
$\bar{x}$		531	1503	2359					
σ		80	165	154					
Total $\bar{x}$		555	1414	2380	2.7415	3.1466	650	1245	1716
σ		70	200	189	0.0543	0.0631	61	114	84
Ungra	/a:/	637	1112	2287	2.8041	3.0461	722	1070	1676
»	»	625	1137	2275	2.7959	3.0558	712	1085	1670
»	»	837	1637	2887	2.9227	3.2140	882	1372	1923
»	»	775	1662	3087	2.8893	3.2206	836	1384	1990
»	»	675	1312	2462	2.8293	3.1179	755	1190	1755
»	»	625	1425	2337	2.7959	3.1538	712	1253	1699
»	»	825	1600	2337	2.9165	3.2041	872	1350	1699
»	»	1075	1712	----	3.0314	3.2335	1047	1409	----
$\bar{x}$		759	1450	2525					
σ		155	240	327					
Ungra	/a/	625	1312	2350	2.7959	3.1179	712	1190	1704
»	»	625	1300	2337	2.7959	3.1139	712	1183	1699
»	»	625	1150	2200	2.7959	3.0607	712	1093	1636
»	»	800	1700	2887	2.9031	3.2304	854	1403	1923
»	»	737	1787	2925	2.8675	3.2521	805	1447	1936
»	»	825	1650	2787	2.9165	3.2175	872	1378	1886
»	»	875	1650	2887	2.9420	3.2175	910	1378	1923
»	»	675	1350	2312	2.8293	3.1300	755	1211	1687
»	»	675	1362	2362	2.8293	3.1342	755	1218	1709
»	»	625	1487	2362	2.7959	3.1723	712	1289	1693
»	»	725	1137	2325	2.8603	3.0558	795	1085	1693
»	»	787	1712	----	2.8960	3.2335	845	1409	----
»	»	500	1050	1825	2.6990	3.0212	602	1032	1466
»	»	762	1725	2637	2.8820	3.2368	826	1416	1828
»	»	1037	1612	2487	3.0158	3.2074	1024	1357	1766
$\bar{x}$		727	1466	2477					
σ		130	244	313					
Total $\bar{x}$		741	1460	2493	2.8613	3.1586	801	1270	1761
σ		117	237	310	0.0774	0.0735	106	134	129
Ungra	/u:/	350	1037	----	2.5441	3.0158	460	1024	----
»	»	325	862	2062	2.5119	2.9355	435	900	1573
»	»	437	887	2350	2.6405	2.9479	544	920	1704
»	»	450	962	2450	2.6532	2.9832	556	974	1750
»	»	562	1012	2250	2.7497	3.0052	657	1008	1659
$\bar{x}$		425	952	2278					
σ		94	76	166					

Ungra	/u/	375	612	----	2.5740	2.7868	485	701	----
»	»	362	737	2075	2.5587	2.8675	472	805	1579
»	»	350	712	2287	2.5441	2.8525	460	785	1676
»	»	325	775	2125	2.5119	2.8893	435	836	1602
»	»	300	600	2300	2.4771	2.7782	409	690	1681
»	»	362	825	2462	2.5587	2.9165	472	872	1755
»	»	450	800	2212	2.6532	2.9031	556	854	1641
»	»	537	875	2237	2.7300	2.9420	635	910	1653
$\bar{x}$		383	742	2243					
σ		76	98	127					
Total $\bar{x}$		423	823	2255	2.5929	2.9095	506	868	1661
σ		78	137	135	0.0851	0.0747	78	105	61
Frasnita	/O/	450	850	2287	2.6532	2.9294	556	891	1676
»	»	450	887	2287	2.6532	2.9479	556	920	1676
»	»	437	987	----	2.6405	2.9943	544	992	----
»	»	375	1037	2337	2.5740	3.0158	485	1024	1699
»	»	450	850	2350	2.6532	2.9294	556	891	1704
»	»	475	925	2150	2.6767	2.9661	579	948	1612
»	»	562	1062	2000	2.7497	3.0761	657	1042	1545
»	»	637	1300	2212	2.8041	3.1139	722	1183	1641
$\bar{x}$		480	987	2232	2.6756	2.9904	582	986	1650
σ		82	150	124	0.0708	0.0621	74	98	57

TABLE 5.

Village	Vowel	F1	F2 (Herz)	F3	logF1	logF2	F1	F2 (Mels)	F3
/i/ Sh. Vasili	/i/	350	1837	2350	2.5441	3.2641	460	1471	1704
»	»	337	1912	2437	2.5276	3.2815	447	1506	1744
»	»	337	2062	2375	2.5276	3.3143	447	1573	1715
»	»	312	1962	2550	2.4942	3.2927	421	1528	1793
»	»	337	2112	2537	2.5276	3.3247	447	1596	1788
»	»	337	2000	2487	2.5276	3.3010	447	1545	1766
»	»	337	2087	2587	2.5276	3.3195	447	1585	1808
»	»	412	2300	2737	2.6149	3.3617	530	1681	1867
»	»	375	2312	2725	2.5740	3.3640	485	1687	1862
»	»	425	2275	2712	2.6284	3.3570	533	1670	1857
»	»	375	2275	2862	2.5740	3.3570	485	1670	1914
»	»	425	2200	2575	2.6224	3.3424	533	1636	1803
»	»	362	2537	3000	2.5587	3.4043	472	1788	1962
$\bar{x}$		363	2144	2610	2.5581	3.3296	473	1610	1814
σ		37	195	190	0.0433	0.0394	38	88	76
Sh. Vasili	/E/	487	1625	----	2.6875	3.2109	590	1365	----
»	»	425	1775	2400	2.6284	3.2492	533	1441	1726

