DIAPHONIC VOCOID VARIANTS IN INTER-LINGUISTIC CONTACT BETWEEN ENGLISH AND AFRIKAANS, AFRIKAANS BEING THE CONSTANT.

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PREFACE

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ABSTRACT

MOTIVATION

The object of this investigation is to record and describe various sounds and sound structures conditioned by inter-linguistic contact, as observed in the English speech of South African Bilinguals whose home language is Afrikaans.

SUMMARY OF CONTENTS

In Section A the phenomenon of bilingualism is discussed with reference to the findings of leading investigators into the field of contrastive linguistics.

Section B contains a brief contrastive analysis of phonetic and phonemic features of English and Afrikaans.

The main body of Section C is devoted to an auditory analysis of reading and "free speech" tests. Renderings by Afrikaans-English Bilinguals are matched against renderings of a Norm. The object was to explore and analyse the impact of native Afrikaans linguistic prejudices upon the quality of vocoids in citation forms and in the continuum of speech. Furthermore, several perception tests were used to establish whether native Afrikaans linguistic habits inhibit the aural perception and the identification of English vocoids. Correlates between the aural and the perception tests are recorded. Trends observed in the rendering of vocoids in the speech of Afrikaans-English Bilinguals are listed.

Section D contains the spectrographic analysis of English structures uttered by A.-E. Bilinguals and by the Norm. The results are compared with trends observed in the auditory analysis in Section C.

Section E contains a summary of methods and techniques in the teaching of English speech that follow upon the findings in Sections C and D.

CONTRIBUTION TO KNOWLEDGE

A comparative analysis of aspects of English and Afrikaans phonology on scientific principles constitutes some contribution to the body of knowledge of the discipline of contrastive linguistics.

Furthermore, language teaching in South Africa lacks a firm basis of principle, the science of language pedagogy hardly exists. A scientific contrastive analysis of live speech offers an excellent basis for the preparation of instructional materials, and this investigation, therefore, should provide a significant contribution towards that end.

CONTENTS

SECTION C

AUDITORY ANALYSIS

SECTION D

ACOUSTICAL ANALYSIS

SECTION E

METHODOLOGICAL INFERENCES

SECTION A.

INTRODUCTION

1. Scope of this Investigation.

The greatest single event that promoted and shaped the thoughts of scholars on bilingualism was the publication of Uriel Weinreich's epoch-making work "Languages in Contact" in 1953. André Martinet concludes his preface to the volume with the words: "We needed a detailed survey of all the problems involved in and connected with bilingualism by a scholar well informed of current linguistic trends and with a wide personal experience of bilingual situations. Here it is".

Weinreich regards languages as in contact when "they are used alternately by the same persons" (op.cit.,p.1) and defines "interference" as "those instances of deviation from the norms of either language which occur in the speech of bilinguals as a result of their familiarity with more than one language i.e. as a result of language contact",(op.cit.,p.1).

Einar Haugen (Monograph Series no.7,p.9) supports the tenet of interference held by Weinreich and stresses the need to extend the concept of description to include the issues involved when two languages are used by the same person. He proposes the term "bilingual description" for the methods that are appropriate for making systematic comparisons of languages.

Although the word "interference" is adequately defined above by Weinreich and, in my opinion, used dispassionately and in a non-derogatory sense, some socio-linguists, notably Joshua A. Fishman("Linguistics" no.39, 1968,p.21) and J.J. Gumperz ("Linguistics" no.39,p.29) object to what they regard as Weinreich's linguistic approach and to the use of the word "interference", which, according to Fishman, has a "pejorative connotation that a truly impartial science would have avoided", (op.cit.,p.29). He maintains that linguists have failed to notice the different degrees and amounts of "interference" that are situationally and functionally patterned. The linguist has seen his task in relation to bilingualism as "similar to that of a housewife looking for smears of paint: what (phonetic, lexical or grammatical) structures of language X have rubbed off on language Y and vice versa",("Linguistics" no.39,p.27).

So-called "free variation" has been unexplained and has been regarded as random fluctuations by linguists, whereas through socio-linguistically sensitive analyses it has been discovered that much of this variation is not free but corresponds to highly patterned usage by particular subpopulations. The socio-linguistic view regards bilingualism as the total behavioural functioning in society through the medium of two or more languages,(Robert F. Roemig in paper:"Bilingualism and the National Interest", Monograph Series no.23,1970,p.373). Gumperz in paper: "Verbal Strategies in Multilingual Communication",(Monograph Series no.23,1970,p.131) echoes Fishman's reservations and, while admitting that linguists "have discovered significant alternations in phonology, morphology and syntax", - phenomena that have certain linguistic features in common - maintains that "these features may have quite different social significance". To what extent the socio-linguistic approach synthesises and orders phenomena deriving from interference or language contact is not clear. Fishman in paper: "Sociological Inquiry into Bilingualism",("Linguistics", no.39,1968,p.31) claims that a socio-linguistic study of bilingualism can solve the "problem of generalization by finding a consistent set of parameters that relate micro-analysis to macro-analysis".

This tenet may hold for a bilingual community consisting of subsets of socially recognised aggregates, provided a particular variety of dialect is dominant within the periphery of this area with little overlapping, failing which the ultimate inference would imply complete componentialization and individualization precluding synthesis and generalization.

That language is a social fact needs no justification but a predominantly socio-linguistic approach would probably explain linguistic data through extralinguistic factors, (M.Le Roy,1967,p.95).

Apparently little field work has been done in psychology on interference phenomena in bilingualism,(J.E. Alatis, p.113). C.E. Osgood has some theoretical observations of a general nature which do "not present the results of research" as he and his associate editor Thomas A. Sebeok confess on page ix of the preface. However, he seems to anticipate the rearrangement of patterns in the speech of a bilingual when he states that "new sets of decoding and encoding habits (my italics) are formed in competition with the old"(op.cit.p.139) "when a person, after being proficient in his own, first language, starts learning a second language". Carrol (op.cit.p.115) is more specific. "Transfer problems at the psycho-motor level are illustrated by phenomena of foreign accent and inappropriate articulation of phones." He refers to difficulties in pronunciation of foreign sounds and ascribes these to both a "perceptual component and a motor component"(op.cit.p.115): the latter aspect obviously referring to the articulatory propensity of the native tongue to modify the quality of the phonation of the bilingual's second language. Carrol categorically puts the position of psycholinguistic research into bilingualism as follows: "I don't believe there is any psychologist yet who can give satisfactory answers to the questions that we might reasonably ask about transfer effects in foreign language learning: because few studies of transfer in psychology have dealt with transfer from one very highly learned system of habits to a new and different set of habits", (op.cit.p.117).

"Interference" still constitutes one of the basic conceptual problems of bilingualism. (See International Seminar on Description and Measurement of Bilingualism - 1967). Although this fundamental notion has not been delimited - for instance, when does borrowing become interference or interference become borrowing, to mention but one problem attached to it - there is general agreement that one of its characteristics is that it is some sort of deviation from the norm.

The present investigation is based on the live speech of bilinguals - the only datum on which linguistic research can be based. The term "interference" implies the rearrangement of patterns that result from the introduction of elements from Afrikaans into the English speech of a bilingual whose first language is Afrikaans. In the overt realization of English by an Afrikaans native, linguistic overlap between the two codes is observable - unless the speaker masters the two systems with native proficiency, in which case there can be no interference. I shall investigate the rearrangement of patterns in the phonic system of English as realised by an Afrikaans-English

Bilingual with special reference to the vowel-like sounds or vocoids. The forms of interference will be stated in terms of structural linguistics.

Although bilingualism is a phenomenon of many dimensions and research into language contact achieves increased depth and validity on an inter-disciplinary basis when co-ordinated with sociological and psychological considerations so that more complete findings could be expected from the synthesized efforts of all the disciplines relevant to the problem, this investigation does not presume to exhaust the subject and will be limited to exploring interference in descriptive linguistic terms deriving from the phonology of English and Afrikaans, with special reference, as stated above, to the vocoids in the English speech of an Afrikaans-English Bilingual.

A.2.

Defining an Afrikaans-English Bilingual.

Bilingualism has been variously defined. Haugen, in a discussion after a paper, "Linguistic Convergence in Immigrant America" by Weinreich,(Monograph Series no.7, Sept.1954,p.52), defined it as beginning "at the point where the speaker can produce complete meaningful utterances in the other language". Confronted by the problem of adequately defining "meaningful utterances", he revised his definition somewhat in 1956 and described bilingualism as a cover term for people with a number of different linguistic skills, having in common only the fact that they are not monolinguals,(Haugen: "Bilingualism in the Americas", p.9).

Bilingualism has also been defined as the ability to speak two languages equally well. Native proficiency is not a necessary ingredient of bilingualism. Indeed, the linguistic problems involved in bilingualism are based upon the empirical fact that the bilingual deviates from a norm because of the influence of another language. Another language learned simultaneously with a native language or later duplicates in many ways the functions of the native system and involves the alternate or modified use of the same physical organs with concomitant differences in the quality of the realizations. If there were no deviation there would be no interference. "In so far as the bilingual succeeds in keeping the languages apart, he is two separate speakers in one person, and there is no bilingual problem",(H. Vogt. Quoted by Haugen in "Bilingualism in the Americas", p.11). At the International Seminar on the Description and Measurement of Bilingualism at the University of Moncton in 1967, (p.42), E.G. Malherbe described bilingualism as the co-existence in the same individual or community of two distinct sets of linguistic symbols of communication. At the same seminar John Macnamara introduced a new parameter into his tenet viz. that of reading, (p.82). "I shall consider", he says, "as bilingual a person who, for example, is an educated native speaker of English and who can also read a little French". This means that bilingualism is being treated as a continuum, or rather a series of continua, which vary among individuals along a variety of dimensions.

One might also include a passive bilingualism: understanding without the ability to communicate overtly. Perception and reproduction and correlation or lack of correlation between the two phenomena will be referred to in Section C under the relevant heading.

Native proficiency in both English and Afrikaans and passive bilingualism do not come into the ambit of this thesis. In South Africa the learning of both English and Afrikaans is mandatory in all government schools in the "white areas" i.e. areas not under the jurisdiction of the governments of the different Bantu peoples. The study of the two official languages involves reading, writing and speaking. Examinations conducted at all levels of promotion and at the school-leaving stage include tests in all three disciplines. The result is that an Afrikaans-speaking native can read, write and speak English with varying degrees of ability: he is, therefore, in possession of two sets of norms; his native Afrikaans, and the English which he learned at school. The learning of English at school may or may not have been supplemented by a process of natural assimilation as a result of exposure to the language when associating with native English compatriots in different environments. The average Afrikaans-English Bilingual or A.-E. Bilingual would thus represent Afrikaans natives who can read, write and speak English with different degrees of variation from the standard norm.

A.3.

Contrastive Linguistics.

Linguistics lacks a term descriptive of the discipline of comparing and contrasting languages. Leonard Bloomfield, (1950,p.445), used the term "sound substitution" with reference to phonological interferences arising from two systems operated by the same person. Initially, investigators attempted to give a mere description of the "mispronounced" sounds, but, later, scholars searched for the causes of mispronunciation in the transference of native language prejudices to non-native structures. With the development of the phoneme theory the measuring and characterizing of the transference presented special difficulties. If the concept of the phoneme is limited characteristically to only one system, how could a "non-existent system" be described in phonemic terms? Weinreich (op.cit.,p.14) poses the problem of interpreting, in functional terms, the sounds used by a bilingual, as they lie in a "structural no man's land between two phonemic systems". In 1956 Haugen, (op.cit., p.4) proposed the term "dialinguistics" as a possible name for interlingual confrontation. Two years previously he had suggested the terms "diaphones" and "diamorphs" to identify interlingually defined phonemic structures. Bright, (Monograph series, no.23, 1970, p.4) was less explicit in his description of interlingual contact and declared that "linguistic diversity" was the essential criterion of the field of contrastive linguistics. Mackey (Monograph Series, no.23,1970,p.4) stated that the linguistic tenet of a distinction between "langue" and "parole" should be reassessed in the light of data supplied by bilinguals. He assigned bilingualism to the domain of "parole" as a characteristic of the idiolect of the individual speaker. In opposition to this view Dingwall,(Monograph Series no.23, 1970,p.4) used the term "diglossic", posing the co-existence in the same environment of the high prestige native structure and of a low prestige idiom characterised by the modifications caused by the transference of native language habits to the non-native system.

The Modern Language Association of America has published a number of volumes comparing and contrasting the phonology and morphology of the most widely used modern languages in America. One of the volumes is, "The Sounds of English and German", by W.G. Moulton (1962). These projects are motivated by a desire to highlight sound and structural differences between English and the other languages to facilitate and promote the learning of English by non-native speakers of English. Reference has already been made to the International Seminar on the Description and Measurement of Bilingualism in 1967.

The brief references above are sufficient evidence to prove that the co-existence in the same person of more than one linguistic structure has gradually become the subject of increased interest to investigators both for utilitarian purposes and for the scientific study of the phenomenon.

A.3.1.

Co-existence of Different Linguistic Structures in the Same Speaker.

Reference has already been made to the existence of different systems in the same individual. Co-existent systems are relevant to any situation characterised by a symbiosis of languages as the bilingual lives in a non-homogeneous speech community.

W.F. Leopold (Monograph Series no.7, 1954,p.19 et seq.), in describing the language learning of his own daughter observes that in the area of bilingual learning of small children "infants exposed to two languages from the beginning do not learn bilingually at first, but weld the double presentation into one unified speech system". Whether data based on the observation of a single English-German child justify generalization is open to question. However, Leopold is a professional linguist who states his observations in linguistic terms. He transfers this hypothesis to adult bilingualism. "The natural thing for both children and adults seems to be to operate with one language system, and the walls between the two systems are brittle, unless bilingualism is cultivated with effort", (Monograph Series no.7, Sept. 1954,p.30). One of the fundamental differences between Leopold's daughter and the position of A.-E. Bilinguals in South Africa is that the former was highly motivated and had to speak to communicate her wishes, whereas the majority of Afrikaans natives in South Africa study English for institutional purposes.

Weinreich,(1953 & 1970), Leopold, (1954), quoted above, Vildomec,(1963), Gumperz, in paper: "Communication in Multilingual Societies",(Monograph Series no.23,1970,p.19),Haugen(1970), Mackey, in paper: "Interference, Integration and the Synchronic Fallacy",(Monograph Series no.23,1970,p.195),R.di Pietro in paper: "The Discovery of Universals in Multilingualism", Alatis,(1968), and others, support the fundamental tenet implied in Leopold's observation, namely, that divergent linguistic systems do not exist as two or more monolithic structures in the same speaker. Vildomec,(1963), supports the idea of reconstruction of both sequential and non-sequential features and observes that, if the bilingual does not distribute the non-sequential features in accordance with a native habit, he speaks the language with a foreign accent. As early as 1953, Weinreich's dictum of "double interference" warned the native listener that his perception of what constitutes foreign accent is subject to the built-in prejudices of his native system.

The co-existence of different linguistic structures is revealed in overt verbalization as a succession of an infinite number of variable competences and cannot, therefore, be defined in absolute terms. The non-native realizations represent points in a continuum from one language to another, whence the necessity of matching the succession of competences against a single representative norm to obviate the disentanglement of foreign accent from dialectal deviations. The norm will be referred to in Section C.

With reference to the co-existence of structures, Haugen, (Monograph Series no.23,1970,p.6), uses the following German nomenclature to illustrate his tenet. The acquisition of the second language is referred to as "AUFBAU", the aphasic dismantling as "ABBAU", and the bilingual's reconstruction as "UMBAU". The object of studies of bilingualism would then be to try to establish in what way a language has "been rebuilt or UMGEBAUT" by virtue of the co-existence of two languages.

Mackey,(Monograph Series no.23,1970, p.195 et seq.), discusses another aspect of the co-existence of linguistic structures. He distinguishes between "code" and "message", and draws attention to the operation of separating the integration of foreign elements into the code of the bilingual from the interference of such elements in the message or speech. By the same token he differentiates between elements entering the speech of bilinguals from another language that may be repeated with such consistency as to give the impression that they have been transferred to the native system and integrated into its code. This poses the problem of distinguishing between borrowing and interference - one of the most difficult puzzles in the study of the co-existence of different structures in the same speaker. R.J. di Pietro,(op. cit. p.15), concludes that the language systems of bilinguals could either be maintained separately or "merge somehow".

Although the body of data on bilingualism is diversified, there appears to be general agreement on two aspects of the co-existence of divergent systems in the same individual: provided the bilingual operates two systems with native proficiency, the two systems may be said to be maintained separately. Such cases are rare. But, in the average bilingual, the native system is dominant. Its dominance is evident in that the realization of the foreign system is characterised by the imposition of elements of the native structures upon the foreign system.

A.3.2.

Phonemes of one Language Incommensurable with those of all Others.

At the first International Congress of Linguists at the Hague in 1928, R. Jakobson, S. Karcevskij and N.S. Trubetzkoy presented their famous "Proposition 22", which marks the birth of the new discipline of phonology. The proposition deals with the "significant differences" that characterise the elements of every phonological system and of the "phonological correlations" that are constituted by series of binary oppositions (Le Roy, 1967,p.64). One of the fundamental concepts of Trubetzkoy's tenet is that in languages there are only differences. This is the prelude to the establishment of phonemic contrasts by commutation tests and the identification of allophonic variants by the criterion of complementary distribution. The difference between phonetics and phonology is that the former has to do with the organic production of sounds, but the latter envisages, as far as sound is concerned, that which "fulfils a definite function in langue",(Trubetzkoy, quoted by Le Roy, op.cit.p.66).

Trubetzkoy defines a phoneme as "the sum of the phonologically pertinent features of a phonic image"(Quoted by Le Roy, op.cit.,p.68). The words, "phonologically pertinent features", demand closer circumscription, but the significant elements in this definition are that the phoneme is not equated with a phonic image and, furthermore, that it consists of a sum of features. The distinctive element of opposition that individualises the phoneme would be stated with greater clarity by the descriptivists and structuralists. Individualization, the analysis of speech into distinctive units, constitutes one of the fundamental tenets of the phoneme theory.

Daniel Jones, (1950,p.8), quotes Wingfield, who defines a phoneme as "a group of speech sounds nearly enough alike to be treated as a unit for alphabetic purposes". If "alphabetic purposes" refers to orthography, it is an ephemeral norm with which to correlate speech sounds to; but the idea of a group of speech sounds recurs in this definition. Jones correlates his definition with realizations. He defines a phoneme as "a family of sounds in a given language which are related in character and are used in such a way that no one member ever occurs in a word in the same phonetic context as any other member"(Jones 1950,p.10). Jones admits that the words "related in character" are rather vague, since it is impossible to specify what degree of dissimilarity will prevent two sounds from belonging to a single phoneme. However, Jones's definition incorporates the most important components of the phoneme concept, viz.: it is not a sound, but a class of sounds; the members of the class are characterised by phonetic similarity; and the members are not interchangeable in contexts. A.C. Gimson, (1965,p.44), reduces the definition of a phoneme to a brief statement stressing its contrasting function: it is "the smallest contrastive linguistic unit which may bring about a change of meaning".

Brief reference should be made to David Abercrombie's view of the phoneme theory. Phonemically language is analysed in linear sequence. He disapproves of the temporal segmentation according to which "the aural medium is treated as if it were closely parallel to the visual medium", (Abercrombie, 1966, p.121). He critically calls it the "posture and glide" view of speech. His parametric approach conceives of language as "patterns of movement" which define the producing-process of speech in parametric terms. He lists physiological parameters (a) in the respiratory system, (b) in the phonatory system, and (c) in the articulatory system. Each of these is in turn divided into a number of sub-sections. However, he does regard the phonemic approach "for many purposes quite a useful one" and admits that his parametric approach "is always a valuable supplement (my italics) to a segmental approach".

The above references to the phonemic approach sufficiently illustrate that it is characterised by variations within certain restrictions, and that it is contrastive and individual. The last aspect will be referred to briefly as it is the most salient feature relevant to an investigation into bilingualism.

The phoneme belongs to one language. It is limited in its application to a single structure. In 1951 Harris claimed that the universe of discourse for a descriptive linguistic investigation is a single language or dialect. Haugen, 1956, posited that statements of linguistic structure are limited to one structure. R.H. Robins (1964, p.128), recounts the descriptive procedure dictated by the phoneme theory. "In terms of the phoneme theory......languages can be shown to organise the selection they make of the available sound differences in human speech into a limited number of distinctive recurrent units". Robert Politzer in paper: "Developing Cultural Understanding through Foreign Language Study", (Monograph Series no.7,Sept.1954, p.101), points out that the distinctive aspect of the phoneme implies that two systems cannot be compared phonemically. If we compare, for instance, English /i/ and Afrikaans /i/, we compare them only as phonetic realizations, we compare phonetic substance; but as phonemes, that is, from the point of view of function within their systems, they are incomparable. Weinreich's famous dictum that the phonemes of one language are incommensurable with those of all others, has apparently clinched any attempt to utilise the phoneme for inter-lingual investigation.

With the exception of Haugen and Weinreich, none of the authors quoted above has considered the issues involved when two systems merge. Are the realizations of a bilingual speaking his L2 to be stated in phonetic terms only or can cross-linguistic overlapping be stated in phonemic terms? These issues will be discussed in the following sub-sections.

A.3.3.

Is "Interference" Evidence of Inter-linguistic Identifications Made by the Same Speaker?

"Interference" is a controversial concept about which much has been written. The words "deviations from the norms of either language" in Weinreich's much-quoted definition, would imply that both L1 and L2, the native and non-native systems respectively, are affected as a result of language contact. He quotes Hans Vogt, who, at the International Conference of Linguistics in 1949, posited that every impoverishment or enrichment of a system involves the reorganization of all the old distinctive oppositions of the system. "To admit that a given element is simply added to the system, which receives it without consequences for this system, would ruin the very concept of system"(Weinreich, op.cit.,p.1). Paul Garvin, in his discussion of Weinreich's paper: "Linguistic Convergence in Immigrant America",(op.cit.,p.54),differentiates, in any state of bilingualism, between co-existing patterns and loans. In his view, language switching is evidence of co-existing patterns, whereas loans are an example of interference. It is easy to keep these processes apart conceptually, but in the empirical situation the difference is not always clear. Whether the process involved be "loan" or "interference", each implies co-existing patterns. The same applies to processes designated as interpolation, linguistic borrowing, merging or coalescing and the rearrangement of patterns. A "bilingual state" is implicit in each and the investigator observes the result of interference in the act of speech. Haugen's threefold division into integration, interference and code-switching, has been hailed by Nils Hasselma as the most explicit statement of degrees of integration. These divisions may indeed be termed degrees of integration and could, academically, be regarded as categories of the co-existence of systems; but it would be more than a challenge for the investigator to correlate modifications in the rendition of the bilingual to each of these degrees of integration.

In this investigation, bilingualism implies the co-existence of two systems of divergent codes in the same individual with the native system dominant. The approach is synchronic, with the result that language switching and borrowing, in the sense of the insertion of an English structure into an Afrikaans utterance, are regarded as random interpolations for the nonce. Speech switching and borrowing are much in evidence throughout South Africa. Whether these operations stem from linguistic, psychological or sociological motivations, or a combination of all three, has still to be investigated; but they are observed among communities of all cultural levels. The switching is usually preceded by some such parenthesis as, "soos ons in Engels sê" (literally "as we say in English"),and the quality ranges from renditions in the Afrikaans phonemic system to renditions of native proficiency depending upon the linguistic sophistication of the speaker. The switch is usually made at lexeme boundaries, but it also occurs within the structure of a single word, in, for instance: "Ek moet dit opfieks" ("I must fix it up"). Normally, however, it embraces one lexeme or a cluster of lexemes. R. Jakobson, C.G.M. Fant and M. Halle, in "Preliminaries to Speech Analysis", 1955, p.12, refer to a mode of speech switching which has no counterpart in South Africa, namely, urban colloquial Czech, which is an oscillation between the literary language and vulgar Czech, "each of them displaying its own phonemic pattern". A rare type of bilingualism is recorded by Scerba. He mentions bilingual Sorbians who have only one language with two modes of expression, i.e. they possess one set of signifieds with two signifiers each (quoted by Weinreich, 1953, op.cit., p.9). Haugen, in paper: "The Phoneme in Bilingual Description",(Allen, p.124), cites a most unusual case of bilingualism: a Norwegian who operates two languages with one phonemic system. Every utterance in English is realised in his native phonemic structure. And, his English is intelligible!