»	»	487	1775	2750	2.6875	3.2492	590	1441	1872
»	»	412	2000	2487	2.6149	3.3010	520	1545	1766
»	»	412	1712	----	2.6646	3.2335	567	1409	----
»	»	425	1900	2287	2.6284	3.2788	533	1500	1676
»	»	537	2025	2500	2.7300	3.3064	635	1557	1771
»	»	612	2012	2700	2.7868	3.3036	701	1551	1852
»	»	475	2225	2562	2.6767	3.3473	579	1648	1798
»	»	575	2150	3037	2.7597	3.3324	669	1612	1975
»	»	500	2012	2487	2.6990	3.3036	602	1551	1766
»	»	562	2150	2875	2.7497	3.3324	657	1612	1919
$\bar{x}$		497	1947	2609	2.6928	3.2874	598	1519	1812
σ		64	190	229	0.0551	0.0431	58	89	91
Sh. Vasili	/ʌ/	429	1162	2637	2.6284	3.0652	533	1100	1828
»	»	437	1125	----	2.6405	3.0512	544	1078	----
»	»	462	1200	2400	2.6646	3.0792	567	1124	1726
»	»	625	1025	2937	2.7959	3.0107	712	1017	1940
»	»	625	1137	2775	2.7959	3.0558	712	1085	1877
»	»	600	1162	2437	2.7782	3.0652	690	1100	1744
$\bar{x}$		529	1135	2637	2.7173	3.0546	626	1084	1823
σ		97	60	227	0.0808	0.0235	87	36	90
Sh. Vasili	/a/	562	1175	2462	2.7497	3.0700	657	1109	1755
»	»	675	1262	2300	2.8293	3.1011	755	1161	1681
»	»	725	1337	2587	2.8603	3.1261	795	1204	1808
»	»	700	1537	2537	2.8451	3.1867	775	1317	1788
»	»	512	1462	2387	2.7093	3.1649	613	1274	1720
»	»	612	1450	2525	2.7868	3.1614	701	1268	1782
»	»	662	1462	2350	2.8209	3.1649	743	1274	1704
»	»	812	1600	2787	2.9096	3.2041	862	1350	1886
»	»	837	1562	----	2.9227	3.1937	882	1330	----
»	»	812	1550	2812	2.9096	3.1903	862	1325	1895
»	»	800	1512	2737	2.9031	3.1796	854	1302	1867
»	»	750	1662	2875	2.8751	3.2206	816	1384	1919
»	»	825	1825	2700	2.9165	3.2613	872	1466	1852
»	»	762	1687	2500	2.8820	3.2271	826	1397	1802
$\bar{x}$		718	1506	2581	2.8514	3.1751	787	1297	1802
σ		102	171	186	0.0659	0.0505	84	94	77
Sh. Vasili	/u/	337	725	2562	2.5276	2.8603	447	795	1798
»	»	325	637	2650	2.5119	2.8041	435	722	1833
»	»	350	650	2550	2.5441	2.8129	460	732	1793
»	»	375	900	2800	2.5640	2.9542	485	929	1890
»	»	350	700	2550	2.5441	3.8451	460	775	1793
»	»	325	687	2512	2.5119	2.8370	435	765	1777
»	»	450	900	----	2.6592	2.9542	556	929	----
»	»	387	850	----	2.5877	2.9294	496	891	----
»	»	437	862	----	2.6405	2.9355	544	900	----

»	»	387	887	----	2.5877	2.9479	496	920	----
»	»	475	887	----	2.6767	2.9479	579	920	----
»	»	425	775	----	2.6284	2.8892	533	836	----
$\bar{x}$		385	788	2604	2.5828	2.8931	494	843	1814
σ		51	104	106	0.0574	0.0584	49	81	46
Sh. Vasili	/O/	587	1012	2400	2.7686	3.0052	679	1008	1726
»	»	437	950	2400	2.6405	2.9777	544	966	1726
»	»	612	1125	----	2.7868	3.0512	701	1078	----
»	»	500	1000	2475	2.6990	3.0000	602	1000	1760
»	»	512	912	2462	2.7093	2.9600	613	938	1755
»	»	525	975	2500	2.7206	2.9890	625	984	1771
»	»	500	987	2525	2.6990	3.9943	602	992	1782
»	»	562	962	----	2.7497	2.9832	657	974	----
»	»	625	1200	2962	2.7959	3.0792	712	1124	1950
»	»	687	1037	----	2.8370	3.0158	765	1024	----
»	»	625	1250	----	2.7959	3.1004	712	1154	----
»	»	687	1150	----	2.8370	3.0607	765	1093	----
»	»	650	1050	2950	2.8129	3.0212	732	1032	1945
»	»	700	1125	2875	2.8451	3.0512	775	1078	1919
»	»	625	1050	2850	2.7959	3.0212	712	1032	1910
»	»	637	1137	2425	2.8041	3.0558	722	1085	1738
$\bar{x}$		592	1058	2620	2.7686	3.0229	682	1035	1817
σ		78	97	234	0.0596	0.0398	68	61	93

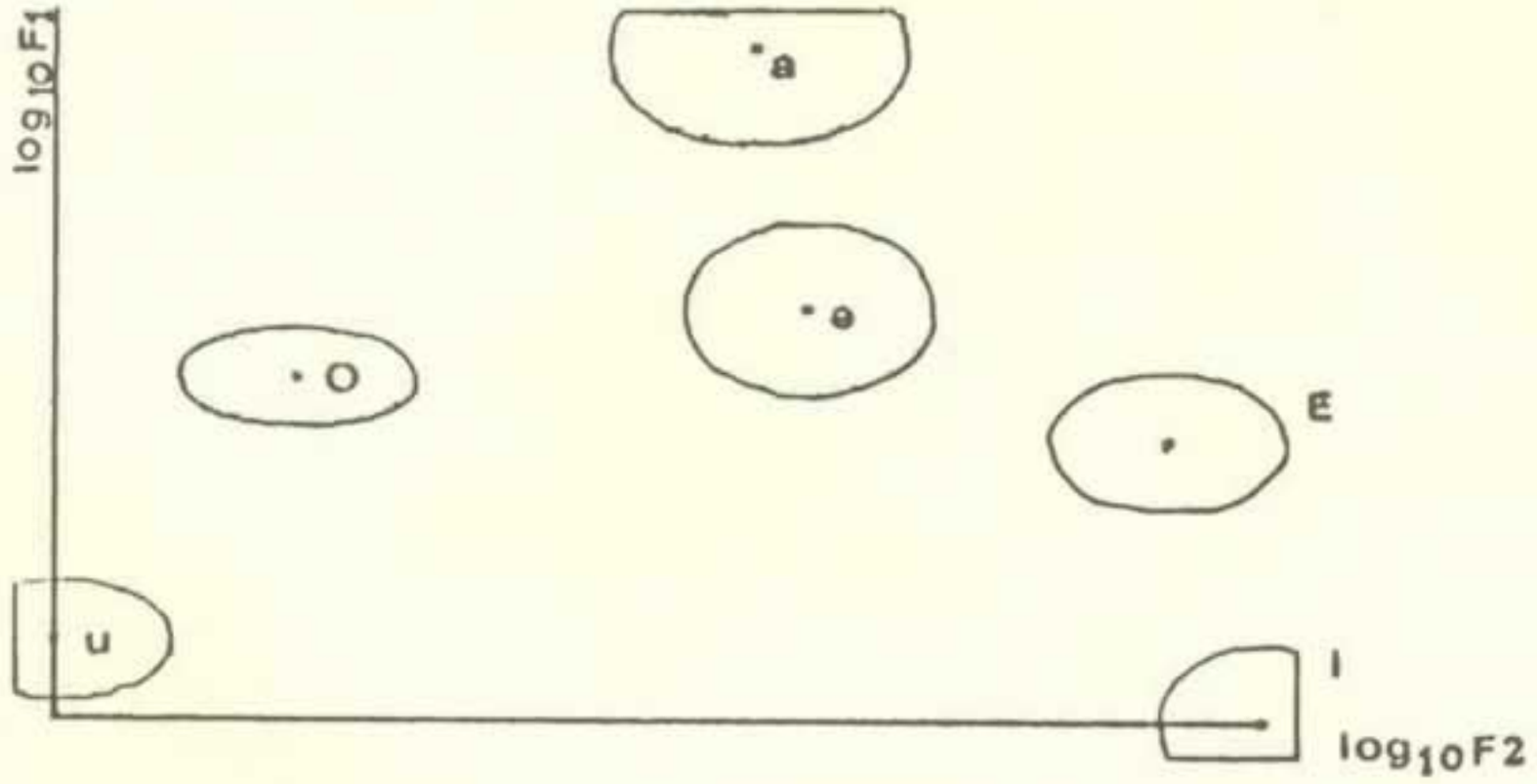
TABLE 5: Tuscan Vowels (after Ferrero)

Vowel	F1 (Mels)	F2	Vowel	F1 (Mels)	F2
/i/	409	16121	/e/	480	1505
»	409	1581	»	490	1554
»	389	1636	»	508	1586
»	409	1590	»	508	1545
»	389	1612	»	499	1559
»	429	1612	»	460	1590
»	389	1500	»	470	1477
»	399	1568	»	518	1509
»	399	1522	»	470	1496
»	389	1612	»	450	1518
»	369	1681	»	480	1563
»	399	1545	»	499	1500
»	379	1568	»	508	1568
»	409	1612	»	450	1545
»	379	1590	»	518	1500
»	409	1650	»	508	1581
»	429	1681	»	565	1590

»	389	1612	»	528	1522
»	399	1522	»	518	1500
»	399	1690	»	528	1612
»	460	1631	»	547	1577
»	399	1636	»	490	1545
»	490	1681	»	508	1636
»	470	1636	»	547	1545
»	379	1604	»	556	1522
$\bar{x}$	408	1607		504	1546
σ	29	40		31	41
/ɛ/	602	1468	/a/	824	1038
»	629	1477	»	775	1160
»	682	1487	»	884	1130
»	602	1500	»	799	1136
»	584	1522	»	884	1118
»	602	1500	»	854	1178
»	656	1443	»	759	1106
»	655	1468	»	861	1228
»	682	1487	»	799	1223
»	620	1403	»	824	1118
»	673	1500	»	854	1148
»	602	1428	»	783	1136
»	629	1463	»	816	1062
»	611	1443	»	791	1124
»	620	1477	»	767	1136
»	611	1536	»	868	1093
»	673	1545	»	791	1183
»	655	1453	»	759	1112
»	620	1453	»	816	1093
»	664	1559	»	868	1268
»	647	1500	»	840	1124
»	647	1509	»	832	1112
»	499	1500	»	891	1148
»	673	1531	»	861	1136
»	699	1418	»	854	1112
$\bar{x}$	629	1483		826	1137
σ	45	40		41	50
/u/	440	724	/o/	584	832
»	409	732	»	508	775
»	440	808	»	602	854
»	429	791	»	508	832
»	409	799	»	584	854
»	419	808	»	490	816
»	490	808	»	470	775
»	508	816	»	602	899
»	440	699	»	556	799

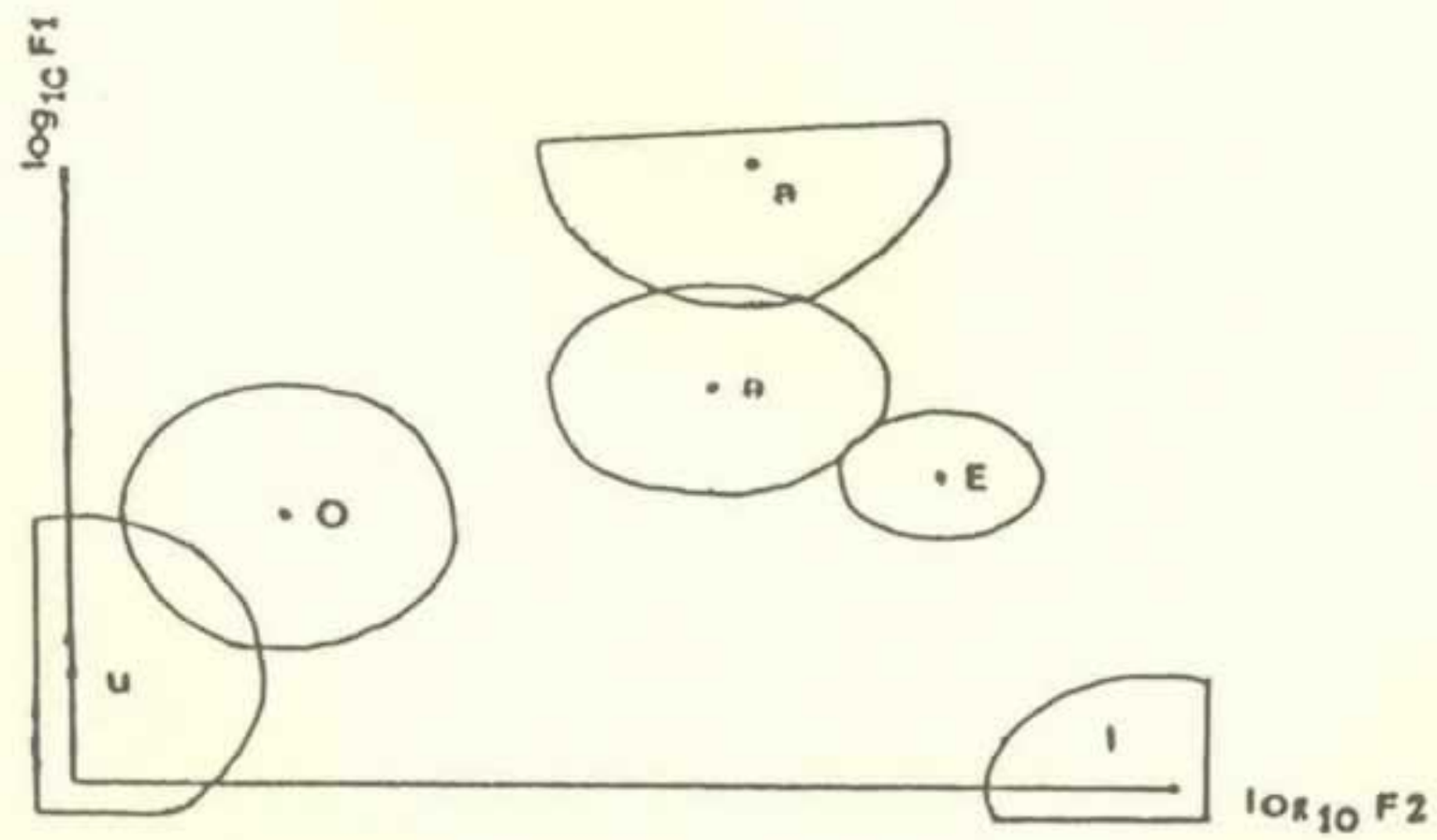
»	419	783	»	547	876
»	399	690	»	528	732
»	409	832	»	538	854
»	389	741	»	508	724
»	429	716	»	499	824
»	450	716	»	593	854
»	460	732	»	593	816
»	419	775	»	584	824
»	429	816	»	556	929
»	419	750	»	518	816
»	450	854	»	538	884
»	490	824	»	508	783
»	429	816	»	556	854
»	450	816	»	528	832
»	409	741	»	547	854
»	419	791	»	602	816
$\bar{x}$	434	775		546	828
σ	29	47		39	47
/ɔ/	690	861	/ɔ/	602	832
»	690	929	»	690	884
»	664	847	»	638	929
»	602	868	»	655	929
»	690	906	»	716	1014
»	655	847	»	655	922
»	602	847	»	611	959
»	673	922	»	690	914
»	673	951	»	673	937
»	602	854	»	638	1007
»	647	540	»	611	854
»	690	1038	»	690	944
»	690	891			
$\bar{x}$	657	909			
σ	35	57			