The pertinent problem posed by the bilingual and extraordinary cases such as those cited above, is, to what extent is interference, in the act of speech, characterised by inter-lingual identification? When the A.-E. Bilingual speaks English he equates structures with his dominant native Afrikaans. I doubt whether he is confronted by a deliberate binary choice, namely, of rendering a structure in its original code, or of merging it with his native code. The bilingual automatically and unconsciously identifies it with some similar structure in his native code. Even a conscious attempt to encode in the phonemic structure of L2 will be subjected to the constraints imposed by his native phonological system. Schor, in an unpublished thesis on "English Loan Words in some American Immigrant Languages",(quoted by E. Haugen, "Bilingualism in the Americas", p.34), refers to what he terms a kind of "filtering" of elements of L2 through a screen set up by L1. He quotes the example of a Spanish speaker who will, at first, identify all three final contoids in English: "sun, sung and some" with his native /n/, as this is the only nasal contoid that occurs finally in his own language. This is essentially an instance of under-differentiation, but at the same time it provides evidence of merging or overlapping. In regard to inter-linguistic identification, Nils Hasselma, in paper: "How can we Measure the Effects which one Language may have on the Other in the Speech of Bilinguals?"(L.G. Kelly, 1967, p.125), observes that linguistic integration is a process of the "adaption of imported items to the phonology........of the recipient language".

Summarily, interference as defined by Weinreich and as explained by most investigators, implies, in the act of speech, modification of the norms of one or two systems. Modification must either tend towards the evolution of an entirely new system or it must be related to one of the two existing systems or to both. Encoding a new system unrelated to the norms of two existing systems must be discounted as an organic impossibility. Observation and research work have corroborated the premise that the native system determines, to a degree, the "norm" - in the sense of a modified system - of the variety of L2 realised by the bilingual. The variety realised is an inter-lingual variety. Inter-lingual identification constitutes the condition for interference and determines the L2 rendition of the bilingual.

A.3.4.

Bilingual Description not Equivalent to Two Monolingual Descriptions.

Weinreich's previously quoted dictum, namely, that the phonemes of one language are incommensurable with those of all others, is a concise statement of a corollary of the phoneme theory. The phoneme is limited to one system at a time. Jakobson, Fant and Halle, (op.cit.,p.11), reaffirm the individual aspect of the phoneme by observing that establishing the phoneme patterns of a language implies the assumption that in its sound shape "any language operates with discrete (my italics) and polar distinctive features". In a bilingual situation, they aver, the task of phonemic patterning is complicated in cases of co-existent phonemic systems.

The limitation of the phoneme to one system does not provide for phenomena of inter-linguistic contact. However, inter-lingual identification is part of bilingual behaviour and would therefore warrant bilingual description. A bilingual description is more than two monolingual descriptions laid side by side in as much as it aims at describing the inter-linguistic identifications in the speech of a bilingual. Weinreich acknowledged this and in a footnote to page 8 of his "Languages in Contact", states that while the forms of expression and content in each language are incomparable and incommensurable, certain overlappings in the substance of the expression and the content suggest their cross-identification to the bilingual. Jakobson, Fant and Halle, (op.cit., p.11), use the phrase "phonemic patterning" with reference to the complicated process involved in a bilingual situation.

Later Weinreich revised the chapter on "Phonic Interference" in his "Languages in Contact". This was after he had consulted Haugen and some other linguists. In the revised version he distinguishes, on phonemic level, between syntagmatic and paradigmatic factors, the former involving the segmentation of sound sequences, the latter phonemic contrasts and the distinctive feature analysis of phonemes. He goes a step further in his concession to bilingual description and supports Haugen's premise of diaphonic variants. "Whatever role is assigned to the distinctive features in analysing the allophones of a given language, when the cross-language equivalences between allophones have been established......there can be no objection to the adoption of Haugen's procedure for classifying them into 'diaphones' (inter-lingually identified phonemes) of various types" (U. Weinreich: "On the Description of Phonic Interference", Kelly, op. cit., p.126).

Brief reference should be made to Haugen's thesis. (vide: E. Haugen: "The Phoneme in Bilingual Description", Kelly, op.cit., pp.120 et. seq.). Statements on linguistic structure are limited to one language. English and Afrikaans cannot, for instance, be described in terms of a single linguistic code. The phoneme theory, "invoking the dimensional notion of linguistic segments", has individualized structural elements and prescribed procedures in descriptive linguistics. The limitations of its dictates exclude the description of phenomena arising from inter-linguistic contact. Furthermore, the contrastive sound elements in each language are limited in number. Each contrastive sound unit consists of a class of sounds: it is the sum of its variants. The phoneme may thus be defined in two dimensions. It is the sum of its variants or allophones which are correlated to the structural environment. In its phonetic characteristics it is a free variant correlated to the individual speaker. The free variants may be called "variphones". These two aspects of the definition of a phoneme are limited to a single code and make no provision for inter-linguistic communication. Inter-lingual identification introduces a new dimension into linguistic realization. This realization has a status which is neither that of the allophone nor of the variphone. Can the phoneme be used in the context of bilingual description? Haugen maintains it can, provided that, what he metaphorically calls a third dimension is added to its definition. The realization of the bilingual requires a third category of phonemic variants. This third category he has labelled a "diaphone". (This is not to be confused with Daniel Jones's "diaphone" - a term which he uses to designate free variation at the word level within the same language or dialect.).

Fishman, (op. cit.,1968, p.30), ascribes virtual autonomous identity to cross-language identifications. He castigates the structuralists for not having approached bilingual speech in an impartial way, i.e. as an unknown structure demanding the same approach as an unknown variety of talk. They have "failed to note that certain subsets of speakers did not at all view their talk as consisting of 'now x, now y', but, rather, 'part x, part y' or even of 'x and y', but, rather, viewed it as simply a kind of 'x' or a kind of 'y', or, not unusually, as 'z', that is, as a variety in its own right".

The words "a variety in its own right" probably refer to the procedure of analysis and not to identity. Fishman's words obviously do not designate a code entirely unrelated to the two structures operated by the bilingual, but rather a system that, because of its differential value, warrants identification and description in its own right. The fact that the inter-lingual identifications made by the A.-E. Bilingual are predictable within certain contexts, that they can be tested by experimentation and observation, is additional motivation to ascribe to them a status, commensurate, as far as analysis is concerned, with that of a differentiated system.

It is evident that parallel descriptions of two monolingual codes cannot be equated with a bilingual description. The cross-language realizations are different from either of the two monolithic codes.

The merging of systems and the resultant realization of the bilingual raises the problem of its relation to Saussure's differentiation between langue and parole. The acceptance of a distinction between language and speech must assume that every speech event belongs to a definite language. Only on this assumption is it possible to conceive of an utterance containing elements uniquely characteristic of that utterance or parole, "the concrete individual act of the speakers who use the system in a given situation",(Le Roy, op. cit., p.54). The problem posed is the status of the renditions of the bilingual. Can the status be referred to parole? If so, then the bilingual operates an individualized system which must, in turn, reflect the status of langue as "these two objects are intimately bound up together and each presupposes the existence of the other"(Cours: Translated by Glanville Price, p.24). If the cross-language rendition of the bilingual is equated to parole, it is invested with the status of a language - and this it is not. It evolves from the interaction of two systems and arises from the inability of Native A to render system B as a Native B because of the interference of his native code. It does not presume to have the identity of parole, because it does not constitute a linguistic code in itself with the status of a language. Since differentiated linguistic structures may be called monolithic, we could coin the term "dilithic" to identify it.

Bilingual description is obviously not to be equated with two monolingual descriptions.

A.4.

Hypothesis: The average A.-E. Bilingual does not operate two linguistic systems alternately (language switching), but phonologically he operates a system with a new dimension astraddle two linguistic systems.

The simplest evidence of linguistic influence is that in which one item is taken out of one language and used in the context of another; for instance, the word "box" in the following Afrikaans utterance: "Sit die boks op die tafel". ("Put the box on the table".) Before it was transferred, "box" showed the phonemic structure characteristic of English. In the context of Afrikaans the phonemic structure of the word is modified by features of the Afrikaans structure. Should the Afrikaans native utter the whole sentence: "Put the box on the table", then a somewhat similar process will take place, but with this difference that the utterance will be modified within the periphery and by the bias of the entire Afrikaans phonological system. To which of the two languages is the stretch of speech to be assigned?

Identification of the realization of the A.-E. Bilingual can be done only when we have what Haugen calls a "base line" from which to start: a state of language or languages immediately preceding the bilingual's rendition. In the case of the A.-E. Bilingual the identification of his realization presupposes a descriptive analysis of the two systems involved, namely, English and Afrikaans. If his realizations accord with the English system, then, obviously, his speech must be assigned to English, and if they coincide with the Afrikaans system, then likewise, his speech must be assigned to Afrikaans. If, however, the A.-E. Bilingual's speech has to be assigned to the two codes simultaneously, then he operates a system astride the two linguistic structures. The hypothesis of the present investigation is that the A.-E. Bilingual operates a cross-language system.

SECTION B.

PHONETICS AND PHONEMICS

B.1.

Vocoids Defined.

Speech sounds are traditionally divided into two categories: vowels and consonants. In accordance with modern trends the terms "vocoid" and "contoid" will be used to designate phonetic types of vowel-like and consonant-like sounds respectively, and the terms "vowel" and "consonant" will be applied to phonemes or linguistic categories.

Daniel Jones, (op. cit., p.22), defined a vocoid as "a voiced sound in forming which the air issues in a continuous stream through the pharynx and mouth, there being no obstruction and no narrowing such as would cause audible friction". W.G. Moulton, (op. cit., p.6), narrowed down the definition to "sounds articulated in such a way that the breath stream flows unhindered along the medial line of the vocal tract". The operative word "medial" would eliminate the problem attached to the classification of lateral [l] as, in articulation, the air swirls past either one or both sides of the tongue and not along the centre. In the above definitions the criterion of distinction between vocoids and contoids is one of stricture.

Another criterion of distinction has a predominantly linguistic significance: vocoids generally having a nuclear, syllabic function whereas contoids are marginal. This definition poses the problem of the status of syllabic consonants in: "little, button" etc., phonemically /litɫ̩/, /bʌtn̩/, but, read in conjunction with the criterion of stricture and the flow of the breath stream along the medial line, it is evident that the narrowing in the articulation of syllabic consonants involves stricture and closure.

From the above definitions it is clear that the distinction between vowels and consonants is not arbitrary; on the contrary, it is based upon physiological differences and structural patterning. Contoids are most easily described in terms of their articulation, as the visual and tactile processes involved in their production are readily perceptible. But articulatory description of vocoids demands a predominance of auditory impressions, as the physiological parameters involved in their production depend largely on slight variations of the tongue position.

A further distinction between vocoids and contoids is based on acoustic considerations, namely, on relative sonority of the sounds. Sonority, audibility or carrying power depends upon the inherent quality or timbre of sounds. It is to be distinguished from prominence which again depends upon various features accompanying the production stage of sounds. All other features being equal - length, stress, etc. - sounds classified as vocoids are more sonorous than contoids.

An acoustic description of vocoids can also be given in terms of disposition of characteristic formants. Spectrographic analysis of any CV or VC structure displays a spectrum in which contoids are characterised by frictional modulations with or without a voice bar, depending upon a

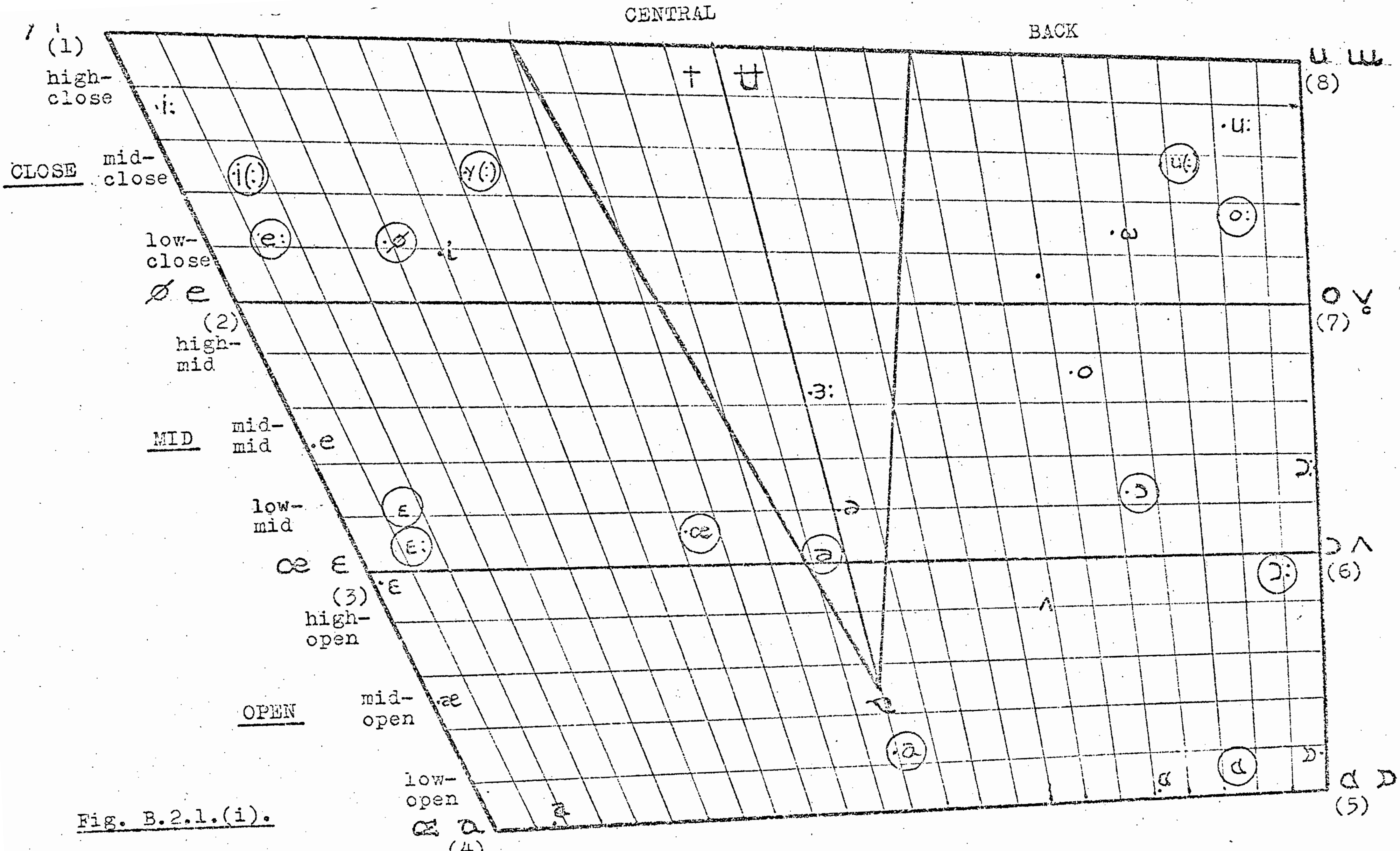

CENTRAL
BACK
(1)
high-close
CLOSE
mid-close
low-close
(2)
high-mid
MID
mid-mid
low-mid
(3)
high-open
OPEN
mid-open
low-open
(4)
(5)
(6)
(7)
(8)

Fig. B.2.1.(i).

voiced or voiceless articulation. Vocoids, on the other hand, are characterized by formants which are frequency regions of high energy concentration corresponding to the passbands of the resonance cavities in the vocal tract. These formants are characteristic components of the quality of sound and reflect the phonetic quality of the relevant vocoids.

B.2.

Two-dimensional Vocoid Diagram.

Fig. B.2.1.(i) depicts a schematized assembly of the conventional two-dimensional vocoid diagram. It displays the tongue positions of the Cardinal Vowels and the approximate tongue positions of average English vocoids, after Gimson, and of average Afrikaans vocoids according to Pienaar and Le Roux, (op. cit., p.46). The terms R.P., Southern British English, British English or simply English are used interchangeably. It must be borne in mind that vocoids depend largely on very slight variations of tongue position. For this reason it is inadvisable to attempt to be over-precise in pin-pointing the location on the vocoid chart which in effect, represents the height of the hump of the tongue in vertical and horizontal phases in the articulation of the vocoids. The vocoid chart is thus ruled in squares to facilitate the location of the approximate area of articulation. Furthermore, as two renderings can hardly be identical, allowance must be made for variability within certain scales of tolerance. Jones was fully aware of this when he referred to the tongue positions of "average" English vowels. The same would apply for the positioning of the Afrikaans vocoids. The average or dominant area of production is reflected in the diagram, and in the case of the English vocoids, these areas represent the rendering of the Norm against which the renderings by the A.-E. Bilinguals are matched.

Examination of the comparative vocoid diagram reveals some interesting details about the relative distribution of the areas of articulation. In the close front area English has two vocoids and Afrikaans has four. In the mid front area the figures are one English and three Afrikaans.

Afrikaans has no representatives in the open front area where English has three. In the central area English has two and Afrikaans one.

The figures for the back area are:

Open back:	English 3,	Afrikaans 3.
Mid back :	English 2,	Afrikaans 1.
Close back:	English 2,	Afrikaans 2.

Below the Cardinal [ɛ] - [ɔ] line, i.e. C3 to C6, there are three Afrikaans vocoids and six English. Above the Cardinal 3 to 6 line English has eight vocoids and Afrikaans has eleven. The logical conclusion is that, in English, there is relatively, a greater demand for utilising the lower potential of the oral articulatory organs that in Afrikaans. For the upper potential, close and mid, the position is reversed, though it must be pointed out that of the close vocoids of English, two are closer than any of the Afrikaans vocoids. Another interesting feature which is evident from the vocoid diagram is that there is not a single Afrikaans vocoid on the periphery of the diagram. By contrast, English has six "cardinal" vocoids located on the boundary of the diagram. The more remote from the neutral or central position in the mouth, the clearer and more well-defined the quality of the vocoid is. In conformance with this principle the front and back high-close vocoids of English, the mid and open vocoids in the vertical dimension, [e , ɛ , æ], the advanced back low-open [ɑ] – which is close to the periphery – and the back vocoids [ɒ , ɔ :], all have a more well-defined timbre than any of the Afrikaans vocoids by virtue of their remoteness from the neutral position.

The eight Cardinal Vowels have fixed positions on the periphery of the diagram. They have known acoustic qualities and known tongue and lip positions and provide a referential frame of international validity. In general terms, therefore, the Afrikaans close vocoids are not very close, the front vocoids are not very fronted, the back vocoids not very far back, the border vocoids are, without exception, within the boundary of the Cardinal diagram: they tend towards a neutral position, (Pienaar and Le Roux, op. cit., p.43).

B.3. Oppositions.

B.3.1.

Opposition: High-low.

The position of the tongue, which is the most versatile of the vocal organs in the production of vocoids, is usually described in two dimensions: high vs low and front vs back, with an intermediate position that correlates with the production of mid and central vocoids. The high-low movement of the tongue is usually accompanied by a concomitant lowering or raising of the jaw. If, for the purpose of this description, the tongue is divided into tip, blade, front, back and root, it is the relative position of the front to the hard palate that provides the distinctive quality of the front vocoids. The following schematic diagram, Fig.B.3.1.(i), depicts the organs of speech involved in the production of the vocoids.

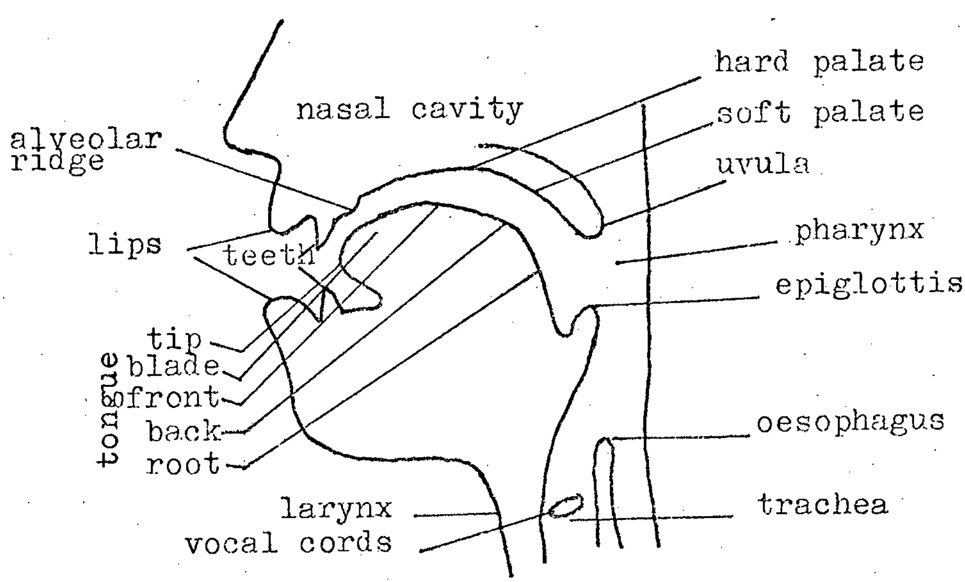


Fig. B.3.1.(i).

The relative tongue positions for vocoids [iː, e, æ, ɑː] — are illustrated in the following figure:

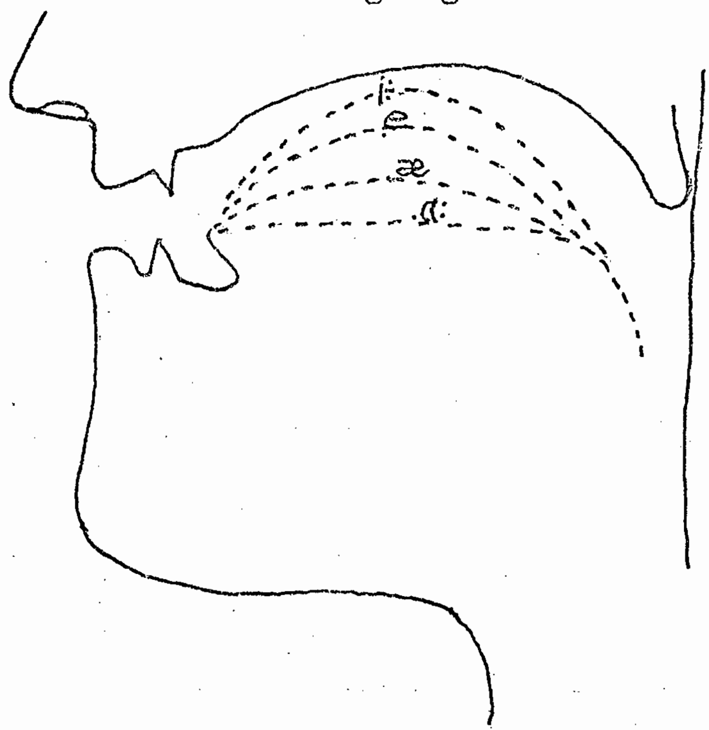


Fig. B.3.1.(ii).

The relative tongue positions for the back vocoids are indicated in the following figure:

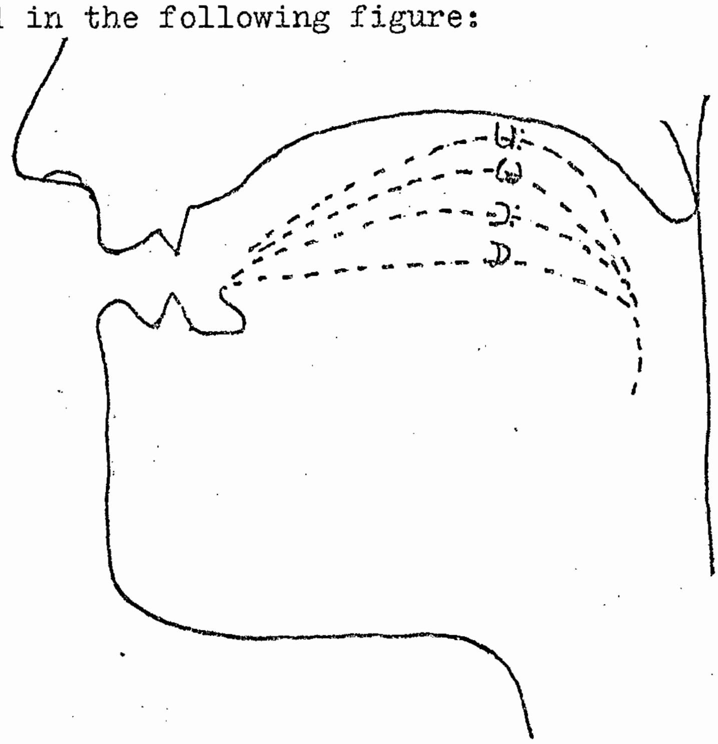


Fig. B.3.1.(iii).