Fig. 1



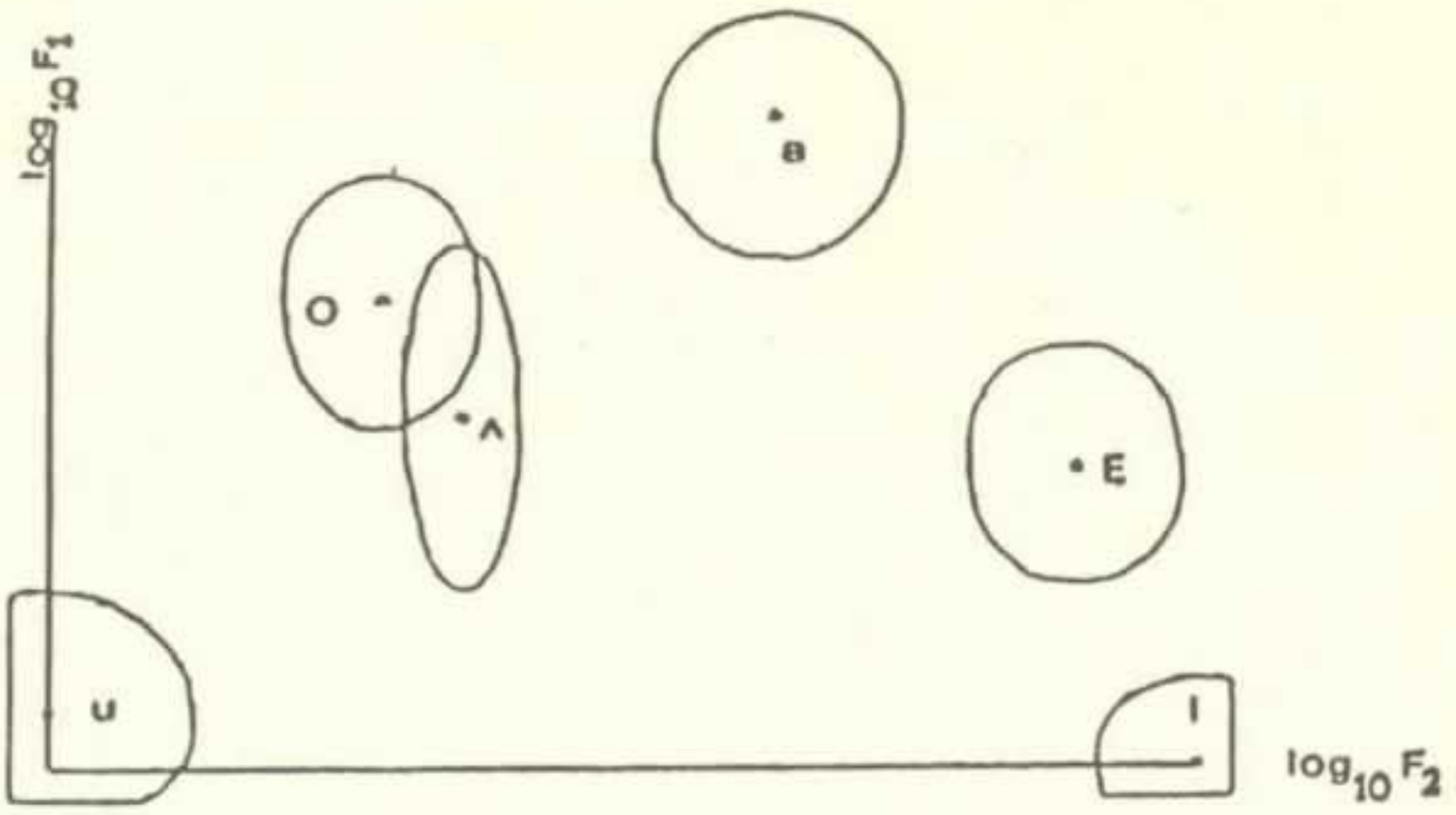
VILLAGE FRASCINETO

Fig. 2



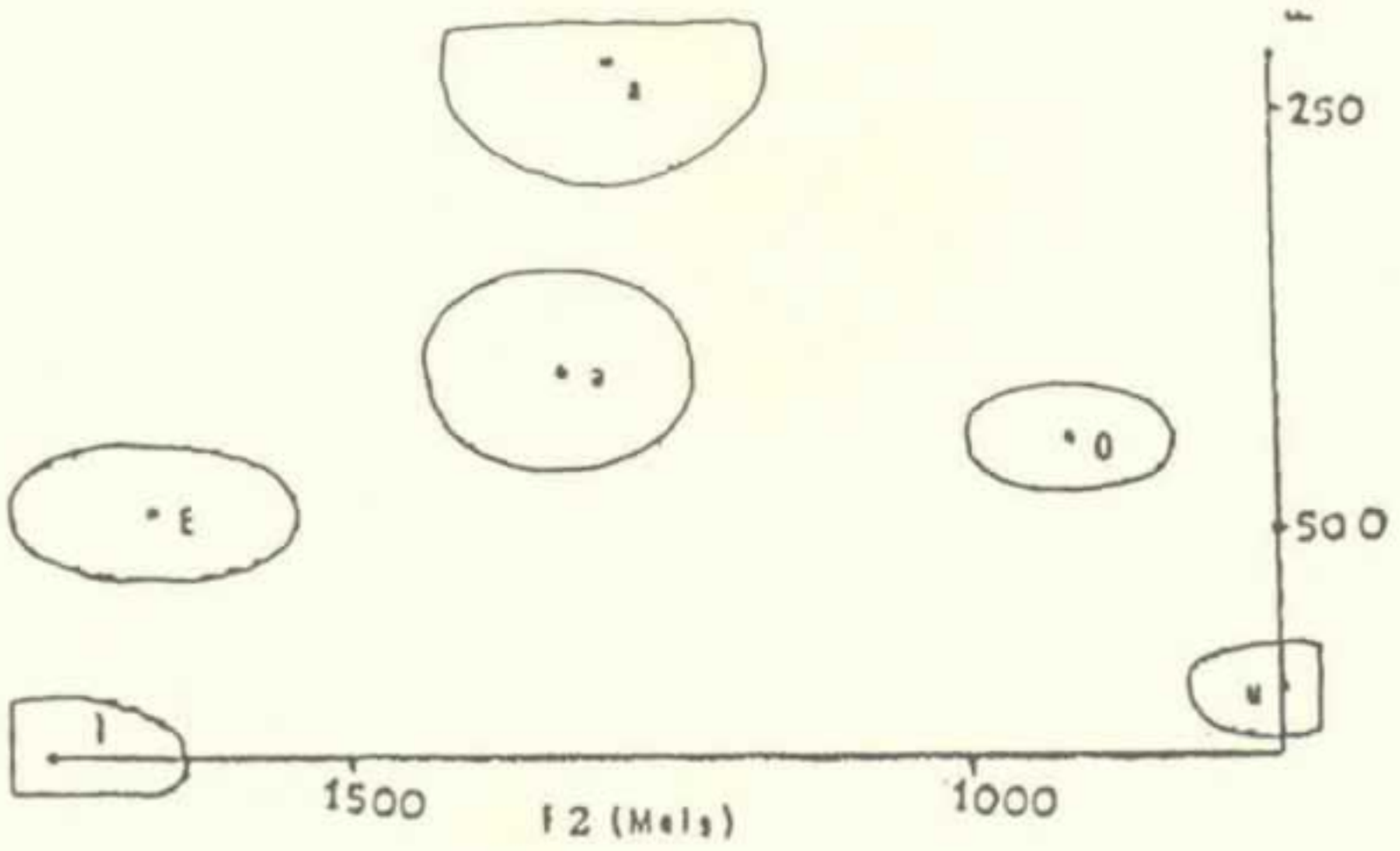
VILLAGE LUNGRO

Fig. 3



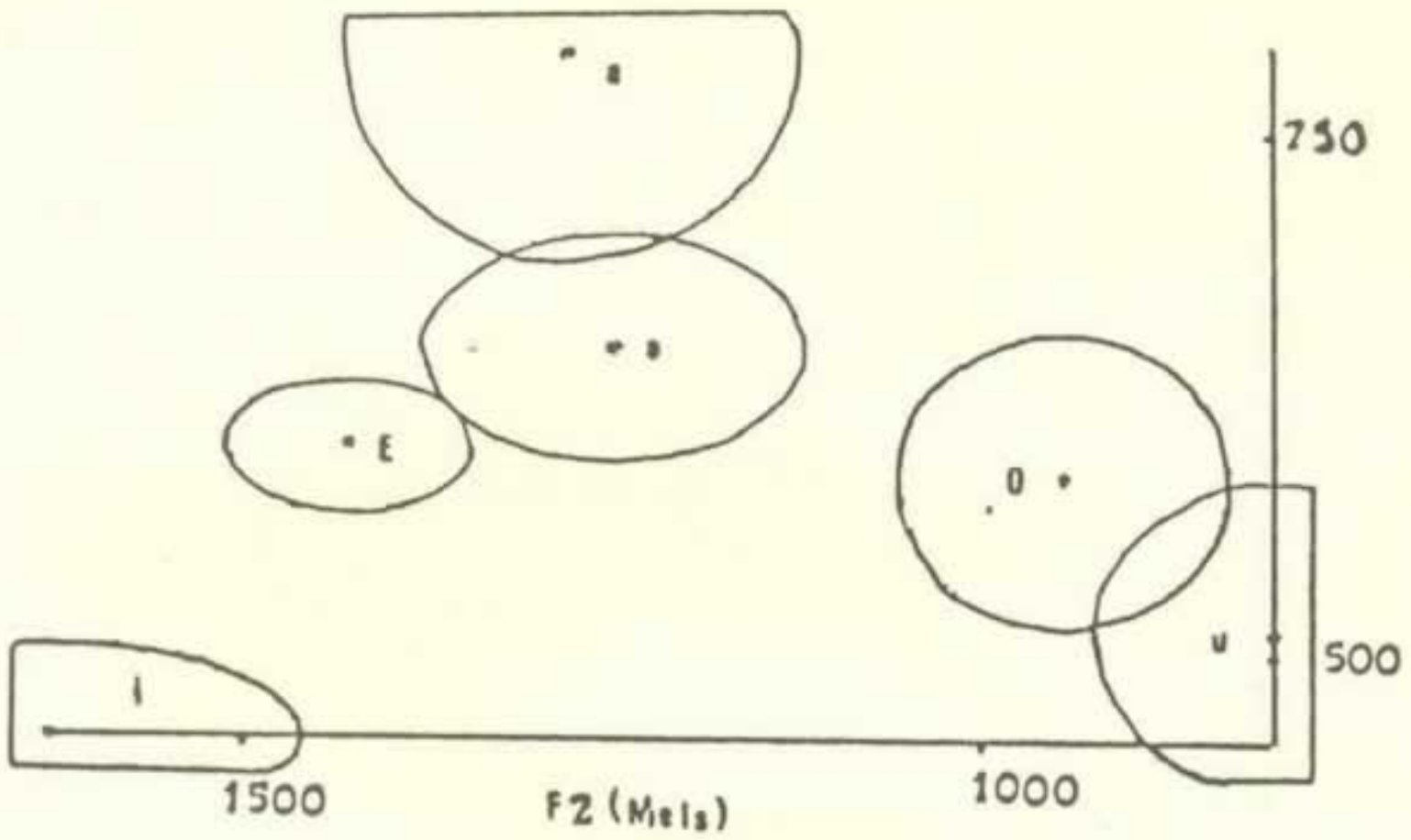
VILLAGE SAN BASILE

Fig. 4



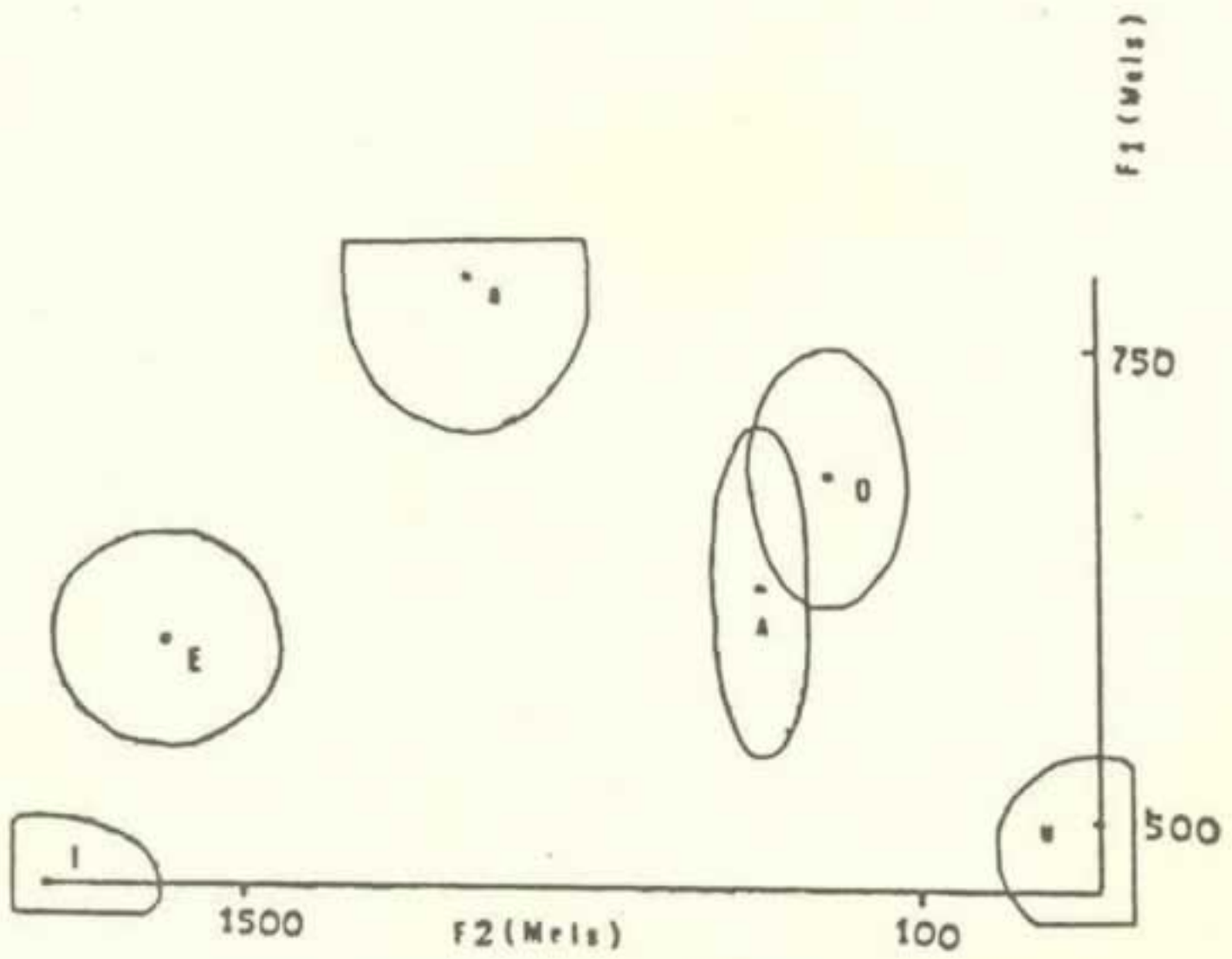
VILLAGE FRASCINETO

Fig. 5