Fig. B.3.1.(ii) illustrates the progressive lowering of the hump of the front of the tongue from [i:] to a flattened position for [ɑ] . Fig. B.3.1.(iii) shows a parallel configuration for the back vocoids, but in this case the area of narrowing is between the back of the tongue and the soft palate. In Fig. B.3.1.(ii) the highest point of the tongue in the vertical range of positions represents close [i:] in "seem", for instance, and the lowest point represents vocoid [ɑ] in "calm".

It may be expected that in the rendition of the A.-E. Bilingual some overlapping may occur due to nasalization, lip-rounding, coarticulation, etc., but the distinctive feature in the rendering of any one idiolect will be the differentials close-open, as illustrated in the following diagrammatic representation:

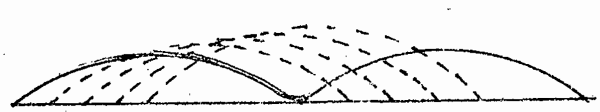


Fig. B.3.1.(iv).

The humps represent the tolerances allowed for the vocoids [i:] and [e]. The broken lines indicate articulations that gradually assume the quality of [e] . Unless there is a concomitant lowering of the tongue height for [e] , the opposition [i: - e] will eventually be neutralized.

In principle, what has been said about the organic production of English vocoids applies likewise to that of the Afrikaans vocoids. Details of production are, of course, different. High-low opposition extends up to the low-mid area of articulation as there are no Afrikaans vocoids in the front open area. Similarly, there are no "cardinal" Afrikaans vocoids in the front area. The front area is characterized by three retracted members: two in the close area, viz. [ʏ] and [ø], and one in the mid area, viz. [œ]. For the back vocoids the high-low opposition extends over the full range close-open.

In referring to vocoids differentiated by a high-low opposition the terms "close, mid, open" are used. This nomenclature accords with the physical relation of the articulators. For finer-grained distinctions each of these areas is sub-divided into "high, mid, low".

B.3.2.

Opposition: Front-back.

"Front-back opposition refers to the horizontal range of positions in the close, mid and open areas. The triangle in the centre Fig. B.2.1.(i), marks the central area in the front-back opposition. English / Afrikaans vocoids [i] and [u] which are organically similar (but by no means identical), are extreme specifications in the close front-back opposition. Mid-open English [æ] and English [ɑ] represent extreme positions in the low front-back opposition. Afrikaans has no front equivalent but an organically similar back low-open vocoid. Both English and Afrikaans have a vocoid located in the mid-central area, symbolized [ə]. A very approximate and schematic representation of high-low and front-back oppositions that correlate with the front and back of the tongue, is illustrated by the following quadrilateral. It does not show the fact that because the jaw is hinged at the back of the mouth, the dimension high-low covers greater distance for front vocoids than for back vocoids.

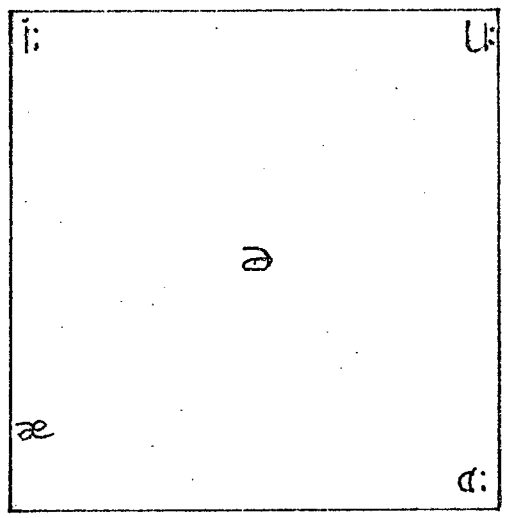


Fig.B.3.2.(i).

Vocoids [iː , uː] are articulated by the front and back of the tongue in close proximity to the hard palate respectively. [æ] and [ɑ] represent articulatory extremes with the relative areas of the tongue in a low or open configuration. The sequence [iː - ə - ɑ] , for instance, can be spoken as a continuous sound, as the articulation is marked by continuous gradation, the sounds gradually shading off into one another. The above positions could also be taken as points of reference in gross qualitative distinctions e.g. [ɛ] is closer than [æ] and farther forward than [ə] .

B.3.3.

Opposition: Rounded-unrounded.

In the close-open dimension the lips are usually correlated to the movement of the jawbone, but the lips may also move independently of both the position of the tongue in the oral chamber and of the jawbone. Lips may be spread, neutral, or assume different degrees of rounding. Lip-rounding adds a new dimension to the description of vocoids: it represents another variable through which English and Afrikaans vocoids, within each language, are contrasted. Alternating the pronunciations [bi:] and [bu:] demonstrates the opposition unrounded-rounded with concomitant re-arrangement of the tongue. For English [i:] the front of the tongue is raised to a height slightly below and behind the close front position; the lips are spread. For [u:] the tongue raising is relaxed from the closest position and is somewhat advanced from true back. The lips tend to be closely rounded, (Gimson, op. cit., pp.95 and 114). Pienaar, (op.cit., p.47 and 53), describes the articulators for Afrikaans [i(:)] as follows: Tongue is between high and mid-high, but closer to high; lips slightly spread, but virtually neutral. For [u(:)] the tongue position is likewise described as between high and mid-high, but nearer to high; lips are open-rounded ("ondergerond") and half-closed. There is no pouting of lips. Articulatorily, therefore, English [i:] is a high, front spread vowel, or in the present terminology a "close, front unrounded vocoid"; and [u:] a "close, back rounded vocoid". The Afrikaans counterparts, organically, and with the above qualifications, may be described in the same terms: "close, front unrounded", and "close, back rounded". The configuration of the articulators, in effect, determines the quality of any vocoid. Given a static arrangement of the other articulators, tongue, velum,etc., lip-rounding, in acoustic terms, enlarges the oral resonance by slight elongation and modifies the front opening of the resonance chamber from spread to rounded. Lip-rounding, which is a secondary feature added to a sound, will also be referred to as "labialization", (Pei, op. cit., p.140, Gimson, op. cit., p.30).

English has no front rounded vocoids. Afrikaans has three, referred to by Pienaar, (op. cit., pp.56 to 58), as "abnormal vocoids" by virtue of the fact that, contrary to normal articulation of front vocoids with spread or neutral lips, these three are characterized by open-rounded ("ondergerond") lips. They are symbolized [y(:)] , [ø] and [œ] , being the rounded symmetries of the Afrikaans front vocoids [i(:)] , [e:] and [ɛ(:)] respectively, and distributionally represented in the Afrikaans words: "minuut" /mənyt/, ("minute"), "neus" /nø:s/, ("nose"), and "put" /pœt/, ("a well"). With the exception of [ɑ:] , which in both English and Afrikaans is articulated with neutrally open lips, the back vocoids are characterized by various degrees of lip-rounding. English,[u:, ω, ɔ:, ɒ] are articulated with a descending degree of lip-rounding. The Afrikaans back vocoids [ɔ:, ɔ , o , u(:)] are all marked by open lip-rounding ("ondergerond").

As lip-rounding adds a new dimension to the description of vocoids, the three polar dimensions thus far described should be illustrated in a three-dimensional figure. The following sectional representation combines the traditional two-dimensional vocoid diagram with its acoustic correlate. The chart is superimposed in the mouth so that a rough three-dimensional display, as seen from profile, is given.(R.P. vocoids [ɑ], [ɒ], represent back approximates contrasted by the feature of neutrally open lips, and open lip-rounding, (Gimson, op. cit.,pp.105, 107),).

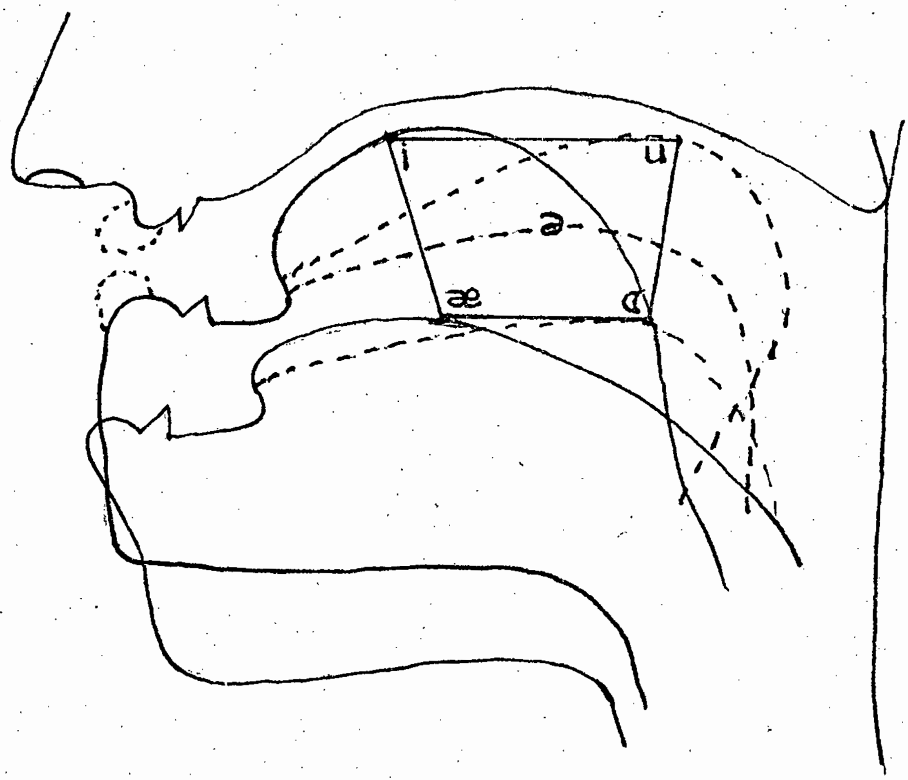


Fig.3.3.(i).

B.3.4.

Opposition: Monophthongs-diphthongs.

From a technical point of view it is highly improbable that a vocoid maintains the same quality throughout its articulation. For practical purposes we distinguish between vocoids that obviously or mandatorily change in quality, namely, "diphthongs", and vocoids that remain relatively constant,namely, "monophthongs". A monophthong has been defined as a vocoid that throughout its duration has a single, constant articulatory position and acoustic structure, and whose boundary on either side is a consonant or a syllabic boundary, (Pei, op. cit., p.166). Diphthongs, on the other hand, are duophonic: articulatorily they are characterized by movement from an approximate position in a particular direction. It is customary to regard a diphthong as a combination of two contiguous vocoid sounds, so pronounced as to form one syllable with phonemic status. Diphthongs change timbre during the course of their emission. Auditorily the listener perceives a certain vocalic quality at the beginning of a diphthong and another at the end. Jones, (op. cit., p.57), defines a diphthong as an independent vowel-glide not containing either a peak or a valley of prominence. "Vowel-glide" implies that the speech organs start in the position for one vowel and move in the direction of another vowel. "Independent" designates a glide that is expressly made, and not merely an unavoidable concomitant of the sounds preceding and following. By definition the diphthong may rise or fall continuously, but its articulation may not be affected by interruption of the continuous rise or fall of prominence, there may be no diminuendo-crescendo of breath force. A diphthong must necessarily consist of one syllable i.e. made by one impulse of breath, and it may vary in quantity.

Diphthongs may be of the rising or falling type, one end being more prominent than the other. Prominence may be due either to the inherent sonority of the vocoid or to stronger stress, or a combination of both. In a falling diphthong the beginning is more prominent than the end and in a rising diphthong the beginning is less prominent than the end. When the component vocoids are more or less of equal inherent sonority, one end is generally rendered less prominent than the other by reducing the force of the exhalation. The components of the glide [ɛə] , viz. [ɛ + ə] are approximately of equal sonority, but in enunciation the beginning of the glide is pronounced with greater force and therefore has more prominence. In the diphthong [iə] , [i] is inherently less sonorous than [ə] , but by virtue of the force of the exhalation, [i] sometimes acquires greater prominence, (Jones, op. cit.,p.58). But in words such as "happier, carrier", in which the termination [ə] assumes morpheme status, " [i] and [ə] are conveniently treated as a hiatus of vocoids in two syllables, with a variant monosyllabic pronunciation [iə] ", (Gimson, op. cit.,p.137). The English diphthongs are all falling or decrescendo diphthongs. In this investigation the terms "diphthong, diphthongal vocoid glide, or glide" will be used interchangeably. The first part of the diphthong will be referred to as the "vocoid" element and the transition as the "glide" element.

The following figure represents the dominant articulatory areas of English diphthongs diagrammatically, (after Ward and Gimson).

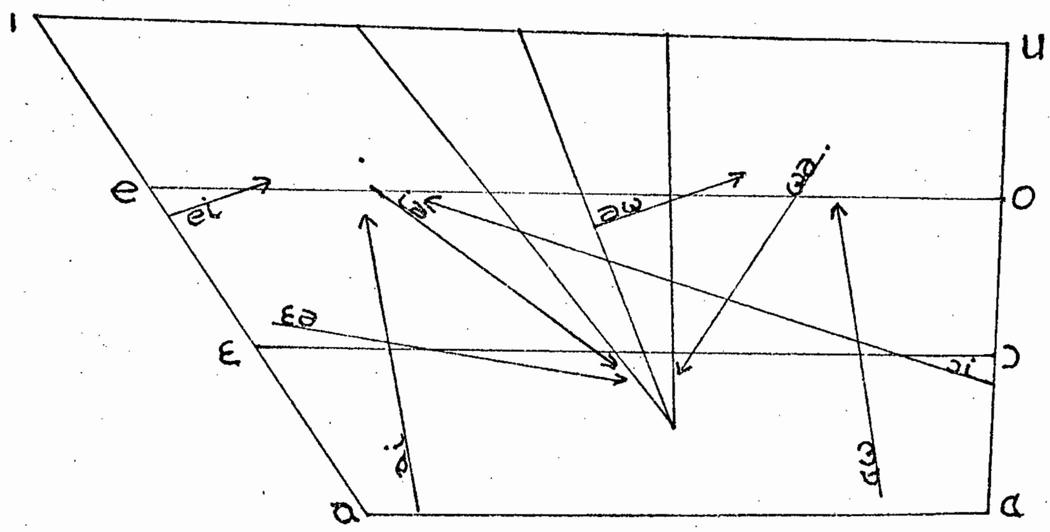


Fig. 3.4.(i).

There are ten standard diphthongs in Afrikaans, all of which are descending glides. Seven move in the direction of [i] and three in the direction of [u(:)] . Diagrammatically the Afrikaans diphthongal vocoid glides are illustrated in the following figure, after Pienaar, (op. cit., p.59).

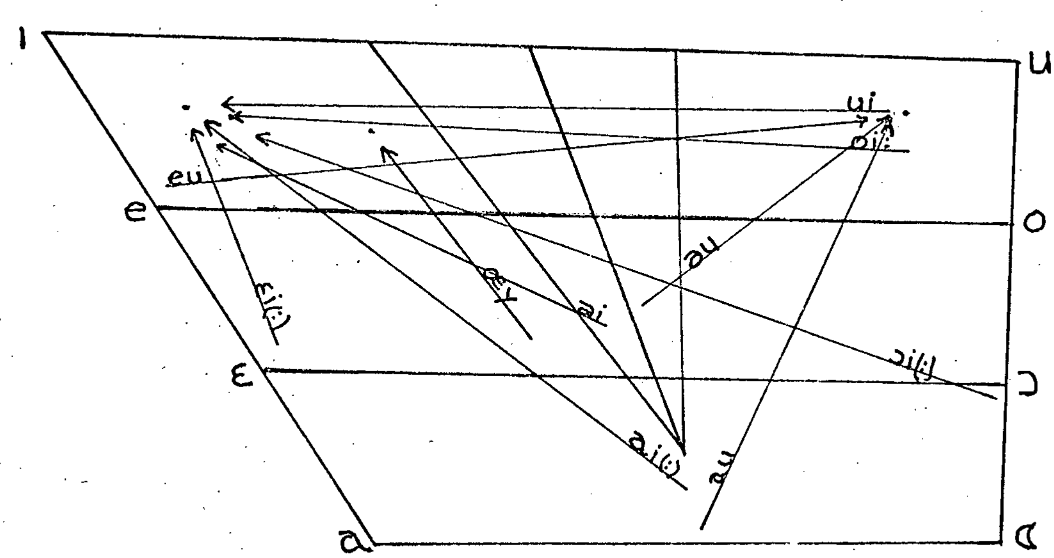


Fig. B.3.4.(ii).

It will be observed that Standard English has only eight dominant glides whereas Afrikaans has ten, excluding five dialectal glides, (Pienaar, op. cit., p.58). Only three English diphthongs glide in the direction of [i] , whereas in what is regarded as Standard Afrikaans, seven diphthongs glide towards close front [i]. There are no centring glides in Afrikaans; English has three. English has two glides towards the close back area and Afrikaans has three.

Brief reference will be made to diphthongs that are approximately similar in the two languages. According to

Pienaar, (op. cit., p.60), the inception of the vocoid element of the Afrikaans diphthong [əi] , which has an organic resemblance with the English diphthong in "race", for instance, is difficult to determine with any degree of precision. The vocoid starts in a centralized, mid, front area and the glide moves towards Afrikaans [i]. The vocoid of the English diphthong begins on the periphery in the front high-mid area and the glide moves towards English [ɩ] . The [ɑɩ] ,[ɑi] glides in English and Afrikaans are also organically similar, but the vocoid elements begin in distinctly different areas. The English vocoid has its inception at a retracted C4 - [ä] position, and the Afrikaans in a mid-open central area. Without anticipating the results of the auditory and acoustical analysis, one observes from the diagrammatic representation of the diphthongs on the vocoid chart, that the glide elements of the Afrikaans [i] diphthongs converge in a close front area characterized by a somewhat tense articulation, whereas the glide elements of the English [ɩ] diphthongs move towards a retracted low close area, although the tongue is not generally raised to a level closer than retracted C2=[ë] , (Gimson, op. cit.,p.122). The articulators are comparatively lax.

English has two [ω] glides and Afrikaans has three [u] glides to the close back area. Two of these, one each in English and Afrikaans, have related areas of inception of the vocoid, namely, the two symbolized [ɑω] and [ɑu] respectively in English and Afrikaans. The vocoid element of the English diphthong begins at an advanced C5= [ɑ̈] position and the glide moves in the direction of [ω] , "though it may not be raised higher than the half-close level", i.e. a centralized C7 = [ö] ,(Gimson, op. cit.,p.130). According to Pienaar, (op. cit.,p.61), the vocoid element begins on the [ɒ - ɑ] periphery, midway between the two, and the glide moves towards Afrikaans [u]. The glide element, probably terminates in a much closer area in Afrikaans than in English. This diphthong has a high frequency distribution in English.

B.3.5.

Opposition: Short-long.

Vocoids differ in duration. Absolute duration can be measured by instrumental phonetics and is normally expressed in terms of milliseconds or fractions of a second. Duration is relative, but for practical purposes two degrees of length will be regarded as linguistically significant in both English and Afrikaans. These will be designated "short" or "shortened" and "long" or "lengthened". The phonemic status of quantity will be discussed under the relevant heading in phonemics. The difference in duration between "sit" and "seat" is obviously perceptible, but between "seat" and "seed" the quantitative difference is not as obvious to the ear as native speakers of English have not been sensitized to the difference because it is not significant. The difference between "sit" and "seat", however, is both quantitative and qualitative; a difference which is imposed by the phonological structure of English. In the given phonetic setting the "long" phoneme of "seat" has a duration sufficiently greater than that of the "short" phoneme of "sit" for the ear to perceive the difference and for the speaker to have a clear impression of the distinction.

We must bear in mind that the perception of duration is, to a large degree subjective and also relative. For practical purposes Ward, (op. cit., p.162 et seq.), distinguishes three degrees of quantity: short, half-long and long. She goes on to point out how the quantity of a vocoid is affected by its phonetic environment. To a degree she echoes Jones who also points out that apart from other conditioning factors, suprasegmentals, such as stress and intonation, affect the relative duration of vocoids.

In Afrikaans, duration of vocoids is phonemic and finer-grained quantitative differences are also related to word structure. Pienaar distinguishes five degrees of duration in Afrikaans vocoids conditioned by structural patterning, stress, nasalizing, etc. (op. cit., p.177). Van Wyk in "Phonologie", p.35, quoted by de Villiers, (op. cit., p.60), has a somewhat different approach to the short-long opposition. He uses the term "rekbaar" ("elastic, able to be extended") to designate long vocoids and "weinig rekbaar" ("slightly elastic") to designate short vocoids. In Afrikaans [ɑː, eː, oː, øː] and the diphthongs are "elastic", and [a, ɔ, ɛ, œ, ə] are not "elastic". The elastic vocoids may vary in duration without signalling a semantic difference, but the "non elastic" vocoids may not. He posits furthermore, that short vocoids are sharply segmented and long vocoids weakly segmented. At the moment of greatest intensity in its articulation the short vocoid is abruptly segmented by the post-vocalic contoid. Long vocoids are articulated without interruption - a feature which is correlated to a high degree of "elasticity". This tenet appears to be valid for both long and short vocoids in <u>checked</u> syllables, which are "segmented" by contoids, but apparently excludes vocoids in final, unchecked syllables. Such vocoids are not "segmented" by contoids, e.g. Afrikaans words: "eina!", (exclamation of pain), "diè" ("this"), "hiernatoe", ("this way"), "dè", ("here", in the sense of "take this").

<u>B.3.6.</u>

<u>Opposition: Tense-lax.</u>

Vocoids differ in the relative degree of muscular energy involved in their articulation. C.K. Thomas, in his "Introduction to the Phonetics of American English", and others, describe how the difference can be verified by tactile means, or may be demonstrated by electro-myographic recording. Both Moulton, (op. cit., p.58), and Malmberg, (op. cit., p.37), support the tense-lax opposition. Jones, (op. cit., p.39), refers to considerable muscular tension involved in the production of tense vocoids, but has reservations about the accuracy and validity of the criterion of tenseness or laxness to identify vocoids. He prefers the articulatory description. English short [ɪ] , according to him, is a vowel in which the tongue is lowered and retracted from the "close" position. This description is generally sufficiently accurate. The term "lax" may also be used to describe an organic position in English [ʊ] , e.g., as in "put", as compared with that of long [u:] , as in "boot". Here the organic characteristics of short [ʊ] , as compared with those of long [u:], might be more accurately described as a lowering and advancement of the tongue and a wider opening of the lips, (op. cit., p.39).

It may be advisable to apply the terms "tense" and "lax" to close vocoids only, as there exists too great a divergence of opinion as far as open vocoids are concerned.

The opposition tense-lax is not significant in Afrikaans and, in fact, is not a feature in the articulation of Afrikaans vocoids. In listing general characteristics of Afrikaans articulation, Pienaar observes, "Afrikaans word gekenmerk deur slap spierspanning", ("Afrikaans is characterised by lax muscular tension"), (op. cit., p.43). The result is that the "relaxed" ("ondergespanne") vocoids are well represented while the so-called "tense" vocoids are, in effect, intermediate between tense and lax. Summarily, he observes, manner of articulation results in Afrikaans sounds being somewhat "dof",("obscure"), less tense, less clearly defined, neutral,(op. cit., p.45).

B.3.7.

Opposition: Oral-nasal.