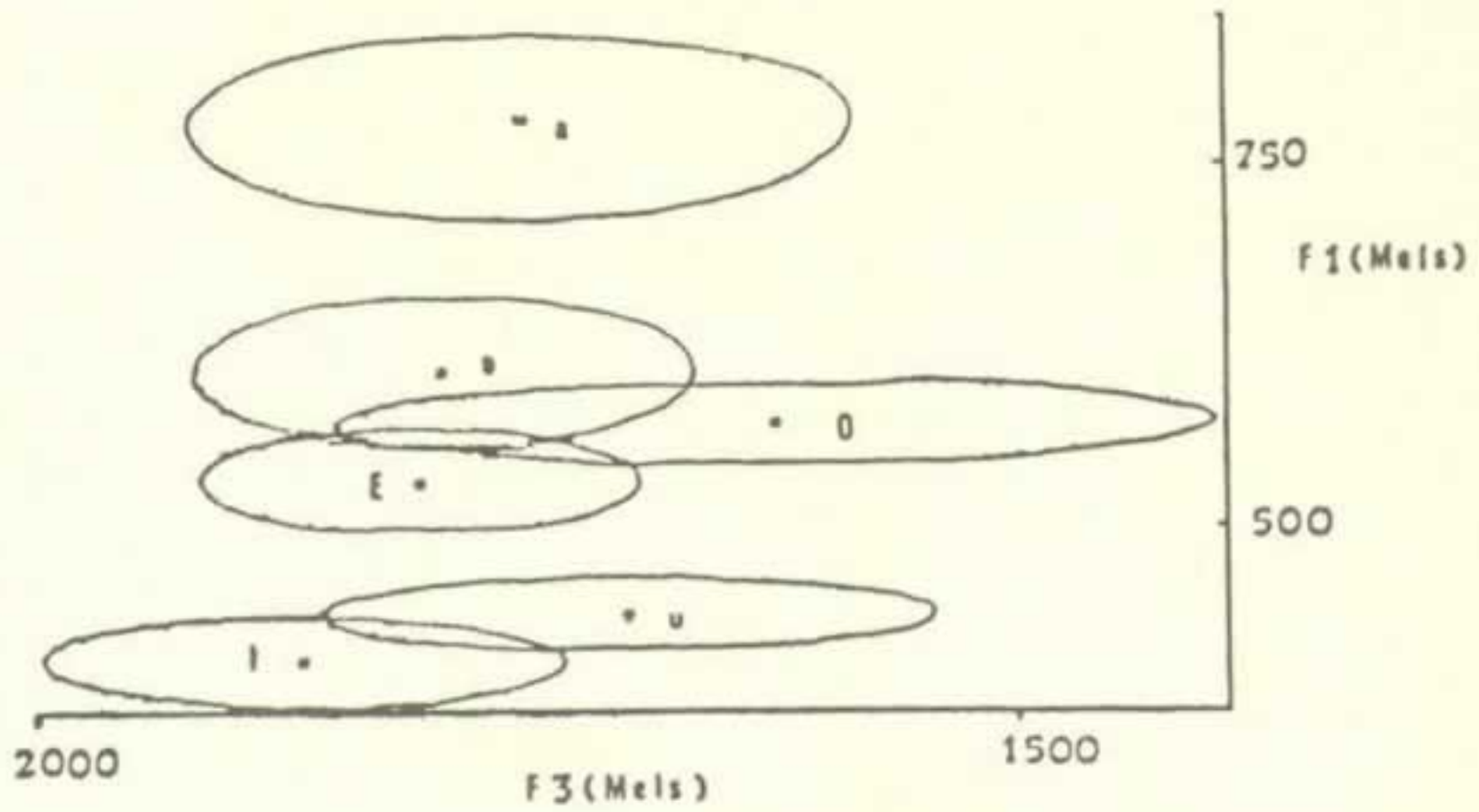
VILLAGE LUNGRO

Fig. 6



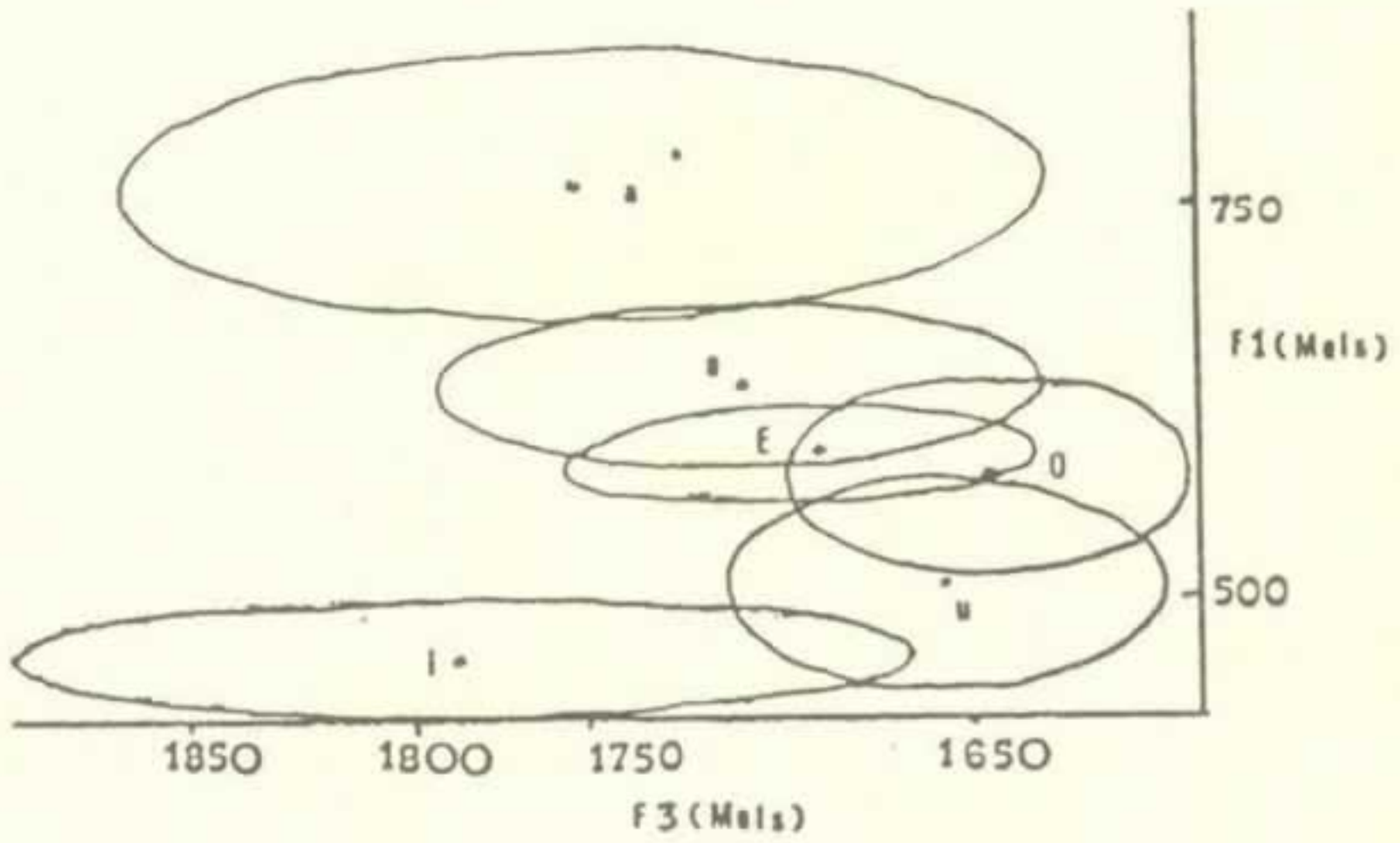
VILLAGE SAN BASILE

Fig. 7



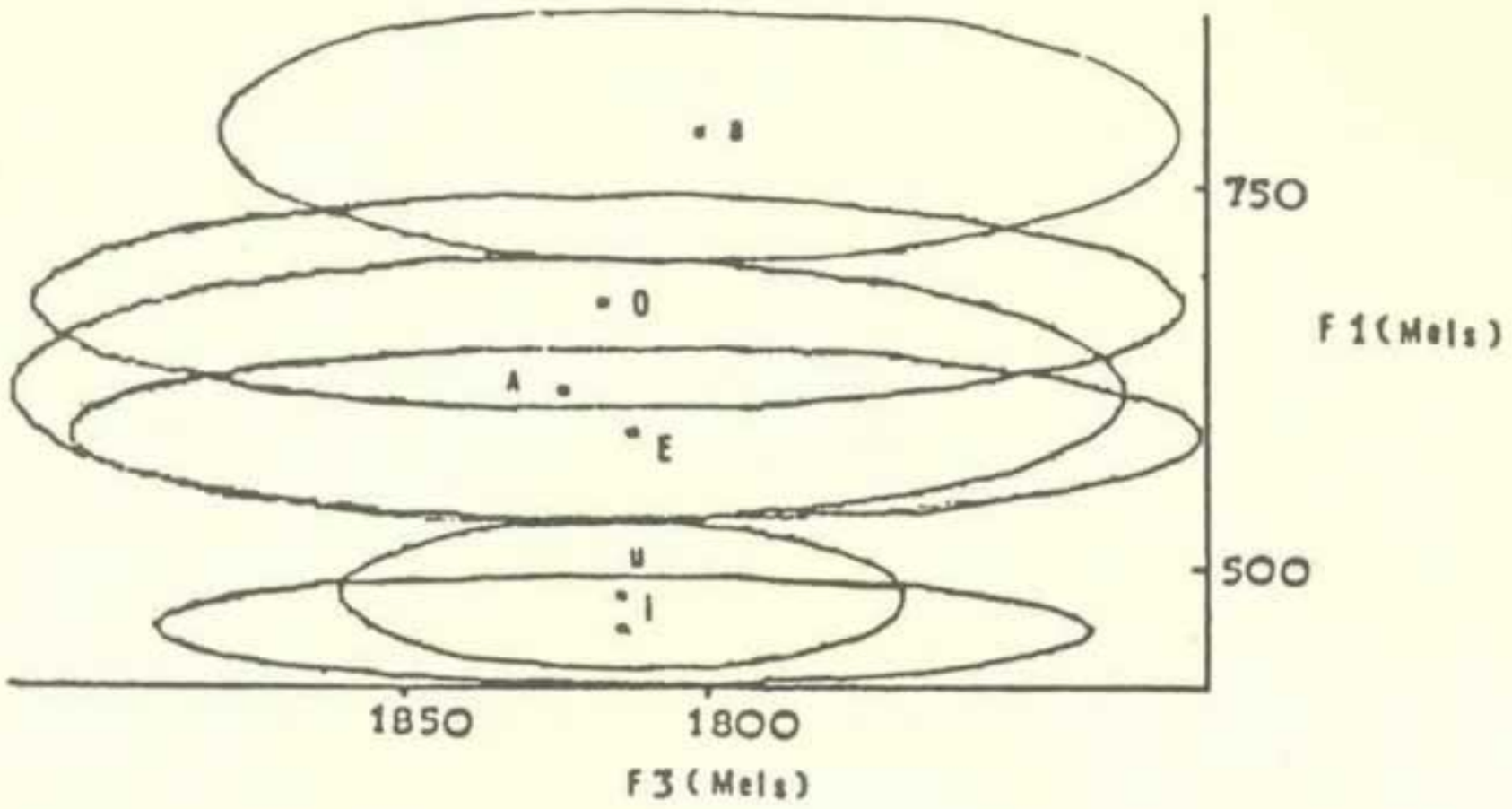
VILLAGE FRASCINETO

Fig. 8



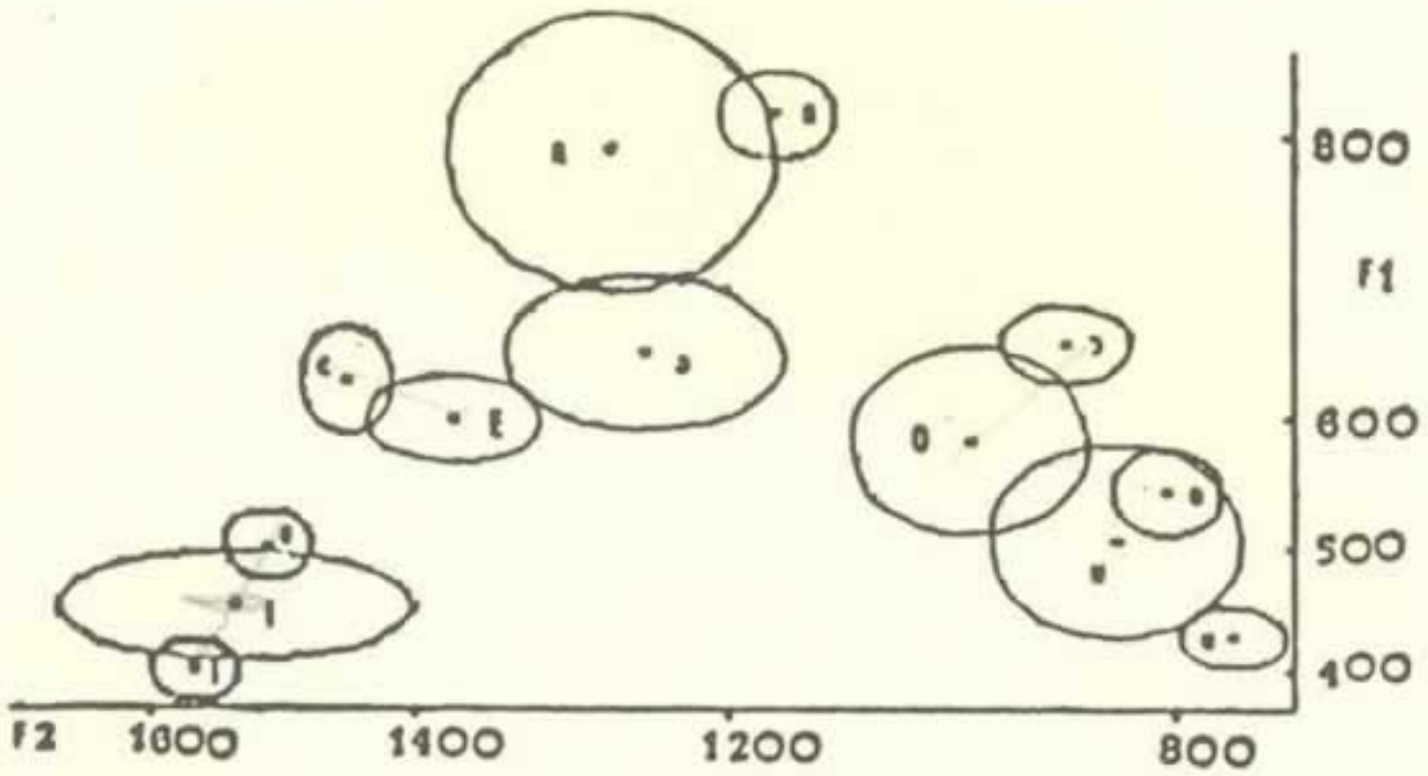
VILLAGE LUNGRO

Fig. 9



VILLAGE SAN BASILE

Fig. 10



CONFRONTO TRA ITALIANO E DIALETTO
IN TRATTO SEMPLICE DATI PER FRASCINETO
IN TRATTO DOPPIO DATI PER ITALIANO
IN X MEL F2
IN Y MEL F1