The velum is a flexible mass which may be raised to shut off the upper part of the pharynx which gives access to the nasal cavity. Three modes of articulation are possible.

(i) Access to the nasal resonance chamber may be shut off completely, which is the configuration for the production of oral sounds.

(ii) Both oral and nasal passages may be partially open allowing egression of air through both mouth and nose.

(iii) The oral passage may be closed completely, forcing the air expiration through the nasal passage only. The position of the soft palate during the pronunciation of a nasal vocoid is illustrated in the following figure: the velum is lowered so that egression of air is through both oral and nasal passage simultaneously.

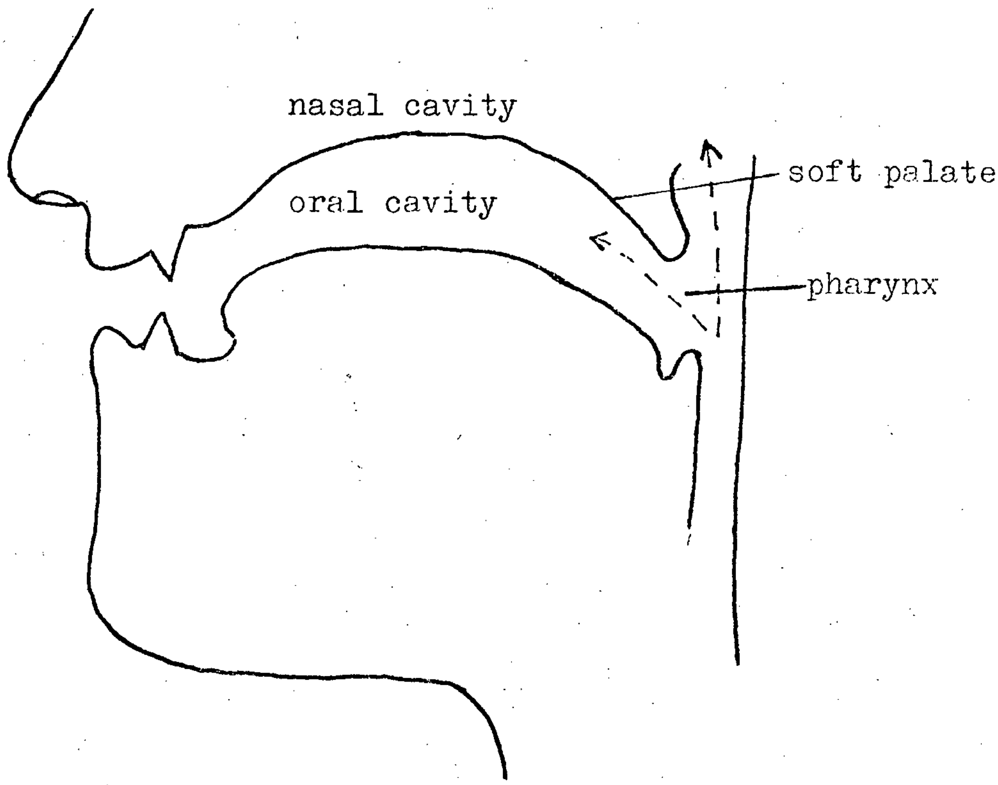


Fig. B.3.7.(i).

English has no nasal vocoids but a nasal resonance may be perceived due to the proximity of a nasal contoid. However, such nasal resonance does not play any linguistic role and is incapable of signalling a semantic difference.

Pienaar distinguishes between "nasalation" and "nasalization". The former designates a process which is characterized by a non-velic closure without additional restriction to interleading passages from the pharynx to the nose and the mouth. The latter entails restriction of the passages from the pharynx to the nose resulting in a lowered pharyngeal formant.

In Afrikaans nasalizing is marginally significant. Organically, the velum is lowered and the airstream passes through both the oral and nasal passage. Nasal vocoids are symbolized by a tilde (~) above the vocoid e.g. /ã/. Nasalizing may be phonemic in Afrikaans and assume a semantic difference. As it is a type of assimilation it is accompanied by lengthening of the vocoid, which assumes the duration of the vocoid and of the succeeding contoid, as indicated instrumentally by the kymograph, (Pienaar, op. cit., p.66).

B.4.

Phonemics.

Phonetics is universal and phonemics particular and individual. Phonetics attempts to give a description and classification of the sounds of any language. In all languages [p] is a voiceless bilabial plosive; but, when [p] becomes a signalling unit and can be formulated in a distributional class, it sheds its universal characteristic and assumes the function of a discrete unit of signalling in a particular language. Then the phonetic unit [p] becomes a phonemic unit /p/, which is an abstract linguistic unit. [p] symbolizes a sound, but /p / does not symbolize a sound. It is an abstraction representing a cluster or "family" of sounds whose "oneness", in spite of disparity in physical articulation, is determined by contextual patterning, by complementary distribution and by phonetic similarity. An example of contextual patterning is the advanced and retracted articulation of [k] in "key" and "car" or Afrikaans "kiem" ("germ"), and "kom" ("come"); of complementary distribution, the aspirate and unaspirate [t] in "top" and "stop", and likewise in Afrikaans, vocoid [i] is long before [r] in word-final contexts, but usually short in other contexts e.g. "bied" ("command"), "bier" ("beer"). The contextual location of variants in complementary distribution is predictable, e.g. initial aspirate [p] in "pot", and unaspirate [p] in non-initial position, e.g. "spot". Phonemes are always significantly opposed, but [h] and [ŋ] are never significantly opposed as, typically, [h] occurs initially in words and syllables and [ŋ] typically finally. By definition [h] and [ŋ] should, therefore, be members of the same phoneme. However, no native Englishman would ever regard them as allophonic variants because constraints imposed by native usage would violate such a notion. The criterion of phonetic similarity assigns [h] and [ŋ] to different phonemes by virtue of their physical dissimilarity.

The phonetician can study sounds without understanding the language or the meanings of words: his discipline is international. He is concerned with the study and analysis of sounds as the results of articulatory processes and of their transmission and perception without reference to any particular language or to their function in that language. The phonemicist is concerned with speech sounds in as much as they are of linguistic significance and only those sound phenomena and characteristics that are significant and distinctive in a particular language.

In our phonetic analysis it was obvious that vocoids are a continuum of many dimensions. Under "Phonetics" seven dimensions were cited to facilitate description of vocoids. It is important to bear in mind that each of these dimensions is a continuum. There are no absolute dimensional categories in vocoids. (The Cardinal Vowels are, of course, unvarying sounds of fixed quality). There is no short, tense, close, etc., vocoid in absolute terms. Vocoids can only be relatively short, relatively tense, close, etc.. It is obvious, therefore, that a complete inventory of all the potential phonetic realizations of English and Afrikaans vocoids is an inexhaustible task. How many gradations are possible between English /i/ and /ɩ/ or between Afrikaans /ɔ:/ and /o/?

Phonemics dispenses with the limitless potential of phonetic renditions. It is concerned with distinctive features. Intelligent communication is possible by virtue of the dichotomous scale which is inherent in the communicative ability of articulate languages. Language is intelligible because sounds are in opposition to each other, they are contrastive. Phonemics selects from the available sound differences in human speech a limited number of distinctive units. To differ distinctively two sounds must, for instance, be able to replace each other in identical contextual environments, e.g. "MAP" and "MOP". The number of these distinctive features in any language is comparatively small as compared with the potentially unlimited number of actually different sounds spoken by the same linguistic group.

In a broad transcription phonemics identifies each distinctive sound with one symbol. In any language these sounds are recurrent, hence the adequacy of only a limited number of symbols. The numbers of distinctive sound units differ from language to language, but the lower and upper limits have been calculated to be about fifteen and fifty.

In addition to differing from language to language, the number and distribution of distinctive units within any one language may differ according to dialectal or regional divergences and even in the idiolect of a single speaker. However, in spite of these differences and the diversity implicit in the overall pattern, the same phonemic system is valid for all speakers of Southern British English or R.P., which in this investigation represents the phonemic system of the Norm. "Standard Afrikaans" has fourteen "pure" vocoids and ten diphthongs, (Pienaar, op. cit., pp.45, 58). The approximate tongue position for the production of these is given in Figs. B.2.1.(i), B.3.4.(i), B.3.4.(ii). Brief articulatory descriptions will be given in Section C as part of the comparative auditory analysis.

B.4.1.

The Vocoid Phonemes of English.

For the purpose of this investigation no attempt will be made to discuss the phonemic status of all the vocoids of English and Afrikaans, except in so far as it might be necessary to stress the distinctive features of some of them.

If we take the significant syllabic function as the criterion, phonemic status will be granted to the following English vocoids. Diphthongal vowel glides will be regarded as vocoids: The categories of the English vocoids are those listed by Gimson, (op. cit.,pp.86 - 87). The phonetic assessment of the qualities of the vocoids is relative and in terms of Cardinal values.

Final.	Non-final.	Notation.
1. Short.		
pity	pit (raised, retracted [e]	ɩ
-	pet (between [e] and [ɛ]	e
-	pat (between [ɛ] and [ɑ]	æ
-	pot (approximately [ɒ]	ɒ
-	put (advanced, raised [o]	ω
-	putt (lowered, centralized [ɔ]	ʌ
bitter	affect (central, only in weak forms)	ə
2. Long.		
bee	bead (lowered [i]	i:
boo	brood (lowered, advanced [u]	u:
bar	bard (advanced [ɑ]	ɑ:
bore	bored (raised [ɔ]	ɔ:
burr	bird (mid central	ɜ:

3. Long. (diphthongal glides with prominent first element)

(a) glide to [ɩ].

bay	bayed (lowered [e] to [i]	eɩ
by	bide [a] ⟶ [i]	aɩ
boy	buoyed [ɔ] ⟶ [ɩ]	ɔɩ

(b) glide to [ω].

go	goad (mid [ə] ⟶ [ω]	əω
bough	bowed (between [a] and [ɑ] ⟶ [ω]	aω

(c) glide to half-open [ə].

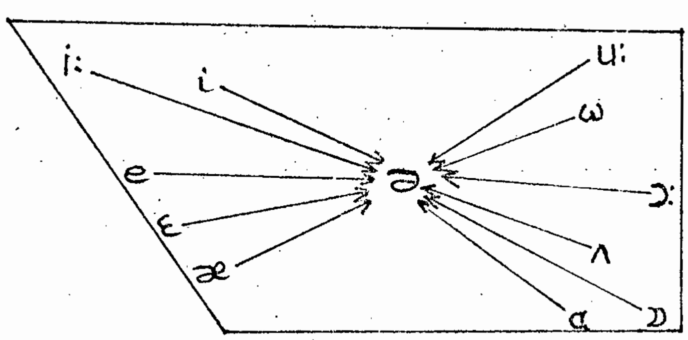
beer	beard [ι] ⟶ [ə]	ιə
bare	bared [ε] ⟶ [ə]	εə
boor	moored [ω] ⟶ [ə]	ωə
(bore	bored [ɔ] ⟶ [ə]	ɔə

For practical purposes the diphthongal glide [ɔə] will be discounted as both Gimson, (p.110), and Ward, (p.121), as well as Jones, (p.111), observe that the long pure vocoid seems to have replaced it.

<u>B. 4.2.</u>

<u>Vocoid /ə/.</u>

The phonemic status of [ə] requires closer scrutiny. In informal speech in unstressed environs the entire vocalic system collapses into a mid central unstressed [ə] , as illustrated in the following schematized assembly:



<u>Fig. B.4.2.(i).</u>

This implies that there is no significant difference between using the full vocoids or the reduced [ə] . The reduction and obscuration of so many unaccented forms in colloquial English - E.L. Tibbitts and A.C. Wilson in "The Sound of English", (p.17 et seq.), list 50 groups of such structures - constitute a feature of great linguistic difficulty to the non-native speaker of English. Correct manipulation of sub-phonemic features of a language demands a particular degree of linguistic sophistication. Much has been written on the status of [ə] in English. The ultimate criterion is its significant function in the English system. In the words "city - sitter": /siti - sitə /, "fatty - fatter": /fæti - fætə/, "ready - redder": / redi - redə /, and a number of other words, it is clearly a commutable element signalling a semantic difference. Furthermore, it contrasts with zero in the structures, "bout - about": / bawt -əbawt/ Hence it must be regarded as an independent phoneme of English. At the same time it is possible to treat /ə/ as an unaccented allophone of /ɜ :/"since it may be claimed that no true opposition between the vowels exists", (Gimson, op. cit., p.116). There is a quantitative difference between /ɜ:/, when it does not carry primary accent, and unstressed /ə/, the former having longer duration e.g. "foreword" and "forward", quoted by Gimson, (op. cit., p.117). It should be noted that unaccented /ə/, in its phonemic status, has a low functional burdening, as the number of words in which it does herald a semantic difference is limited.

B. 4.3.

Duration.

We have already seen that Gimson, in his categories of vocalic phonemes has, seven short, /ɪ, e, æ, ɒ, ʊ, ʌ, ə/ and five long (relatively pure), / i:, u:, ɑ:, ɔ:, ɜ:/ vocoids that rank as phonemes, (op. cit.,p.93). Duration warrants further consideration.

We know that a phoneme is an abstraction of the sum-total of its allophones. This definition implies that a phoneme consists of a number of attributes. One of these attributes is generally taken to be the dominant or central factor characterizing the phoneme. The question arises whether duration is the dominant feature of vocoids that are generally regarded as long. Jones in his "chroneme" theory recognizes a special chroneme of length, while reserving the term "phoneme" for categories of quality, (D. Jones, "Chronemes and Tonemes", pp. 1-10). Vocoids [i:, ɪ, ɔ:, ɒ, u:, ʊ, ɜ:, ə] differ both qualitatively and quantitatively, but, according to the chroneme theory, the qualitative opposition is subordinate to the quantitative or chronemic feature. These pairs are regarded as long and short members of the same phoneme, but, at the same time, belong to two different chronemes.

Timbre or quality is a concomitant of duration in the above vocoids. The differences overlap, but can be perceived auditorally. They are also evident on a spectrogram. Differences in duration and indeed, in quality, are conditioned by other features as well, e.g. environment and segmental conditioning. Ward, (op. cit., p.162), points out that long vocoids are longer when followed by voiced contoids than by voiceless contoids: thus, nuclear /ɑ/ is longer in "halve", than in "half". Likewise Malmberg, (op. cit., p.74), cites examples of vocoids that are longer before fricatives than before stops, e.g. "leave" and "lead". Duration is also tied up with tense and lax muscular tension. Moulton, (op. cit.,p.58), quotes "seat", with a tense nucleus, being longer than "sit", which has a lax vocoid. Post-nuclear contoids also appear to have an impact on duration: long vocoids seem to be more protracted before lenis contoids than before fortis contoids, e.g. "need" and "neat" respectively. In his study of the phonemes of English, Cohen, (op. cit.,p.86), quotes Eringa, "Het Phonologische Quantiteitsbegrip" who, in his elaborate study of quantity from the phonemic point of view, posits that the only two vocoids in English that are opposed by presence of duration and absence of duration are /ɔ:/ and /ɒ/. This view is untenable as both auditory and acoustical analysis reject such a tenet. Jones, in his pronouncing dictionary has an interesting note on "jam". "Some speakers", he observes, "make a difference of length according to the meaning, using /dʒæ:m/ for 'fruit conserve', and /dʒæm/ for 'crush, wedging'," etc.. Gimson states, (op. cit.,p.90), that only in the case of /ɜ: - ə/ can there be said to exist an opposition solely of length, and adds, that even in this case it has to be stated that /ə/ occurs only in unaccented syllables, whereas /ɜ:/ can occur in syllables carrying primary or secondary accent. However, the phonemic status is not involved. It would appear that duration as a primary attribute in determining phonemic status is valid only in the renderings of the nucleus of the word "jam", cited above. Lehiste, (op. cit.,p.18), in her study "Suprasegmentals" observes that duration seems to be correlated with tongue height. All other factors being equal, a close vowel is shorter than an open vowel. She then makes the interesting observation: "it is quite probable that the differences in vowel length according to degree of opening are physiologically conditioned and thus constitute a phonetic universal". Suprasegmental features, e.g. pitch, also condition quantity. The difference between the following two intonation contours correlates with a difference in quantity. These examples are quoted by Gleason, (op. cit.,p.49), in his discussion of the phonemic status of intonation contours.

(i) I'm going home.

(ii) I'm going home.

The vocoid of "home" in (i) is of greater duration than that of "home" in (ii).

To a native English speaker the variations referred to above are automatic and unconscious. The A.-E. Bilingual has to "learn" these differences as his natural response is to manipulate intrinsic features according to the dictates of his native system.

To what extent is duration significant in English? The most valid test to identify phonemes seems to be to establish their significant function. Apart from the word "jam" in which the differentiating function of quantity appears to be seldom called upon to signal differences in utterances, length as a dominant feature does not appear to have a significant function. The vocoid phonemes of English are to be regarded as differing from each other in quality.

In spite of the fact, however, that length is not distinctive, the length sign (:) after vocoids will be used in notation in this investigation, to facilitate recognition.

B. 4.4.

Diphthongs,(English).

Reference has already been made to Gimson's classification of English vocalic phonemes into the following categories: seven short, five long (relatively pure) and eight diphthongal glides: three to /i/, two to /ω/ and three centring glides to /ə/.

In the previous section we concluded that the primary feature lending phonemic status to English "long" vocoids, in spite of other features that may fuse together as conditioning factors, is quality. A different approach in the analysis of English long vocoids is to regard them as sequences of short vocoids with differences of quality allophonically conditioned by environment, or as compounds of short vocoids plus the glides /j/ or /w/, (Robins, p.134, Gimson, p.92). Thus [i:] would be interpreted as /ɩ+ i / or /ij/; and [u:] would be interpreted as /ω+u/ or /uw/. This diphthongal interpretation of long vocoids is based on phonetic considerations, but, in order to obviate the complicated analysis necessitated by regarding long vocoids as composite units, in this investigation they will be regarded as long, relatively pure vocoids, the more so as neither interpretation affects the organization of "long" vocoids as distinctive units in English.

Diphthongal glides, which are characterised by the reorganization of the vocal mechanism to begin at an approximate vocoid position and move in the direction of another, have been variously analysed. They may be regarded as single, unitary phonemes with a monosyllabic function, (Jones, op.cit., p.57), or they may be regarded as sequences of two phonemes functioning in the syllable like a long vocoid. The two elements comprising the sequence are identified with existing phonemes in the English system. The biphonematic approach can only be validated provided the component elements can be commuted with existing phonemes. Cohen, (op. cit.,pp.91 et seq.), gives a summary of the divergent views on the analysis of English diphthongal glides. In regard to /eɩ, ɑɩ, ɔɩ ,əω ,aω/ he concludes that neither the first nor the second element seems to be on a par with any existing phoneme of English, hence neither of the component parts is commutable. They have the same value in distribution as other vocoid phonemes.

Cohen rejects the monophonematic identity of the centring diphthongs. According to Ward, (op. cit.,p.120), Jones, (Outline, p.108), Gimson, (Introduction, p.136), the vocoid or first element of these diphthongs is "similar" to the "short" vocoids /ɩ, ω, ɛ /. Cohen maintains that in spite of the traditional phonetic transcription with initial short [ɩ ,ω, ɛ], we have to do with a modification of the long vocoids /i:, u:, æ/ under the influence of a possibly following /r/. These diphthongs are merely contextual variants of the "long" vocoids even when /r/ is not pronounced. Whether his interpretation accords with the English language system is doubtful. It is complicated and may violate the impressions of both production and perception that the R.P. native informant has of his own language. The ultimate criterion, that of distinctive function, is not affected.

B.4.5.

Afrikaans Vocoids.

The following is a list of Afrikaans vocoids. Vocalic diphthongal glides will be regarded as vocoids. The phonetic assessment of the qualities is relative and in terms of Cardinal values:

Final	Non-final	Notation
1. Short.		
die	dief (open, retracted [i])	i
-	predikant (unaccented, close, retracted [e])	e
nè	emmer (close, retracted [ɛ])	ɛ
oupa	dak (open, central)	ɑ
(hierso)	kop (raised, advanced [ɔ]	ɔ
toe	soet (close, advanced [o]	u
tè / te	sit (mid central)	ə
Abnormal:		
ru	nuut (open, centralized [i]	y
-	rug (centralized,raised [ɛ]	œ
2. Long.		
vlie	mier (open, retracted [i]	i:

gee	lees (close, retracted [e]	e:
sê	blêr (close, retracted [ɛ]	ɛ:
ma	traan (advanced [a]	ɑ:
gô	môre (approximately [ɔ]	ɔ:
glo	kloof (advanced between [o] and [u]	o:
boe (of ba)	boer (open, advanced [u]	u:
	wîe (mid, central)	ə:

<u>Abnormal</u>.

-	muur (close, centralized [e]	y:
-	rûe (centralized, raised [ɛ]	œ:
-	leun (raised, retracted [e]	ø

<u>3. Diphthongal Glides</u> (<u>with prominent first element)</u>.

<u>Final</u>	<u>Non-final</u>	<u>Notation</u>
(a) <u>Glide to [i(:), y]</u>		
my(short)	lyk (low-mid [ɛ] → [i]	əi
taai(short)	baie (open, central [a] → [i]	ai
raai(long)	kaaiman (open, central [a] → [i]	ai:
lui(:)	kluit (centralized [œ] → [y]	œy
gôi(:) nôi(long)	tôings [ɔ] → [i]	ɔi(:)
looi(long)	ooit [o] → [i]	oi:
koei(usually short)	broeis [u] → [i]	ui

(b) <u>Glide to [u]</u>.		
leeu(usually long)	leeurik [e/i] → [u]	eu:
kou (short)	oud [ə] → [u]	əu

For transcriptional purposes the two relative quantities of short and long will be differentiated by the sign (:) after the vocoid, indicating relatively long. In diphthongal glides the length sign will be inserted after the glide element.

B.4.6.

Afrikaans /ə/.

In regard to the phonemic status of the Afrikaans vocoid /ə/, it should be noted that organically it is akin to English schwa /ə/. English /ə/ has a very high distributional frequency of 10.74% (D.B. Fry, quoted by Gimson, p.143) as English has a very high proportion of unaccented syllables in which /ə/ replaces the strong forms of virtually all vocoids. F.F. Odendal,("Die Struktuur van die Afrikaans Wortelmorfeem", unpublished* D.Litt. thesis, University of Stellenbosch, 1957, p.224), cites /ə/ as "die vokaal met die hoogste realisering",("the vowel with the highest frequency realization"), and then gives details of its frequency distribution in the different syllables of Afrikaans poly-syllabic structures. We have already noticed that in English it is distinctive in obscured forms, e.g. "city - sitter". In the following structures in Afrikaans:

Dit was tè koud, (It was too cold),

Dit was toè koud, (It was cold then),

the semantic difference signalled by stressed /ə/ is obvious, as a commutation test identifies /tə/ and /tu/ as a minimal pair.

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B.4.7.

Nasalization.

As already stated, normal English has no nasal vocoids, but vocoids contiguous to nasal contoids are partially nasalized. Ward, (op. cit.,p.125), points out that in the articulation of "man", for instance, the velum is lowered for /m/ and /n/ and between these two it makes a movement towards closure, but the time is so brief that complete closure is impossible, and egression of air is through both the nasal and oral orifice. Stageberg, (op. cit.,p.296), refers to the three nasal contoids in front-back dimension: /m, n, ŋ/ and the so-called "nasal twang" which is disagreeable in English. Nasalization in Afrikaans is in effect an overlapping process entailing a nasalized vocoid and a vocalized contoid. Phonologically one of the processes must predominate. If predominance is fixed on the nasalized vocoid, then there arises the question whether the phonemic distinction is tripartite viz. / kã:s - ka:s - kas/. If the vocalized contoid is regarded as the primary factor, the distinction is simplified: /n - ~/. Allophonic variants are thus conditioned by distributional criteria and not by oral-nasal variants. (See de Villiers, op. cit.,p.109). Whatever approach is adopted, the ultimate criterion is that of significant function. Nasalization establishes semantic difference between: /xans/ ("entirely"), and /xã:s/ ("a goose"), between /lɛ̃:si/ ("lentil") and /lɛnsi/ ("a small lens"). Some native speakers distinguish /xrɛ̃:s/ ("to cry") and /xrɛns/ ("boundary"), /kœ̃:s/ ("ability") and /kœns/ ("art"), but usage fluctuates.

Summarily, nasalization in Afrikaans as a differentiating feature has a low functional burdening, but among many speakers, phonetic dissimilarities which could be significant, are simply features of free variants. Pienaar, (op. cit.,p.63), intimates that nasalization in Afrikaans might have been inherited from French, German or Portuguese, or it might derive from the lax articulation ("slap uitspraak") which characterizes the Afrikaans system.

B.4.8.

Duration.-

Reference has already been made to the fact that duration or quantity is conditioned by many features: close vocoids are usually shorter than open vocoids, front vocoids of longer duration than back vocoids; diphthongs are longer than monophthongs; post-vocalic /r/ usually lengthens vocoids etc.. We pointed out that in "long" vocoids in English the dominant feature differentiating them from organically similar (not "like") vocoids e.g. /i: - ɪ/, is quality.

In the close front range, the duration of Afrikaans vocoid /i(:)/ is conditioned by environment, the vocoid being protracted before final /r/, e.g. /mi:r/, ("ant"), but shortened before other contoids e.g. /mit/ ("haystack"). Difference in duration does not signal a semantic difference so that quantity typifies positional, allophonic variants. The back symmetries of the above front vocoids, and most of the other vocoids of the Afrikaans system, are lengthened or shortened by the context. The distribution is complementary and duration entirely predictable. In monosyllabic structures the vocoids are usually long before /r/ and short in other contexts, including a contoid cluster containing /r/ e.g. long /ɛ:/ in /skɛ:r/ ("a pair of scissors"), but short in /skɛrp/ ("sharp").

Duration in vocalic phonemes also expresses marginal contrasts in which quantity only occasionally acts as a differential between words semantically different. Long and short /ɛ/ are distinctive in words such as /pɛ:rs/ ("purple"/ and /pɛrs/ ("press"), /ɛ:rəns/ ("somewhere") and /ɛrəns/ ("earnstness"). Vocoid /ɔ(:)/ likewise expresses marginal contrast in: /po:nt/ ("a pound") and /pɔnt/ ("a float").

B.4.9.

Phonemic Tolerance.

A significant feature of the Afrikaans vocoid system is the instability of phonemes and the wide tolerance allowed in a number of variants. There is random variability in the pronunciation of many words. It is obviously due to vacillation between two or more pronunciations of the same morpheme. For instance, the physical articulation of /xɔi/ and /xoi:/ is undoubtedly disparate, but both are variants of a word which means "to throw". These must be regarded as free variants at word level as they are not subjected to contextual conditioning, and the differences are not phonemic. Somewhat similar organic discrepancy is found, for instance, in /u/ alternating with /ɔ/ in words such as /xənɔx-xənux/ ("enough"), /sɔp-sup/ ("soup"), /xɔi - xoi:/, ("to throw"), /te:kən-təikən/ ("a sign"), /artapəl -ɛrtapəl/ ("potato"), /fle:s- fləis / ("meat"), and others.

B.4.10.

/i/ and /j/.

Brief reference will be made to the phonemic status of close front /i/ and the semi-vowel or glide /j/. De Villiers, (op. cit.,p.108), posits that /i/ and /j/ are commutable in all structures without heralding a change in meaning. Linguistically such phonemes must be identical in articulation and distribution. He cites, for instance, /ia:x - ja:x/ ("to chase"), /famjlj - famili/. He observes that inter-vocalically there is heard a sound which may be realized as either /i/ or /j/ e.g. "baie, goeie" ("many, good"), phonemically /baiə - bajə/, /xuiə - xujə /. He maintains, furthermore, that they are articulated "met byna of heeltemaal dieselfde artikulasiestande"(with almost or absolutely identical articulatory configurations). But, he adds, in one respect they differ fundamentally: /i/ is a vocoid and /j/ a contoid. Identical homorganic articulation must be rejected as being scientifically incorrect. Substituting the one for the other in phonemic realizations is a matter of free choice, but it would lead to such incongruities as attempting to equate the phonemes realized as /j/ in, for instance, the following two words: /famjlj - ja/, orthographically: "familie" and "ja" ("family, yes"). It would be best to observe the distinction and realize them /i/ and /j/. Pienaar, (op. cit., p.157), distinguishes between /i/ and /j/ and observes that "die Afrikaanse /j/ oor die algemeen meer oorhel na 'n medeklinker, die Engelse ...... meer na 'n klinker",("generally speaking, Afrikaans /j/ tends towards a contoid and English /j/ towards a vocoid"). A phonemic transcription attempts to realize every sound by a distinctive symbol. The same symbols would, therefore, represent the same sounds. Hence my objection to the phonemic symbolization of /famjlj/ and /ja/.

B.4.11.

Diphthongs, (Afrikaans).

It has already been pointed out that Afrikaans has ten diphthongs, all of which are centrifugal: seven to /i/ and three to /u/. All are decrescendo glides with the greatest prominence on the vocoid element. An interesting feature which may be referred to under diphthongs is the diphthongization conditioned by assimilation in diminutives in Afrikaans. The glide is a concomitant of the succeeding sound. The post-vocalic, palatal /c/ adds the additional feature of a close, front palatalized transitional sound to the vocoid nucleus. In overt realization the vocoid becomes a conditioned diphthong with a glide towards the position represented by Afrikaans /i/, /ɣɔt - ɣɔici/ ("a rat"), /sa:t - sai:ci/ ("a seed"), etc. This characteristic may be confusing in some words that have similar renderings e.g. diminutives of the words: "draad" ("wire") and "draai" ("a turn"). Phonemic realization for both is /drai:ci/. Some difference in phonemic notation should be made to indicate semantic difference. The assimilatory process could be identified with a raised ^{i} in notation and the "true" diphthong with the conventional symbolization for glides. Thus: /dra^{i}:ci/ ("a small piece of wire" - diminutive of "draad"), and /drai:ci/ ("a slight turn" - diminutive of "turn").

B.4.12.

The Glottal Plosive.

The glottal plosive or stop has no symbol in conventional orthography, hence its existence is not generally realized. It is formed by the sudden closure of the vocal cords thereby stopping the passage of air into the supra-glottal organs. Sudden separation of the vocal cords releases the pressure below the glottis. "The compression stage of its articulation consists of silence, its presence being perceived auditorily by the sudden cessation of the preceding sound or by the sudden onset (often with an accompanying strong breath effort) of the following sound", (Gimson, op. cit.,p.162). The articulation of [ʔ] must be distinguished from glottalization which involves tension or stricture in the production of certain sounds.

The glottal plosive is not a significant feature in R.P.,(Gimson, op. cit.,p.162), nor does it signal a semantic difference in Afrikaans, (Pienaar, op. cit.,p.110). But in distinguishing words such as "veras" ("to cremate") and "verras" ("to surprise"), the glottal stop signals semantic difference.

In Afrikaans the use of the glottal stop is limited to vocoids, (Pienaar, op. cit.,p.111), and only those vocoids in the anlaut that have primary stress, e.g. "oud" ("old"), "ander" ("other"). It is also used before vocoids that carry great emphasis, e.g. "veral hy" - /fərʔal ɦəi/ ("especially he").

It is a regular feature with many R.P. speakers to mark the boundary of a syllable when the initial sound of the second syllable is an accented vocoid, e.g. "co-operative" - [kəʊʔ(ɒ)p(ə)rətɪv]. A hiatus of vocoids belonging to different syllables may in careful speech be separated by [ʔ] instead of a vocalic glide. This use is extended, in careful delivery, to obviate intrusive [r] in e.g. "law and order" - [lɔː ʔænd ʔɔːdə]. As in Afrikaans, it may be used to reinforce any initial accented vocoid, e.g. "Does anyone know?" -[dʌz ʔɛnɪwɒn nəʊ].

Otherwise than in Afrikaans, in which the use does not affect contoids, in English its use extends to certain contoid structures. This aspect of the glottal stop, however, is beyond the ambit of this investigation.

B.5.

Notational System to be used in this Investigation.

The symbolization of an utterance depends upon whether it is desired to indicate the articulation of detailed sound values or significant functional elements. The former is referred to as an allophonic or "narrow" transcription in which an attempt is made to symbolize all the identifiable features of a phonetic utterance. The latter is the "broad" transcription, based on the recognition of the phonemic theory whereby each phoneme or significant sound unit is represented by a symbol.

To compare sound features and reflect the finer-grained qualitative distinctions, which are of necessity a feature of non-native renditions, a broad transcription would be inadequate. At the same time a detailed allophonic transcription would be cumbersome and involved. Gimson, (op. cit.,p.54), gives an I.P.A. transcription of the word "titles" that would reflect the phonetic features: [ˈtˢʰɑ̈·ëtʊ̈t̥z̥]. He adds that such a transcription reflects the affrication and aspiration of the initial [t], the fact that the first element of the diphthong is retracted from C4 and is long compared with the second element, which is a retracted C2 vowel, that the [ɫ] has a back vowel resonance and is partly devoiced in its first stage, and that the final [z] is completely devoiced.

As our object is to compare utterances with R.P., it is obvious that R.P. specifications, supplemented by Cardinal Vowel specifications, must be the reference points.

As this investigation deals with the realization of vocoids, the notational system may be simplified without sacrificing its efficacy. Reference points will be the eighteen Cardinal Vowels: 1 - 8 primary, 9 - 16 secondary, and 17 and 18 central, as uttered by Jones and charted on the vowel diagram. The 12 pure (as opposed to diphthongal glides) English vocoids, as uttered by the Norm and plotted on the diagram will be the primary reference points. Reference will also be made to the Afrikaans specifications already referred to.

Symbolization will be that given in Section B.4.1. with the following diacritics:

: full length of preceding vocoid.

· half length of preceding vocoid.

ˈ will precede syllable carrying main stress.

˜ nasalization.

¨ centralization.

˕ more open quality.

. closer quality.

[ ]	phonetic transcription.
/ /	phonemic transcription.
+	tongue advanced.
-	tongue retracted.
,	lips more rounded.
c	lips more spread.
ˌ	secondary stress.

Furthermore, to facilitate identification of quality, reference will be made to the detailed sub-division of the vowel diagram illustrated in Fig. B.2.1.(i).

SECTION C.

AUDITORY ANALYSIS

C.1.

Norm.

As has already been stated this investigation is concerned with the realization of English by Afrikaans-English Bilinguals, with special reference to the vocoids. "English" is a cover term embracing many varieties of "English" or regional dialects. However, the English dialect referred to in this context is R.P. or Southern British English. Jones, ("Pronouncing Dictionary", p.ix) refers to it as the everyday speech in the families of Southern English people who have been educated at the public schools.

The vowel inventory of R.P. comprises 20 phonemes. The range of qualitative realizations of these phonemes is infinite. Two utterances by different persons or even by the same subject of the word "man", for instance, show marked differences when analyzed by trained phoneticians or by instruments. But the different realizations are all perceived or interpreted as "man" by other speakers of English. It appears then as Gimson aptly remarks on page 2 of his "Introduction" that in the perception of speech sounds we are concerned with two kinds of reality: the concrete, measurable reality of the sounds uttered, and another kind of reality, an abstraction made in our minds, which reduces the infinite number of different sounds to a manageable number of categories.

Ideally, it would appear that the speech of a single individual should be analysed to identify the phonemes of a language, but the "same" sound in a single idiolect is marked by variations conditioned by speed of delivery, context, and a number of other factors. Linguists therefore select those sound features that are distinctive and usually signal a change in meaning, and refer to them as phonemes. We have just observed that English has 20 vowel phonemes. Each of these phonemes consists of a number of variants called allophones. Each allophone, of necessity, is the sum-total of a number of "sub-allophones" and thus the analysis may continue to a meaningless infinity.

But linguistic analysis has to be practical. Different realizations of the "same" sound cluster about an average core, and although "same" sounds have different attributes, within the diversity there appears to be a primary or central feature characterizing the phoneme. The central feature may be a composite of a number of attributes, but it lends oneness or "sameness" to the phoneme.

The R.P. specifications on the two-dimensional vowel diagram, which primarily represent tongue positions in the articulation of vocoids, are based on the oneness of the quality of English vocoids. It is this oneness that constitutes the basis of the comparative analysis of this investigation. In overt realization it is demonstrated in a recorded version on tape: "English Pronunciation Practice", by G.F. Arnold and A.C. Gimson, published by University of London Press, Limited. These realizations constitute the Norm. Realizations of A.- E. Bilinguals are matched against those of the Norm which represents Southern British English.

As the rendition of the Norm is recorded on tape it constitutes a substantial constant with which the renditions of A.- E. Bilinguals may be compared.

C.2.

Tests.

C.2.1.

Reading Test (a).

The first reading test - a copy of which is attached - consists of a number of words in citation form followed by sentences, some of which are in dialogue form. The test consists of twenty units, each highlighting one vocoid in different environments. The underscored citation forms of the Norm were spoken by Miss O.M. Tooley, lecturer in phonetics at University College, London. The citation forms that are not underscored were spoken by Arnold and Gimson, already referred to, i.e. the Norm. In addition to the words spoken by the Norm, A. - E. Bilingual subjects also spoke the words in brackets, and the "dialogue" after each group of isolated words.

Two subjects, one male and one female, took the test at a time, the female speaking the words recorded by Miss Tooley and the male speaking the words recorded by the Norm. The subjects were given time to "wear off microphone shyness" by recording snatches of their own conversation and then listening to a playback of their own recordings. The object was to record the "natural" speech of the subjects, as formal, stylized speech would have little validity for this investigation. The necessity for "speaking as you normally do" was impressed upon the subjects. They spoke directly into a highly sensitive

(contd on p. 75...

READING TESTS

READING TEST A.

bee see teethe   leave wheel heels
beats seek   ceased teeth
be beats   see seek   teethe teeth

(read complete eat feel ease knee geese creature.)

A. The lady received a lovely necklace.
B. Is it made of diamonds?
A. No, just a number of cheap beads.
B. How they imitate real diamonds beats me.
A. Yes, the key to the process is a close secret.
B. When the wheel fell on my knee, I was hurt.
A. Can you see the blisters on his feet?
B. The sick man asked me to feed his chickens please.
A. I see a bee on the leaf of the tree.
B. There are a number of beacons on the top of the hills.
A. The noise ceased when the wheel was oiled.

lid will wit hills   chilled chicks big sin
lead lid   wheat wit   heels hills

(pencil fit busy honest big practice marriage kill.)

A. Did you reach the village last night?
B. No, the bridge was washed away.
A. Are you ready to come in?
B. Yes willingly, I'm tired and hungry.
A. Did you meet the rich farmer?
B. No, but his son invited me into his house.
A. What pink pimples are these on your arm?
B. It's a rash, it itches terribly.
A. Why is your kit so wet?
B. Keep your chickens out of my garden.
A. What is your opinion of my assistant?
B. She seems both happy and pretty.
A. She sits in her office all day long, looking through the window.
B. Please give me a pill for my headache.
A. I think a glass of milk will be better.

<u>felled felt wretch well Welsh</u>
bench sends legs left
<u>field filled felled</u> <u>reach rich wretch</u>
wheel will well

(bet egg bell.)

A. I bet you didn't see the error.
B. He felt ill when he bumped his head against the branch.
A. Did you spend ten days at the seaside?
B. Yes, but we meant to stay for eleven.
A. Did you pick up a shell each day?
B. I filled a big bag myself.
A. He kept his parrot in a cage, didn't he?
B. Yes man he did.
A. Who's that man over there?
B. It's the gentleman I met yesterday.
A. Many people have been buried in the churchyard.

<u>tanned tapped racks Madge</u> trash shall shanks damp
<u>tinned tend tanned</u> ricks recks racks
him hem ham

A. He hurt his back.
B. How?
A. There are many ants in that bag.
B. This is a bad bed as it is too narrow.
A. The happy children catch butterflies.
B. Did you see any person by the name of Annie?
A. You're a particularly lucky chap.
B. I don't think I've had more luck than Alfred.
A. Is that a shell?
B. No, it's an apple and it's made of plastic material.
A. The load you carry appears to be heavy.
B. I have reason to be happy because the champion allowed me to carry his flag.

<u>drudge drugs pun gull</u> gush fudge hum jump
<u>drags drugs</u> <u>pan pun</u> ham hum

(plunder colour judge but.)

A. Does he help his mother when she's in trouble?
B. He bakes buns for her because he loves her.
A. The first of autumn was a dull day.
B. The judge sometimes spends week-ends in a lonely hut.
A. Climb up and stand under the platform.
B. The murderer escaped with a lot of plunder.
A. The composer is bankrupt and has no money.
B. Don't try to curry favour with the manager.
A. She cut her finger with a knife.
B. We were at the circus and the baby lay in its cot.
A. He ate one hot bun and burnt his tongue.
B. The man on crutches got a big chunk of cake.

<u>car far charged</u> starve hard large
<u>cart staff</u> heart larch
<u>car cart</u> starve staff large larch
ham hum harm match much march

A. The master will come to me after lunch.
B. Did you ask him to visit you?
A. Yes. Are you coming as well?
B. No thank you. I have to mow the grass in my garden.
A. Did you find your cat?
B. Yes, asleep in the cart.
A. I painted the baby's cot blue.
B. The dog barked all night.
A. There are no plants in the parched fields and the animals starve.
B. The wet roads are impassable.
A. He left the cord in your car.
B. The crafty business man made a large pile.

dolls dock cod wrong   shone want watched pond
cud card cod   duck dark dock   stuck stark stock

(box sorry cough cotton.)

A. The bomb destroyed the village completely.
B. It was dropped on that spot.
A. We often go to the sea-side on holiday.
B. There is a long coral reef near the beach.
A. Pass me the padlock in that red box, please.
B. The dog leads the blind man.
A. It stops before it crosses the street.
B. The maid broke the orange pot.
A. And also the baby's doll.
B. I was shocked when I saw the pieces on the floor.
A. Many ships dock at Cape Town.
B. He cut a thick rod to scare the dogs.
A. Give me an orange please.
B. Italy uses much olive oil.

gnaw saws jaw   drawled stormed gorged
north sauce   jaunt stalk
gnaw north   saws sauce   jaw jaunt
stuck stark stock stalk

A. You ought to know that he was born on Christmas day.
B. We had a good downpour but need more rain.
A. Please call Tom and all his friends.
B. The organ in that church was imported from Holland.
A. Is that so! I thought you bought it at the auction sale.
B. The cog of the bicycle broke.
A. There is a brown ornament on the board.
B. He got a strong piece of cord to tie up the parcel.
A. Who caught the thief in your house?
B. It was the strong arm of the law.
A. The child is fond of a coloured ball.
B. Have some more sweet corn.
A. No thank you, no more.

<u>pull would butcher sugar</u>

shouldn't couldn't cook full

<u>ward wood</u> fought foot Paul pull

A. The room in the hotel was quite good.
B. But the cook could improve.
A. The steward did not put any sugar on the table.
B. Where did you put the book I gave you?
A. Look for it under the cushion on the chair.
B. The wood was near, so we went on foot.
A. No, the pool was too deep.
B. Did you see the wolf in the bush?
A. Don't try to fool me: it wasn't a wolf.
B. The bull charged and the boy could not run fast enough.
A. Couldn't someone help?
B. A farmer pulled the boy through the fence and pushed the bull back.
A. The sailor belongs to the ship's crew.

<u>tool youths rue</u> bruise move new

<u>tooth youth</u> roof Bruce

<u>tool tooth</u> <u>youths youth</u> rue roof

<u>Paul pull pool</u> sort soot suit

A. Please help me move this table with the food.
B. What's that on the beautiful blue plate?
A. It's a goose.
B. Water oozes out of the porous rock.
A. You're in a bad mood: don't tread on my foot.
B. What size boot do you wear?
A. I wear shoes and not boots.
B. He has no clue how to solve the problem.
A. As a rule hotels brew their tea too strong.
B. The children liked the merry tune.
A. The dolphin is kept in a pool at the zoo.
B. I choose to remain at home.

<u>heard surge Thursday</u> pearl world burns
<u>hurt search</u> thirsty purse
<u>heard hurt</u> surge search Thursday thirsty
<u>buns burns</u> such search

A. Sir, I've worked hard all day.
B. You were at it from early this morning.
A. In the journal I read an article on world trade.
B. The nurse wears an expensive fur coat.
A. There is no man on earth who does not err.
B. You burnt the book with the difficult words.
A. Herbs are used to make medicine.
B. I shall reserve seats for the play.
A. The burns were only on the surface.
B. We heard a low murmur in the church.

<u>heater younger doctor</u> baker counter
<u>above photography</u>
particularly afterwards decorative

A. The children were alone for about seven hours.
B. Do come along again please.
A. He wrote a good, readable account of the event.
B. The crew were still alive when help arrived.
A. In China much rice is grown.
B. Eat much salad for dinner in summer.
A. The labourers delivered all the goods.
B. What size collar does he wear?
A. I don't know, but his neck is thicker than mine.
B. Mother sends me to the baker every second day.
A. The girl has no particular close friends.

<u>played tray jailed</u>   name raised shades
<u>plate trace</u>   raced shapes
<u>played plate</u>   <u>tray trace</u>   raised raced
<u>red raid</u>   chest chased

A. Yesterday he trod on the cat's tail.
B. He aimed straight at the bird.
A. Marmalade is obtainable in all shops.
B. After the rain the fields changed and became green.
A. The male bird made the nest and then the female laid the eggs.
B. My tooth aches.
A. What with no rain for six months the farmers haven't a ray of hope.
B. The cat ran away across the railway line.
A. Everyone is gay and happy at Christmas.
B. He played well and raced down the line to score a try.

<u>stowed mow told</u>   code robe loaves
<u>stoat most</u>   coat ropes
<u>stowed stoat</u>   mow most   robes ropes
<u>four fur foe</u>   porch perch poach

A. Don't wait for me to help you.
B. I shall go with you to buy the old boat.
A. There are many oak trees along the road.
B. He choked when he ate the roll so fast.
A. The farmer has a good crop of oats.
B. Coal was in short supply this winter.
A. We buy two loaves of bread daily.
B. He told me what the price of the coat was.
A. Here's a bone for your dog.
B. Please slip the note beneath the door.
A. Do not telephone him very early.

<u>child mine</u>	wives lithe	<u>iron</u> pyres
<u>might wife's</u>	life pious	
<u>mine might</u>	lithe like	<u>pyres pious</u>
<u>spy spire</u>	tied tired	

A. While you try to ride I'm going to lead the horse.
B. All right, but if I fall from this height I'll break my arm.
A. He decided to buy his wife a diamond ring.
B. The crocodile caught a calf.
A. Sit closer to the fire.
B. What kind of bird flies so fast?
A. He lost his kite.
B. How did it happen?
A. It blew against a cart and broke.
B. Wait a while before you light the fire.
A. He lives far from the heart of the city and the high society.
B. The writer dramatised the history of Napoleon.

<u>bough cows</u>	howl drown	<u>hour</u> Howard
<u>bout house</u>	drought Howarth	
<u>bough bout</u>	drown drought	<u>Howard Howarth</u>
<u>bough bower</u>	tired towered.	

A. He is a man about town.
B. The owl has just flown out of the towering tree.
A. We shall climb the mountain on our farm.
B. If your father allows you to go.
A. Use a dry towel to wipe your brow.
B. If you don't cross the river now you might drown.
A. Gunpowder is a dangerous compound.
B. Many cows died during the long drought.
A. Is your house in town or on the outskirts?
B. Not so loud please; be calm.
A. He announces that he has flowers to sell.
B. The dog lay on the couch and growled.

<u>joined boils coins</u> coiled poise poison
<u>joint point</u> voice choice
<u>joined joint</u> Poise point void voice

A. The boy picked up a coin in the street.
B. The soil seems to be fertile.
A. Do you wish to buy the house?
B. No there is too much noise in the street.
A. Moisten the rust with a drop of oil.
B. The royal prince spoke in a loud, clear voice.
A. We had a wide choice of sweets and enjoyed the party.
B. The snake lay coiled ready to strike with its poisonous fangs.
A. When the guide joined us he pointed out all the historical buildings.
B. The employer pays his boys good wages.

<u>peers tearful</u> <u>cheered veered</u>
seering hears merely weird
<u>pierce</u> fierce
<u>peers pierce</u> fears fierce

A. How many months are there in a year?
B. My dear, here is the answer: twelve.
A. That fair girl lives near to us.
B. The cashier was weary after a day at the counter.
A. It is clear that he prefers a long beard.
B. This is a real diamond and not a piece of glass.
A. We enjoyed the show at the theatre.
B. He now has the rank of brigadier.
A. A weird figure appeared among the graves.
B. Be careful! don't tear the covering of the chair.
A. No one knows what his idea is.
B. There were tears in the woman's eyes.

dared careful vary there shares rare where stairway
scarce

beared bared bed speared spared sped

cheery chary cherry

A. Do you dare to walk about with such long hair?
B. May I not wear my hair as I please?
A. Please repair the broken chair.
B. For various reasons he could not be there in time.
A. You will find the milk in the dairy.
B. All listened to the prayer of the parson.
A. Where does the cold air blow in?
B. Be careful when you compare the old and the new.
A. Cheer up! don't be so sad.
B. Father always calls Mother: "My Deary".
A. Can you hear well?
B. No, I'm deaf in one ear.
A. The pupil's work is fair.

jury surely truer fluency
pure during fewer European
influence arduous valuable

A. He is sure of his facts.
B. The doctor cured him completely.
A. The cruel man beat the poor dog.
B. We are curious to know about his tour.
A. They assure us that there are fewer lions in these parts.
B. He thanked the rescuer who saved him from drowning.
A. We all want security when we grow old.
B. During the holidays we had many visitors.
A. The mayor is a man of great influence.
B. That stone might be a valuable diamond.

READING TEST B.

leave wheel heels
ceased teeth teethe

A. A number of cheap beads.
B. The key to the process.
A. The wheel fell on my knee.
B. Feed his chickens please.

---

chilled chicks big sin
wheat wit heels hills
pencil fit busy honest marriage kill

A. The bridge was washed away.
B. Are you ready to come in?
A. Did you meet the rich farmer?
B. Pink pimples.
A. It's a rash, it itches terribly.
B. Why is your kit so wet?
A. What is your opinion of my assistant?
B. Please give me a pill for my headache.
A. I think a glass of milk will be better.

---

bench sends legs left
wheel will well bet egg bell

A. He felt ill.
B. Did you spend ten days?
A. Did you pick up a shell?
B. I filled a big bag myself.
A. Yes man he did.
B. It's the gentleman I met yesterday.

---

trash	shall	shanks	damp		
ricks	recks	racks	him	hem	ham

A. He hurt his back.
B. There are many ants in that bag.
A. This is a bad bed.
B. You're a lucky chap.
A. It's an apple made of plastic material.
B. I have reason to be happy because the champion allowed me to carry his flag.

---

gush	fudge	hum	jump	ham	hum
plunder	colour	judge	but		

A. Does he help his mother when she's in trouble?
B. He loves her.
A. The judge in a lonely hut.
B. She cut her finger.
A. He ate one hot bun and burnt his tongue.
B. The man on crutches got a big chunk of cake.

---

starve	hard	large	heart	larch
staff	match	much	march	

A. The master will come to me after lunch.
B. The grass in my garden.
A. There are no plants in the parched fields and the animals starve.
B. The wet roads are impassable.
A. The crafty business man made a large pile.

---

shone want watched pond
stuck stark stock
box sorry cough cotton

A. The bomb destroyed the village completely.
B. It was dropped on that spot.
A. In that red box, please.
B. It stops before it crosses the street.
A. The maid broke the orange pot.
B. And the baby's doll.
A. Many ships dock at Cape Town.
B. He cut a thick rod to scare the dogs.

---

drawled stormed gorged jaunt stalk
stuck stark stock stalk

A. We had a good downpour but need more rain.
B. Please call Tom.
A. The organ was imported from Holland.
B. It was the strong arm of the law.
A. Have some more sweet corn.

---

shouldn't couldn't cook full
fought foot Paul pull

A. The room in the hotel was quite good.
B. But the cook could improve.
A. The wood was near, so we went on foot.
B. No, the pool was too deep.
A. A farmer pulled the boy through the fence.

---

bruise move new roof Bruce
rue sort soot suit

A. Please help me move this table with the food.
B. It's a goose.
A. You're in a bad mood: don't tread on my foot.
B. As a rule hotels brew their tea too strong.
A. The dolphin is kept in a pool at the Zoo.
B. I choose to remain at home.

---

pearl world burns purse
surge search Thursday thirsty such

A. You were at it from early this morning.
B. In the journal I read an article on world trade.
A. You burnt the book with the difficult words.
B. We heard a low murmur in the church.

---

baker counter
particularly afterwards decorative

A. The children were alone.
B. In China much rice is grown.
A. Eat much salad for dinner in summer.
B. Mother sends me to the baker.

---

name shades raced shapes
raised raced chest chased

A. The cat's tail.
B. He aimed straight.
A. After the rain the fields changed and became green.
B. The male bird made the nest and then the female laid the eggs.

---

code robe loaves coat
mow most robes ropes porch perch poach

A. I shall go with you to buy the old boat.
B. He choked when he ate the roll so fast.

---

wives lithe life pious
like tied tired

A. While you try to ride I'm going to lead the horse.
B. Sit closer to the fire.
A. He lost his kite.
B. Wait a while before you light the fire.

---

howl Howarth bough bout
drown drought tired towered

A. The owl has just flown out of the towering tree.
B. Use a dry towel to wipe your brow.
A. Cross the river now.
B. Many cows died during the long drought.
A. Is your house in town or on the outskirts?
B. He has flowers to sell.

---

coiled	poison	voice	choice
poise	point	void	voice

A. Moisten the rust with a drop of oil.
B. The royal prince spoke in a loud, clear voice.
A. The snake lay coiled ready to strike with its poisonous fangs.
B. The guide joined us.
A. The employer pays his boys good wages.

---

seering	hears	merely	weird
fierce	fears	fierce	

A. How many months are there in a year?
B. That fair girl lives near to us.
A. A weird figure appeared among the graves.
B. Be careful: don't tear the covering of the chair.
A. No one knows what his idea is.

---

shares	rare	where	stairway		
speared	spared	sped	cheery	chary	cherry

A. Do you dare to walk about with such long hair?
B. Please repair the broken chair.
A. Be careful when you compare the old and the new.
B. The pupil's work is fair.

---

truer	fluency
fewer	European
valuable	

A. He is sure of his facts.
B. The cruel man beat the poor dog.

TELEVISION

(Speakers: George Smith and his son, John.)

GEORGE: There's a dreadful din coming from Ann's bedroom, John. What on earth is it?

JOHN: Oh, she's borrowed a record-player from one of her friends, and she's trying out some of her latest records.

GEORGE: Does she have to have it on quite so loud? The whole house seems to be trembling with it. Anyway, why can't she use our radiogram?

JOHN: Ours isn't any good, if you really want to hear the music. For one thing, it's got such a small loudspeaker, and only about half the notes come over. And I don't know how many years we've had the sapphire. It must ruin the records we play on it. It's time we got a proper record-player, with bass and treble controls.

GEORGE: That'd be a waste of money. We hardly ever use the grammophone part. And when we do, the quality seems perfectly all right to me.

JOHN: That's because you've got used to it. If we had a decent machine, we'd be able to play it more often. As it is, I wouldn't play my records on it.

GEORGE: Well, we'll have to think about it. But push the door to, would you? It'll keep some of the noise out. I thought I might look at the play on television. When does it come on? Have you seen the Radio Times?

JOHN: Yes. It's on the stool by the fireplace. I'd been hoping to see the soccer international between England and Scotland. It's being played this evening. And I think it's being televised.

GEORGE: That's right. From eight to nine. And the play begins at nine-fifteen. After the news. You may as well switch it on now. You'll get the end of the football match.

JOHN: The picture takes ages to come on this set. Ah! At last! It's not very good, is it? It looks as though they're playing in a fog. Shall I put the big light out?

GEORGE: Yes, just leave the little lamp on. That's better. I think that's as good a picture as you can hope for. I'm afraid the tube's going.

JOHN: What you ought to do is to hire a set. You pay so much a month, and the firm guarantees to maintain the set for you.

GEORGE: No, I think I'd rather buy one. These modern sets are pretty reliable. Hallo! Someone's scored a goal. Would that be Scotland or England?

JOHN: I missed what the commentator was saying because you were talking. I expect they'll show the score on the screen. Ah, yes! Two goals each. And about a quarter of an hour still to go. The play should warm up now. All the papers were expecting England to win easily.

GEORGE: Now who's talking!

microphone attached to a Philips cassette recorder model 2205.

To facilitate comparison the subjects first spoke the isolated words recorded by the Norm. It will be observed that, wherever possible, the vocoids are in contexts in which they are normally pronounced "long" e.g. <u>leave</u>, and in contexts in which the long vocoid is normally "shortened", e.g. <u>beats</u>.

In the isolated words not spoken by the Norm and in the continuous structures, an attempt was made to distribute the vocoids in contexts that would reflect their normal disposition in everyday speech. These are: initially, finally, in stressed and unstressed positions, in mono- and poly-syllabic structures, medially in different contexts e.g. contiguous to lateral, fricatives, ligatures, plosives, velars, affricates, nasals, etc..

After the reading test had been completed by twenty pairs, it became obvious that the test was too long as it took more than an hour with a short break for one pair to complete the test.

<u>Reading Test (b)</u>.

Reading test (b) consists of a modified version of Reading test (a). The number of units and the essential features were retained, but the test was considerably curtailed and the parts read by female subjects were discontinued. It was felt that an adequate number of female renditions had been recorded for auditory analysis. Another consideration was that because of the difference in pitch, the frequencies of a female voice are on an average 16 to 20% higher than those of a male voice - and because of the resultant difficulty in adjusting the spectrograph to accommodate female voices, spectrographic analysis is usually limited to male voices. The result was that only male voices were used for acoustical analysis. Reading test (b) was completed by 58 subjects.

Reading Test (c).

The recording of isolated words in "English Pronunciation Practice" is followed by three dialogues, the first of which is "Television" in which the speakers are "George Smith and his son, John". A scripted version of the recording was read by twelve subjects in groups of two. Copies of the full dialogue were given to the subjects. They were allowed time to read through the dialogue and were then instructed to read only the underscored parts for recording purposes. The object was to use these excerpts for acoustical analysis, and also for auditory analysis of contrastive timbre and intonation.

C.2.2.

"Free speech" Test.

Free speech uninhibited by conventional orthography was elicited by a series of wordless pictures cut from magazines and newspapers. The subjects were allowed time to study the pictures and, as in the case of the reading tests, were taken in pairs. My impressions are that the mere presence of a fellow subject in like circumstances was conducive to allaying nervous fear of the microphone, and this, in turn, promoted normal renditions. Subjects spoke under less strain and were less conscious of the restraints of controlled experimental conditions.

The photographs and pictures were topical and were representative of a wide range of interests. The subjects were requested to give a straightforward description of what they saw and, if they so wished, to comment on any aspect of the pictures. The subjects responded readily.

C.3.

(a) Analysing Procedure: Short and Long Relatively Pure Vocoids.

The following recordings were available for comparative purposes: Primary and Secondary Cardinal Vowels, spoken by Daniel Jones; "English Pronunciation Practice" which included English vocoids, contoids and dialogues; Afrikaans vocoids by an Afrikaans native informant who had had four years "speech training", but whose speech, in spite of his training, was neither "stylized" nor "advanced", but represented that of the average, educated Afrikaans native. It could be regarded as the Afrikaans counterpart of R.P., The specifications of the Cardinal Vowels, and English and Afrikaans vocoids were plotted on large-scale two-dimensional vowel diagrams ruled in squares of 1cm. The English specifications are those given by Gimson as the dominant realizations of R.P. in his "Introduction", and the Afrikaans specifications those given by Pienaar.

The vowel chart was in turn divided into large-scale sections depicting the following groups of vowels and vocoids:

1. Close, front area: Cardinals: [i] and [e].
English : [i] and [ɩ].
Afrikaans: [i (:), e, ø, y (:)].

2.	Mid and open, front area:	Cardinals: [e] to [a].
		English : [e, ɛ , æ].
		Afrikaans: [ɛ(:), œ]
3.	Open and mid, back area:	Cardinals: [ɑ] to [o].
		English :[ɑ , ɒ , ɔ:, ʌ].
		Afrikaans:[ɑ , ɔ: ɔ].
4.	Close, back area:	Cardinals: [o] to [u].
		English :[ω , u:].
		Afrikaans: [o, u(:)].
5.	Central area :	Cardinals:[ɨ , ʉ].
		English : [ə , ɜ:].
		Afrikaans: [ə].

The large-scale vowel chart was used for the diphthongs.

To compare the rendition of the A.-E. Bilinguals with that of the Norm, the procedure was as follows. A single word spoken by the Norm was matched against its counterpart spoken by a Bilingual subject. Wherever relevant, the rendition was also compared with a "similar" vocoid spoken by the Afrikaans native informant. The renditions were compared by a panel of judges comprising a highly trained music teacher of considerable experience, a teacher of many years' experience with a high degree of proficiency in both English and Afrikaans and the author. Renditions were primarily matched for quality against English realizations by the Norm. Dominant articulatory parameters that were considered were:

tongue movements:		front-back, open-close.
		velarization / palatalization.
nasality	:	open / closure of nasal passage.
lip movements	:	different degrees of lip-rounding.

A native English subject has learnt to co-ordinate these parameters from infancy in accordance with the constraints of his native system. A.-E. Bilinguals do not co-ordinate the parameters with the same degree of ability as do native English.

Normally we do not listen to these parameters individually. "We <u>hear</u> the medium as a single unanalysed continuing noise, fluctuating in quality", (Abercrombie, op.cit., p.124). But, in the process of comparing and contrasting, of investigating what features inhibit renditions of native quality, one analyses the parameters that co-ordinate to produce a "single noise". The composite sound is broken up into component features correlated to organic processes. Differences in quality are related to one or more differences in the configuration of the vocal organs. Qualitative differences in the realization by an A.-E. Bilingual, of English [ɩ], for instance, may be due to lowering of the hump of the front of the tongue, and / or retraction of the tongue, or to slight lip-rounding, or to lowering of the centre of the tongue, etc.. By repeatedly comparing alternate renditions of the same vocoid by the Norm and a Bilingual subject, and contrasting the renditions with other vocoids, any variant rendition of a vocoid can be plotted on the vowel chart with a reasonable degree of accuracy. It must be emphasized that it is virtually impossible to pin-point a rendition on the strength of auditory analysis. A point on the chart is approximate and the squares facilitate identifying the finer-grained distinctions that are necessitated by contrastive analysis.

C.3.

(b) Analysing Procedure: Diphthongal Vocoid Glides.

Phoneticians and linguists are cautious in charting the point of inception and point of termination of a diphthong. One reason is that a diphthong is a sound with a duophonic structure, so that, in addition to contextual conditioning of quality, there exists reciprocal conditioning between the component elements. See Pienaar, (op. cit.,p.60) on partial assimilation in the articulation of the Afrikaans diphthong in a word such as "ys" ("ice"), for instance. If the beginning of the diphthong could be extracted and isolated and repeatedly heard, the identity of the inception would be able to be established with a fair degree of accuracy. The same applies to the end of the diphthong. The glide could then be indicated with virtual accuracy, as the tongue, in moving from one vocoid position to another follows the most direct route, (Ward, op. cit.,p.111).

To facilitate exact identification of the elements of diphthongal glides a sound segmentator was used. As the name implies, the instrument segments sounds, and any part of a structure may be isolated and repeated until its identity has been fixed. Furthermore, once a sound has been isolated, the remaining part of a structure contiguous to the isolated sound may be progressively added by infinitesimal portions. The linear capacity of the sound segmentator is limited and it can accommodate structures with a maximum of about six or seven syllables.

C.4.

Geographic Distribution of Subjects.

The subjects whose renditions were recorded came from all four provinces of the Republic of South Africa and from South West Africa. Most of the subjects ranged in age between eighteen and twenty-five. There were fourteen middle-aged subjects and two who were between fifty and sixty. This investigation is concerned with linguistic habits that have already been firmly entrenched, so that the speech of the younger subjects is not included in this investigation for contrastive purposes. As the subjects hail from different parts of South Africa, the renditions would be a fair average representation of the English of A.-E. Bilinguals.

C.5.

Comparative Analysis of Vocoids.

Fig. C.5.(i) is a specimen chart illustrating the method that was adopted in plotting the vocoids in different environments as spoken by A.-E. Bilingual subjects. Cardinal Vowels are indicated on the periphery and English and "standard Afrikaans" specifications have, for this purpose, fixed locations.

The citation forms were spoken both by the Norm and by A.-E. Bilingual subjects, with the result that the plotting of the vocoids as articulated by the Bilingual subjects in relation to the R.P. specifications, presented little difficulty. Vocoids in contexts in sentences, even though they had no model counterparts, were relatively easy to locate, as renditions were inhibited by conventional orthography and reading habits that had been ingrained during years at school.

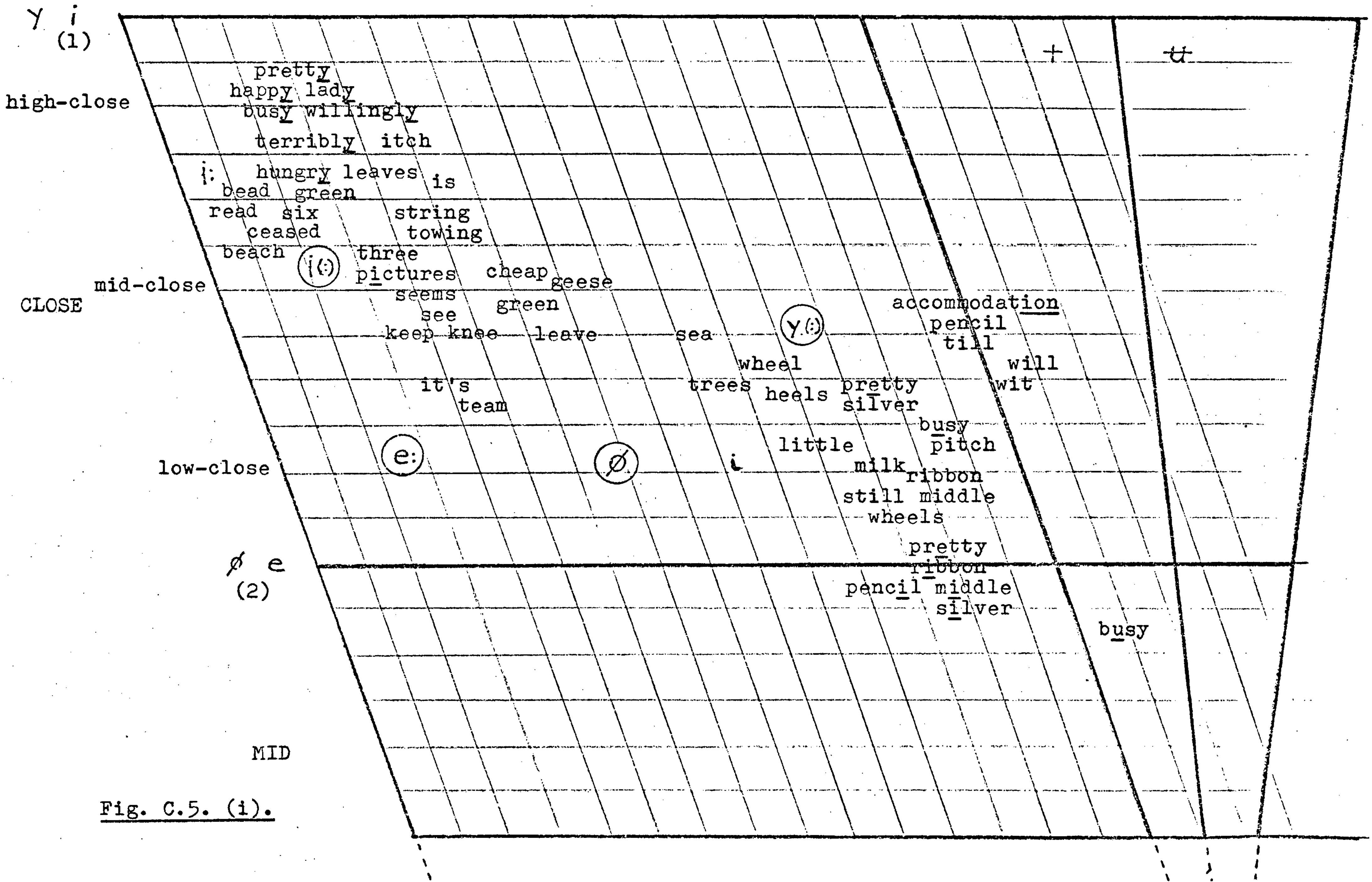
At the same time Bilinguals are exposed to pattern discrepancy with which they cannot cope adequately, so that, in spite of "mental preparation" and requests "to read as you normally speak", scripted texts do not produce the freedom of rendition of free speech. Free speech, engendered by wordless pictures, provided the most valid data as it represented the normal and unaffected overt response by Bilinguals. But, free speech also presented the greatest difficulty in analysis, as contextualized structures are subjected to the pressures of supporting phonemic and morphemic patterns, and are characterized by hesitations, breaks, incomplete verbalization, etc., so that test words had to be mentally isolated for comparative purposes. Most of the recordings had to be played many times before it was felt that renditions could be identified and plotted with a reasonable degree of accuracy.

A detailed account of the allophonic realizations of A.-E. Bilinguals would be inexhaustible! Representative realizations will be discussed below, and a summary of trends will be given at the end of this division.

Vocoid / i: /

The dominant R.P. allophone is one in which the front of the tongue is raised slightly below and behind C1=[i]. The lips are spread and the articulation is tense.

The dominant Afrikaans allophone shares a rather close point of articulation. The hump of the tongue is just above mid-close, and the lips are "effens gesprei, maar sotesê neutraal", ("slightly spread, but virtually neutral"), (Pienaar, op. cit., p.47). In relation to R.P. /i:/ the Afrikaans allophone



y i
(1)
high-close
mid-close
CLOSE
low-close
ø e
(2)
MID
ɨ ʉ
pretty
happy lady
busy willingly
terribly itch
i:
hungry leaves is
bead green
read six string
ceased towing
beach i(:) three
pictures cheap geese
seems green
see
keep knee leave sea y(:)
accommodation
pencil
till
will
wit
wheel
it's
team
trees heels pretty
silver
busy
e: ø i little pitch
milk ribbon
still middle
wheels
pretty
ribbon
pencil middle
silver
busy

Fig. C.5. (i).

is more open and retracted. Articulation is lax.

Virtually no realizations by A.-E. Bilinguals approximate the tense, close articulation of R.P.. Long, nuclear vocoids with primary stress, between initial bilabial and final affricate, e.g. "beach", or alveolar fricative e.g. "seems, ceased", cluster in the front mid-close area between R.P. /i:/ and Afrikaans /i/ e.g. [bï:tʃ, bï:d, sï:mz, sï:st]. Final /d/ and /z/ are usually devoiced; frequently to such a degree that the opposition "bead - beat" is neutralized, not only qualitatively, but also quantitatively, because in devoicing final /d/, Bilinguals also shorten the duration. The reason can probably be found in their native system. In the Afrikaans system symbols [d] and [t] in final position are representative of one phoneme, namely, /t/. Bilinguals transfer the non-distinctive rendering into English at the same time equating the duration of the vocoids. At phonological level the words "bead" and "beat" are in complete complementation.

Pre-nuclear velars /g/, /k/, e.g. "geese, keep", affricate /tʃ/, e.g. "cheap", alveolar nasal e.g. "knee" (followed by an unchecked nucleus), all condition front, mid-close articulation distributed in retracted Afrikaans /i/ area, provided that no post-nuclear /l/ is involved. Realizations of allophones between labio-velar semi-vowel glide /w/ and final /l/, e.g. "wheel", oscillate between high-close retracted R.P. /i:/ and a low-close centralized variant, almost a close fronted /ə/. In this context, the influence of [l] is significant. Three dominant allophones are observed:

(i) diphthongization of long /i:/ with an /ə/ glide on to [l];

(ii) a stylized, virtually homorganic realization, tense, high-close retracted, terminating in a pronounced, clear [l]; and,

(iii) a centralized variant approximating close schwa /ə/.

Realizations in polysyllabic contexts, such as "complete, creature, beacons" are marked by a front allophone between mid- and high-close. Very few subjects observe stress and intonational features. Normally reduced syllables in polysyllabic structures are spoken with secondary stress, and the above words are rendered: [ˌkɒmˈplḭ:t, ˈkrḭ: ˌtʃə̰, ˈbï:ˌkəns], (/z/ of "beacons" usually being devoiced). Citation forms are sometimes rendered with primary stress on both syllables. Endeavours to render hypercorrect versions also produce allophones in the Cl area.

English /h/ is rarely realized as a voiceless fricative. Bilinguals render variants of a voiced semi-vowel. Adjacent [i] is articulated with a retracted hump of the tongue in the mid-close area, with relaxation of effort. Final [l] has the same conditioning influence as in "wheel" above. Pre-vocalic R.P. /r/, [ɹ], which, usually, is a frictionless continuant, is realized as a voiced lingual roll [r] produced by a succession of taps of the tip of the tongue against the alveolar ridge. This configuration conditions the quality of nuclear [i] in "read, reach", producing a retracted, lax variant of R.P. /i:/, between high-close and mid-close, [rḭ:d, rḭ:tʃ].

Vocoid /ɩ/.

The dominant R.P. allophone is pronounced with the postfrontal part of the tongue above the half-close position. The lips are loosely spread and the articulation is lax.

The nearest Afrikaans vocoids, organically, are retracted /y/ and /ø/ which are rounded counterparts of /i/ and /e/ respectively. Acoustic Afrikaans proximates are /i/ and /ə/ which may be regarded as fronted and retracted allophones of R.P. /ɩ/. The variants span the gamut from high-close to high-central, clustering about these polar areas. In word initial structures (VC), in which [i] is followed by a palato-alveolar affricate, e.g. "itch", by a fortis alveolar plosive or contoid cluster, e.g. "it's", by a lenis alveolar fricative, e.g. "is", realizations are fronted and raised to approximate to a slightly retracted R.P. /i:/. Final /z/ of "is" is usually devoiced. "It's" has the most open allophone of the three words cited. These three structures are realized [ïtʃ, ïs, ïts]. Final weakly-stressed /ɩ/ in all di- and polysyllabic structures is raised to the high-close, front area. These realizations sometimes approximate to C1 in closeness but lack the muscular intensification of C1. In disyllabic words, especially, final unstressed /ɩ/ is given secondary stress and not infrequently lengthened. Sometimes the two syllables are uttered with the same degree of prominence so that no accentual difference is perceptible e.g. [ˈprəˈtï· , ˈhæˈpï· , ˈbəˈzï·] , "pretty, happy, busy". In "terribly", [tɛrəblï·] the stress pattern of Bilinguals is primary + weak + secondary/primary.

In the first syllable of the structures "pretty, busy, ribbon, middle, silver, little", in which /ɩ/ oscillates with /ə/ in the realization of Bilinguals, /ɩ/ is centralized to close schwa in high-mid area, e.g. [ˈprə̝ˌtï· , ˈbəˌzï· ,

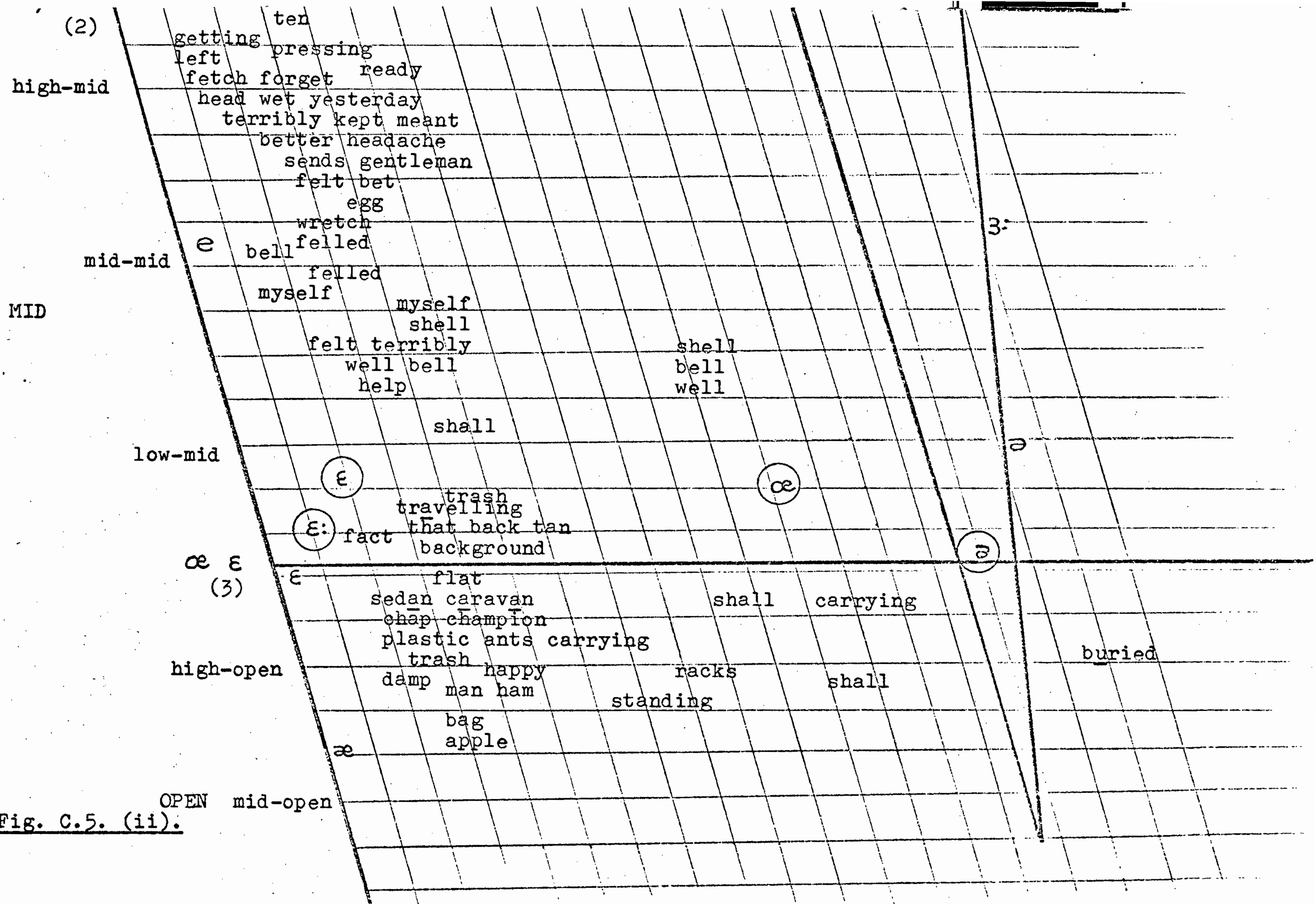
ˈrə̣ˌbə̣n, ˈmə̣ˌdə̣l, ˈsə̣lˌvə̣/ˈsə̣lˌvɜ·, ˈlə̣ˌtə̣l]. "Busy" is frequently rendered [ˈbʌzï·] ,as though the word were spelt "buzzy". The weakly stressed syllable of disyllabic words, e.g. "pencil", is likewise given secondary or even primary stress and realized [ˈpe̥nˌsə̣l/ˈpɛnˌsəl]. The initial /p/ is not aspirated and there is no evidence of syllabic /l/. Syllabification of consonants is foreign to the Afrikaans native system and is not observed in the articulation of average Bilinguals; hence the vocalic nucleus in the second syllable of e.g. "middle, little, pencil".

In monosyllabic structures involving a post-nuclear /l/ or an initial /w/, /ɩ/ is retracted or is centralized to close, fronted /ə/, e.g. [wə̣+l, mə̣+lk, wə̣+t, lï-d], "will, milk, wit, lid" respectively. The same allophones are heard in realizations of "pill, till, build, chilled".

The final "---tion" of polysyllabic structures, e.g. "accommodation", is realized with full syllabic status. The vocoid approximates retracted or centralized Afrikaans /y/ with slight or open lip-rounding, e.g. [ækɒ̣mɔ(ə)ωdəiʃÿ˒n], "accommodation", (diacritic ˒ indicates open lip-rounding). The stress pattern is: secondary + secondary + tertiary + primary + secondary. Raising of weakly stressed syllables to tertiary and secondary stress derives from the inability of Bilinguals to observe the intonational contour of English.

<u>Vocoid /e/</u>.

In articulating R.P. /e/ the front of the tongue is raised between the half-open and the half-close position. Lips are loosely spread. Its position on the periphery implies a



(2)
ten
getting
pressing
left
ready
high-mid
fetch forget
head wet yesterday
terribly kept meant
better headache
sends gentleman
felt bet
egg
wretch
ɜː
e
bell
felled
mid-mid
felled
myself
MID
myself
shell
felt terribly
shell
well bell
bell
help
well
shall
ə
low-mid
ɛ
œ
trash
travelling
ɛː
fact
that back tan
background
ə
œ ɛ
ɛ
flat
(3)
sedan caravan
shall
carrying
chap champion
plastic ants carrying
buried
trash
high-open
happy
racks
damp
shall
man ham
standing
bag
apple
æ
OPEN
mid-open

Fig. C.5. (ii).

degree of muscular tension in articulation. /e/ is charted just above mid-mid.

There are two Afrikaans vocoids which are organically near equivalents, namely, Afrikaans /e/ and /ɛ/. The former is a closer vocoid than R.P. /e/, being in the low-close area, a close, slightly retracted C2=[ẹ-] . /ɛ/ is a close, somewhat retracted C3=[ɛ̣-].

As the Afrikaans system has no similar vocoids, one would expect the predominating influences shaping Bilinguals' realizations to be phonetic proximity and contextual patterning. This is indeed the case. Bilingual realizations cover a wide range from a fronted and retracted low-close area to a low-mid retracted and centralized area. Fig. C.5.(ii) is a specimen chart indicating the realizations of Bilinguals. These may be briefly summarized as follows:

Monosyllabic structures. In virtually all CVC structures, with the exception of structures with a final /l/, realizations are closer than English /e/, bunching about high-mid area. Initial alveolar and velar plosives, e.g. "ten, kept", the bilabial nasal, e.g. "fetch", condition close allophones between high-mid and close, front range, e.g. [tẹ-n, kẹ-pt̪], (initial /p,t,k / are not aspirated, excepting by subjects who have acquired a high degree of bilingual proficiency) - [mẹ-nt, lẹ-ft, fẹ-tʃ]. Realizations of "felt", especially, appear to alternate between high-mid and low-mid retracted allophones, i.e. close and open R.P. /e/, e.g. [fẹ-lt - fe̞-lt̪]. The closest allophone consistently occurred in the realization of "yes", which, at times, was similar to low-close, retracted R.P. /ɩ/. Palatalization of the first element of the semi-vocoid

/j/ is prolonged and the relevant organic arrangement appears to favour a low-close, retracted allophone. Occasionally constriction of /j/ is raised to complete occlusion and, as a result, the first element of the semi-vocoid assumes the features of a voiced, palatal plosive [ɟ] , e.g. [ɟi+s] (fronted R.P. /i/).

A VC structure with initial [e] renders a close R.P. allophone, with final "g" usually devoiced, e.g. [ẹ-k]. A diphthongized rendering of initial [e] in "egg" is heard among elderly A.-E. Bilinguals, e.g. [əik]. In CVC structures with final /l/, the allophones are distributed below mid-mid with retracted hump of the tongue. Thus, "shell, well, bell" are realized [ʃe-l, we-l, be-l]. Not infrequently, nuclear [e] in these structures is retracted to a fronted schwa allophone.

Di- and polysyllabic structures follow the pattern of monosyllables. Nuclear /e/ in the following environments is a high-mid retracted allophone: "getting, pressing, yesterday, forget, better, gentleman, intend". ['gẹ-'tiŋ, 'prẹ-'siŋ, 'jẹ-stər'dai, ˌfɔ·'gẹ-t/ fɔ·rgẹ-t, 'bẹ-'tə-(r), 'dʒẹ-ntəlˌmɛn, in'tẹ-nd]. Realizations of nuclear [e] in "terribly", appear to be evenly divided between a close and an open allophone of English /e/. "Buried" is usually rendered ['bʌˌri·d].

Stress and rhythm patterns of di- and polysyllabic structures are usually those of the Afrikaans system.

Vocoid /æ/.

The tongue position for English /æ/ is raised just below mid-open. The lips are neutrally open. It is produced with constriction in the pharynx,(Gimson, op. cit.,p.100).

The quality is that of open C3 = [ε̞].

Afrikaans has no close articulatory equivalent. In fact, Afrikaans has no vocoid in the open, front area. The nearest Afrikaans organic allophone is /ε/, which is a close C3 = [ε̝] . Afrikaans /ε/ is retracted from the periphery and is articulated with relaxed muscular effort. The specimen chart Fig. C.5.(ii) displays the distribution of Bilingual realizations. It will be observed that these are assembled in retracted high-open area, between R.P. /æ/ and Afrikaans /ε/. A small minority of subjects virtually produce renderings of native proficiency, but average A.-E. Bilinguals achieve a compromise replica between English and Afrikaans boundaries.

In monosyllabic structures the closest allophone occurs between an initial dental fricative and final alveolar plosive e.g. "that", [ðε̝-t̪] . The following CVC environs condition a similar allophone: initial fortis affricate and final, bilabial plosive e.g. "chap", [tʃε-p]; initial ligature /fl/ and final voiced, velar plosive, e.g. "flag", [flε-g] (not infrequently final /g/ is devoiced to /k/); initial bilabial and alveolar plosives, ligature /tr/ and labio-dental fricative e.g. "back, tan, trash, fact" [bε-k, tε·n, trε·ʃ, fε-kt̪]. Final /l/ conditions a retracted allophone of the quality of advanced low schwa e.g. "shall", [ʃə+l̩].

Polysyllabic structures are characterized by similar variant renderings. A very close allophone, similar to retracted Afrikaans /ε/, occurs in "travelling" and in "background", e.g. [ˈtrε̝-vəˌliŋ, ˈbε̝-kgræund] or, with syncopation of /k/ and devoiced /d/ [ˈbε̝-græunt]. Close allophones of /æ/ occur after syllable initial fricatives, plosives, affricates, e.g.

"sedan, caravan, plastic, carry happy", [si·'dɛ+n, 'kɛ+ra,vɛ+n, 'plɛ̣s,tik, 'kɛ̣,ri, 'ɦɛ̣,pi]. A centralized, close allophone is frequently heard in free speech in e.g. "carrying", rendered ['kə+r,iŋ].

A noteworthy feature in the distribution of /æ/ allophones in renditions by A.-E. Bilinguals is that they extend in horizontal dimension from retracted high-open to centralized. Most variants cluster in the high-open front area, where Afrikaans /ɛ/ and R.P. /ɛ/ (usually the inception of the diphthongal glide /ɛə/) are close points of articulation. A number of factors combine to cause the horizontal distribution e.g. contextualization, native bias, phonetic economy. Phonetic economy is a tendency of language to follow the law of least effort. Its manifestation in the above distribution is a tendency for non-native structures to be rendered in a manner approximating the nearest organically similar utterance in the native system.

Vocoid /ʌ/.

The dominant R.P. variety is an unrounded, lowered centralized type of C6 = [ɔ̤̈] . Articulation entails considerable separation of the jaws as the sound, according to Jones (op. cit. p.83), cannot be pronounced with a narrow opening. The tongue is raised just above fully open and the lips are neutrally open.

Afrikaans has no vocoid phoneme which shares a very near point of articulation.

Realizations by A.-E. Bilinguals are spread over a considerable articulatory area ranging from low-central to low

Open and low-mid back vocoids: ɑ, ʌ.

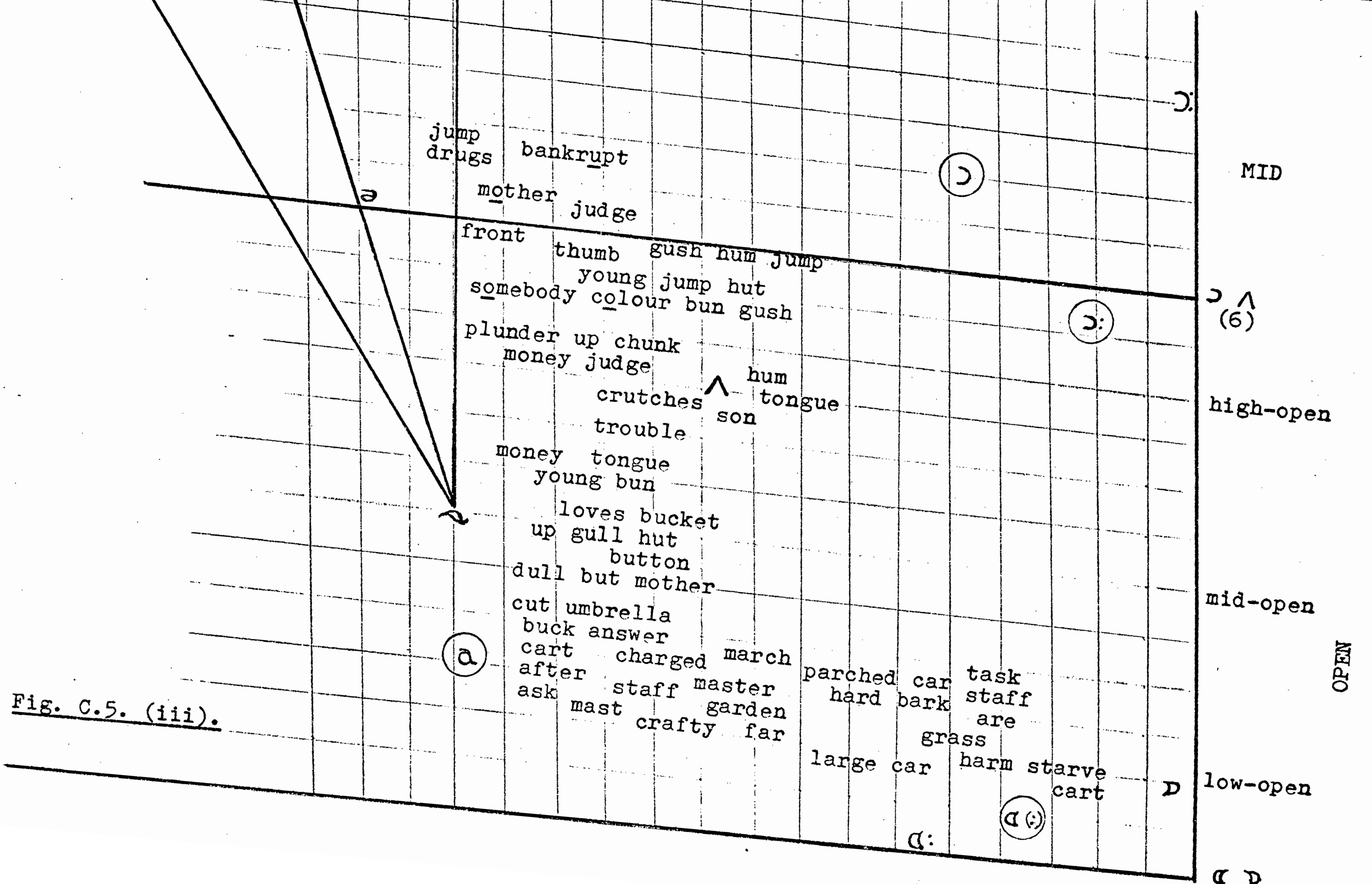


Fig. C.5. (iii).

mid-open. Distribution of realizations are indicated on specimen chart Fig. C.5.(iii). A large number of citation forms and a number of renderings in the continuum of scripted contexts are close equivalents of the timbre of the renderings of the Norm. Main allophones tend towards low-mid central, i.e. a retracted open schwa, and low-open central, i.e. short Afrikaans /a/.

In monosyllabic CVC structures with initial palato-alveolar affricate /dʒ /, compounds /dr/, /fr/, the allophone is slightly retracted low-mid central /ə/, e.g. [dʒə-mp, dʒə-dʒ, drə-gz, frə-nt], "jump, judge, drugs, front" respectively. "Drugs" is frequently realized with devoiced /g/ and /z/, e.g. [drə-ks]. Realizations of the above structures at times equate the quality of the Norm, but these do not represent the dominant trend. CVC structures with initial devoiced palato-alveolar affricate, e.g. "chunk", initial fortis alveolar plosive, e.g. "tongue", initial fortis alveolar fricative, e.g. "son", resemble the timbre of the Norm. The quality of nuclear /ʌ / in "jump" oscillates between low-mid central and open, fronted Afrikaans /ɔ /. Realizations of "gush, hum" share this allophone, e.g. [dʒɔ+mp, gɔ+ʃ, ɦɔ+m], "jump, gush, hum". VC and CVC structures realized with an open, fronted allophone are: word initial "u" in "up", initial velar plosive , e.g. "cut, gull", initial bilabial plosive, e.g. "buck", initial lateral e.g. "loves", [ʌ̙+p, kʌ̙+t, gʌ̙+l, bʌ̙+k, lʌ̙+vz(s)]. The structures are frequently realized with nuclear allophone approximating to Afrikaans /a/ in quality.

Di- and polysyllabic structures have the same range of variants. The allophone in the first syllable of "mother" alternates between retracted low schwa and retracted Afrikaans

/a/ with the latter predominating. Close, centralized allophones of /ʌ/ occur in syllable initial compound /kr/ e.g. "bankrupt" - which is a very close variant -, in initial compound /pl/ e.g. "plunder", initial fortis alveolar fricative, e.g. "somebody", initial /k/ e.g. "colour": [ˈbæŋˌkrʌ̣+pt, ˈplə̣-nˌdə̣, ˈsə̣-mˈbɔˌdi , kə̣-lər]. Initial /b,m/ condition open, fronted allophones, e.g. [ˈbʌ̣+ˌkət, ˈbʌ̣+ˌtən, ˈmʌ̣+ðər], "bucket, button, mother, umbrella". Initial /ʌ/ is also rendered with an open, fronted allophone, e.g. [ʌ̣+mˈbrɛˌlə̣].

Vocoid /ɑ:/.

R.P. /ɑ:/ is pronounced with considerable opening of the jaws. Part of the tongue between centre and back is very low down. The lips are neutrally open. The quality is that of fronted C5 = [ɑ+]. Quantitative difference in realization is conditioned by fortis or lenis post-nuclear contoid, e.g. phonemically: /kɑ:d - kɑ·t/ (card - cart).

Afrikaans has two vocoids, organically similar: /ɑ:/ is low-open back with the quality of fronted,slightly raised C5 = [ɑ̣+] . The point of articulation is very near to that of R.P. /ɑ:/ with resultant similar quality. The second Afrikaans variant is a raised variety mid-way between C [ɔ̣] and C [ɑ̣] periphery. It is usually short. The difference in articulation is both qualitative and quantitative.

Realizations by A.-E. Bilinguals are represented on specimen chart Fig. C.5.(iii). It will be observed that the allophones extend horizontally from central low-open Afrikaans /a/ to advanced low-open R.P. /ɒ/.

Monosyllabic VC structures with final alveolar contoids

/s,t/ have a centralized allophone of the quality of short Afrikaans /a/ e.g. "ask, art",[α̣̈·sk, α̣̈·(r)t]. Full length is reduced to half-length and the tongue is raised from the very low position as reflected by the charting of the structures above C [a] - C [ɑ] periphery. CVC structures with an initial fortis velar plosive, e.g. "cart", a fortis affricate, e.g. "charged", compound /st/, e.g. "staff", fortis labio-dental fricative, e.g. "far", nasal, e.g. "mast, march", have centralized allophones, namely: [kα̣̈·t, tʃα̣̈·dʒd, stα̣̈·f, fα̣̈·(r), mα̣̈·st, mα̣̈·(r)tʃ]. Duration varies between full- and half-length. CVC structures with an unchecked nucleus, e.g. "car", with initial glottal fricative e.g. "harm, hard", with lenis bilabial plosive e.g. "bark", approximate to a close and fronted variety of R.P. /ɑ:/: [kɑ̣:(r), ɦɑ̣:m, ɦɑ̣:(r)d, bɑ̣:k]. Initial plosive /k/ is not aspirated.

Di- and polysyllabic structures are articulated with an advanced allophone varying between fronted, close R.P. /ɑ:/ and Afrikaans /a/, e.g. "master, garden, crafty, after, answer, impassable": [ˈmɑ̣:+sˌtə(r), ˈgɑ̣:+(r)ˌdən, ˈkrɑ̣·+fˌti· , ˈɑ̣·+fˌtə(r), ˈɑ̣·+nˌsə(r), imˈpɑ̣+səˌbəl].

Renditions of A.-E. Bilinguals are characterized by neutral lips, half-open jaws, and somewhat raised tongue position. All these features of lax articulation are reinforced by a common allophone whose main feature is open-rounded lips. "Starve", for instance, has the quality of close, fronted C5 with rounded lips, e.g. [stɒ̣+v̥]. Final /v/ is frequently devoiced.

Nasalization is frequently in evidence in structures with nuclear /ɑ:/ followed by n+C or by weakly stressed s+V syllable, e.g. "branch, advanced, answer".

Vocoid /ɒ/.

In the articulation of R.P. /ɒ/ the jaws are wide open, the back of the tongue is in fully open position and the lips are slightly open-rounded. It has the tongue position of C5 with open lip-rounding, i.e. Secondary Cardinal 13 = [ɒ]. The vocoid is short.

Afrikaans has no very near organically similar vocoid. The nearest Afrikaans "allophone" is Afrikaans /ɔ:/ which has the quality of fronted C6 = [ɔ˖].

The specimen diagram, Fig. C.5.(iv), illustrates the disposition of allophones rendered by A.-E. Bilinguals. The allophones are distributed, horizontally, towards central low-open Afrikaans /a/ and, vertically, towards Afrikaans /ɔ:/, i.e. fronted, close C6 = [ɔ̝˖].

A number of renditions cluster about the area indicating the dominant R.P. allophone. These represent the utterances of a small minority of subjects whose quality approximates to that of the Norm.

CVC structures with initial labio-velar semi-vowel /w/ followed by orthographic "a" e.g. "was, want, wash, watch, etc." are rendered with allophone central, short, Afrikaans /a/, i.e. centralized, close, shortened R.P. /ɑ:/: [wɑ̝̈z(s), wɑ̝̈nt, wɑ̝̈ʃ, wɑ̝̈tʃ]. This rendering alternates with an allophone approximating to Afrikaans /ɔ/, especially in "was, watch", e.g. [wɔz(s), wɔtʃ] . Most other allophones appear to alternate between centralized R.P. /ɒ/ and a somewhat advanced mid- to high-open area. CVC structures with initial fortis velar plosive, e.g. "cog, cough", and initial fortis palato-alveolar fricative e.g. "shocked" have a dominant, fronted low-open

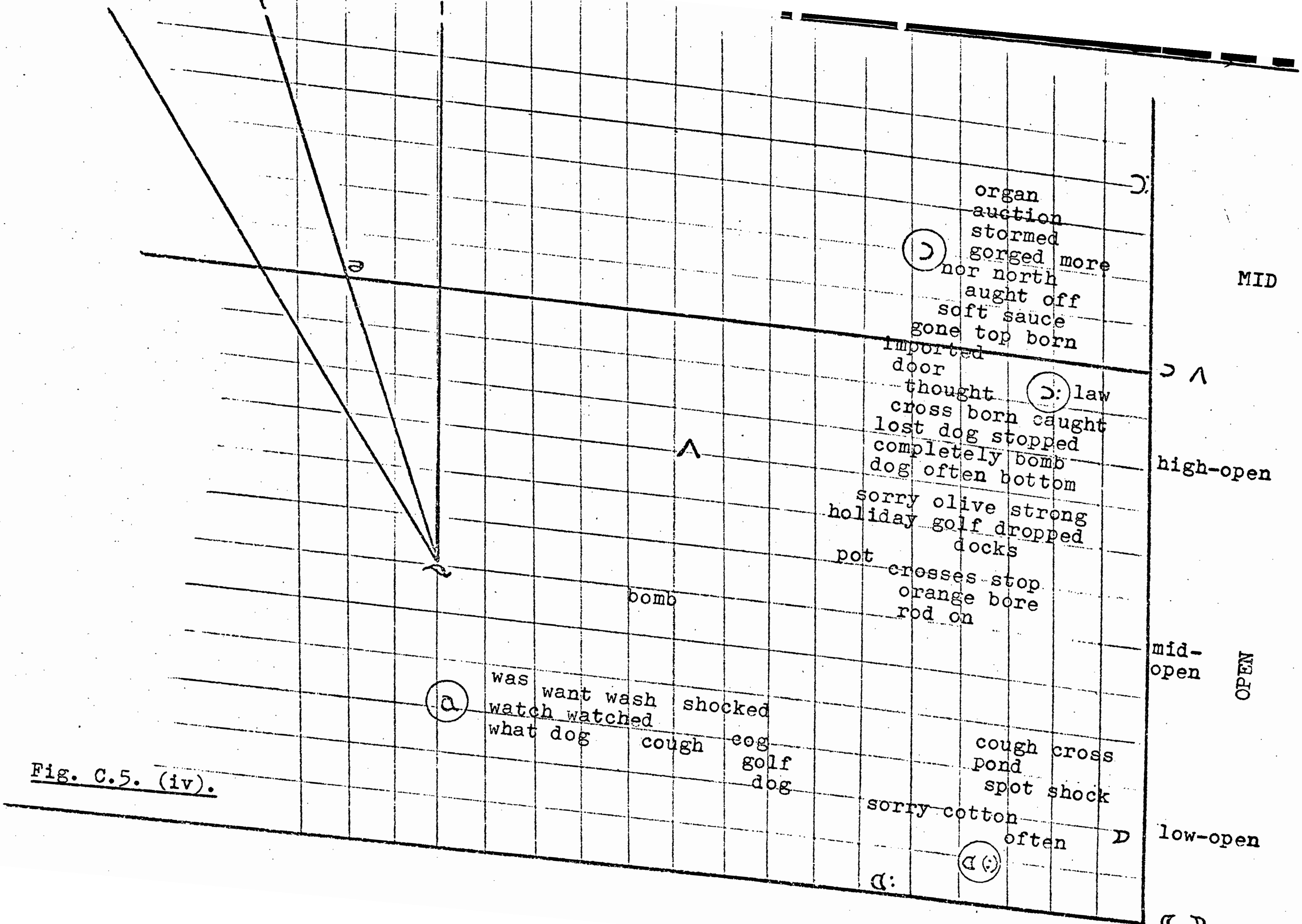


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Fig. C.5. (iv).

allophone: [kɒ̈g, kɒ̈f, ʃɒ̈kt]. The structure "dog" is notoriously susceptible to fluctuations. Deliberate attempts to emulate R.P. /ɒ/ result mainly in two renderings which may be symbolized "darg" or "dark" in conventional orthography, e.g. [dɑ̣·g - dɑ̣·k]. Frequently the rendering is in complete complementation with "dark". This rendering alternates with advanced, close R.P. /ɔ:/, e.g. [dɔ:g - dɔ:k]- the latter with a devoiced velar plosive.

R.P. /ɒ/ appears to be an elusive vocoid for subjects whose native system lacks a near equivalent. The chart indicating the distribution of /ɒ/ allophones by A.-E. Bilinguals, corroborates Pienaar's (op. cit.,p.43) dictum that Afrikaans vocoids are characterized by lax muscular effort. Auditory analysis confirms that in attempts to render R.P. /ɒ/, the mouth is not sufficiently open and the articulation not sufficiently retracted and low back.

CVC structures with an initial dental fricative, e.g. "thought", initial bilabial and alveolar plosives, e.g. "born, docks, pot", VC structures, e.g. "on", and di- and polysyllabic structures, e.g. "sorry, bottom, holiday, completely", cluster in the mid- to high-open, advanced area. The allophone is that of close, advanced R.P. /ɔ:/: [pɔ̣t, 'sɔ̣ˌri· , 'ɦɔ̣ləˌdəi, kɔm'pli·tˌli·] - (pot, sorry, holiday, completely). The stress pattern of a structure, such as "completely", in which the first syllable nucleus is normally obscured to neutral schwa in weak stress, is not observed by Bilinguals. "Com......" is given secondary stress with close [ɔ̣] nuclear allophone, probably because of the legislative force of native Afrikaans in a structure such as "kompleet" ("complete").

Vocoid /ɔ:/.

R.P. /ɔ:/ is a long vocoid with medium lip-rounding. In terms of Gimson's description, (op. cit.,P.109) the back of the tongue is raised between half-open and half-close positions. The quality is that of close C6 = [ɔ̝].

Afrikaans has a somewhat similar vocoid in /ɔ:/ - both organically and qualitatively. The back of the tongue is slightly lower than mid-low, i.e. just below C6 = [ɔ]. It is charted slightly advanced from the periphery. This position signifies that the articulation is not as tense as that of C6. The lips are open-rounded.

Auditorily there appears to be very little difference in timbre between R.P. /ɔ:/ and Afrikaans /ɔ:/, especially in citation forms and in the continuum of scripted versions, in which subjects are inclined to produce over-precise articulations. Variants in the renderings of A.-E. Bilinguals do not assume phonemic status, as, for instance [dɑ̝:k - dɔ:k] in the rendering of "dog".

Characteristic renderings of Bilingual subjects have the following features:

(i) either neutral or slightly open-rounded lips.

(ii) muscular relaxation.

(iii) hump of back of tongue slightly fronted.

(iv) quality: open-fronted R.P. /ɔ:/.

(v) quantity is reduced in relation to R.P.

(vi) homorganic with no diphthongization.

A small number of renditions of VC structure, e.g. "ought", CVC with initial fortis velar plosive, e.g. "caught", and CV structure with unchecked nucleus, e.g. "law", were marked by an open allophone, articulatorily between R.P. /ʌ/ and /ɑ:/. "Ought" almost approximated to close "art", and "caught" to close "cart". The frequency burdening of this allophone is low, so that it could not be regarded as indicating a trend, but rather as an idio-allophonic variant.

Devoicing of final lenis /d/ in e.g. "cord" and curtailing the duration somewhat so that the opposition "caught - cord" is neutralized, is a common feature both in scripted continuum and in the free speech utterances of A.-E. Bilinguals.

The specimen chart Fig. C.5.(iv) illustrates the distribution of utterances by Bilingual subjects. The allophones cluster about open, advanced R.P. /ɔ:/. Very few realizations approximate the compact, tense articulation of R.P. /ɔ:/. Bilinguals articulate with less lip-rounding and with the hump of the tongue not as retracted as for R.P.

Vocoid /ω/.

R.P. /ω/ is pronounced with the blade of the tongue raised just above the half-close position. Articulation is lax. Lips are closely but loosely rounded. Quality is that of close, centralized C7 = [ö̝] . The vocoid is short.

Organically, Afrikaans has a close "variant", symbolized /u(:)/, which may be long or short depending upon the context. It is a close, back vocoid with the quality of advanced, open C8 = [u̞˖] . Lips are open-rounded ("ondergerond" Pienaar, op.cit., p.53) and the hump of the tongue, between the blade and the back, is raised towards the area between the hard and the soft palate. In relation to R.P. /ω/, it is close and retracted. Articulation is lax. This does not imply that R.P. /ω/ is,

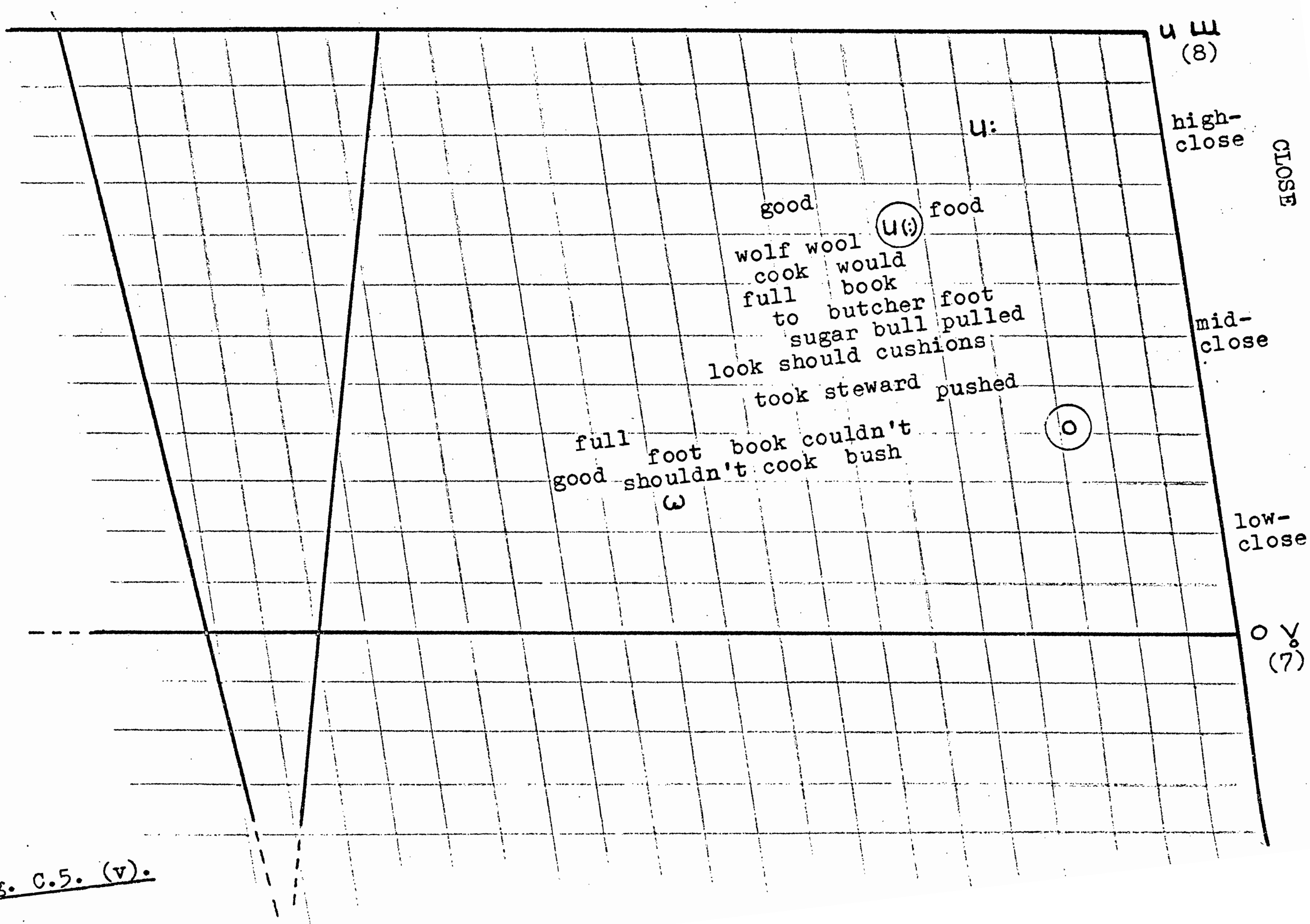
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Fig. C.5. (v).

inherently, an allophone of Afrikaans /u(:)/. On the contrary, it is a centralized variety of C7 = [ö̜]. But in overt realizations by Bilinguals, a large proportion of the allophones tend towards high-close Afrikaans /u(:)/ and not towards mid-close Afrikaans /o/.

The specimen chart Fig. C.5.(v) displays the realizations of A.-E. Bilinguals plotted in relation to R.P./ω/.

R.P. /ω/ evades attempts by Bilinguals to produce the quality of the Norm. The subjects that do approximate to the quality of the Norm constitute a small minority.

Monosyllabic CVC structures with initial semi-vocoid /w/ and final lateral or lateral+/f/,and final alveolar lenis plosive /d/ have close, retracted allophones with nuclear /ω/ usually protracted to half-long. These articulations are characterized by close lip-rounding and slight muscular intensification, e.g. [wu̜·+l, wu̜·+lf, wu̜·+d]: (wool, wolf, wood). All other CVC structures have allophones clustering between R.P. /ω/ and Afrikaans /u(:)/.

Structures, symbolized in conventional orthography with "oo", e.g. "cook, food, book, foot, look", are usually articulated with a lengthened nucleus - an allophone probably conditioned by orthography. This feature is more common in scripted renderings than in free speech. As has already been observed, scripted versions restrain, to a lesser or greater degree, the freedom of articulation prompted by wordless pictures. Sometimes CVC structures with initial velar plosives /k,g/ and final /d/ are realized with a centralized allophone with neutral or neutrally spread lips. The allophone approximates to centralized, secondary C15 = [ɤ̥̈]. This variant may be ascribed to an exaggerated attempt to give a precise rendering of the lax articulation which characterizes R.P. /ω/.

Devoicing of the final lenis contoid is a common feature e.g. [gu̟·t]. Devoicing in these contexts does not affect the quality to any extent but, usually, quantity is slightly reduced.

CV structure "to", which is normally reduced in the continuum of speech, is given secondary or tertiary stress with no obscuration of the vocoid, e.g. in the continuum: "He came to do it", "to" is realized [tu̟+]. The same applies to CVC structures that are reduced in normal speech, namely, "I could / would / should have done it". The quality of the vocoid is that of open, advanced, short [u̟+].

There is no appreciable difference in the quality of /ω/ in disyllabic structures. "Butcher, cushions, couldn't", have close, retracted R.P. /ω/ allophones. Vocoids are short and articulated with close lip-rounding. Structures with pre-nuclear palatal contoids e.g. "should, sugar, steward" have a centralized allophone induced by palatalization, e.g. [ʃω̈d, ʃω̈gə(r), stjω̈ərd(t)].

Vocoid /u:/

R.P. /u:/ is a close back vocoid. The back of the tongue is raised towards the soft palate but somewhat relaxed from the closest position and slightly advanced from true back. Lips are closely rounded. Just as /ω/ is the relaxed, back symmetry of /ι/, so /u:/ is the tense back symmetry of close front /i:/. The quality is that of slightly open, advanced C8 = [u̟+].

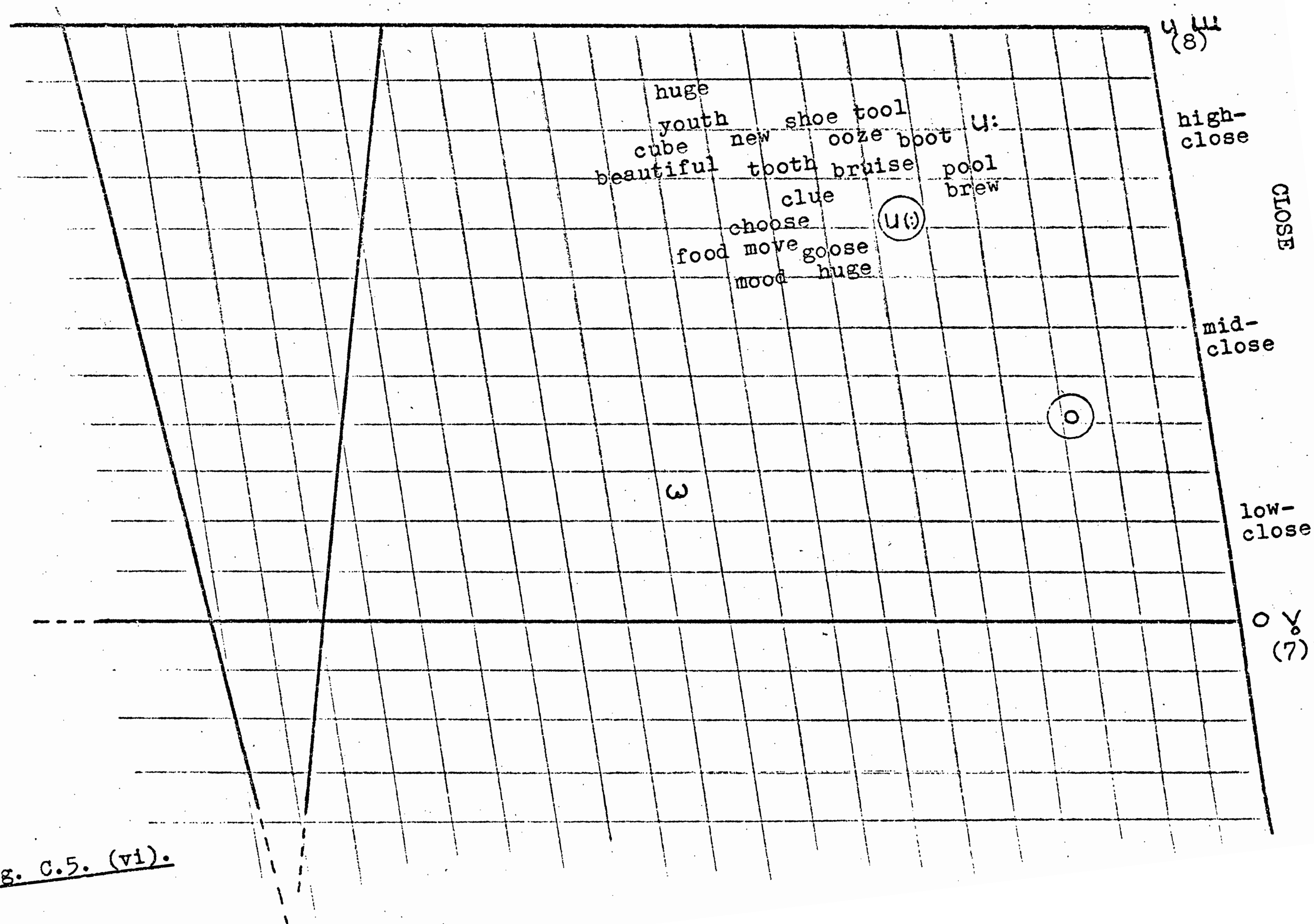

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Fig. C.5. (vi).

The Afrikaans counterpart is, organically a close approximate. The back of the tongue is raised towards the front of the soft palate, so that the hump of the tongue is slightly advanced in relation to R.P. The lips are not quite close-rounded - ("ondergerond") - according to Pienaar (op. cit.,p.53). The two features that distinguish it from R.P. /u:/ are, therefore, slightly advanced articulation and a lesser degree of lip-rounding.

R.P. /u:/ is long or half-long, whereas Afrikaans /u(:)/ may be long or short depending upon the context.

The specimen chart Fig. C.5.(vi) depicts the distribution of renderings by A.-E. Bilinguals. Two main allophones in the speech of A.-E. Bilinguals are advanced and open varieties. All CVC patterns, in mono- and polysyllabic structures, with initial /j/ are palatalized and this entails a considerable degree of centralization, e.g. [jü:θ , njü:, mjü·z(s)ik], (youth, new, music).

Fronted and open-fronted allophones are evidence of lax articulation which is partially induced by neutral lips or very open lip-rounding. CVC structures with initial bilabial nasal and final lenis alveolar plosive, e.g. "mood", initial labio-dental fricative and final /d/, e.g. "food", initial glottal fricative and final lenis affricate, e.g. "huge", initial velar plosive and final fricative, e.g. "goose", appear to be fairly consistent in conditioning open-fronted allophones, e.g. [mu̹:+d, fu̹:+d, ɦju̹:+dʒ, gu̹:+s]. Frequently "huge" is rendered [jü:dʒ] with resultant centralized allophone conditioned by palatal semi-vowel /j/.

Renditions by A.-E. Bilinguals alternate appreciably in the duration of the allophones. Citation forms are usually uttered with full length, but quantity is shortened in scripted continuum and considerably reduced in free speech. Reduced "fool" is accompanied by qualitative modification which jeopardizes the phonemic opposition "fool-full". A similar situation arises with the opposition "food-foot", as final /d/ is usually devoiced.

There is no evidence of diphthongization, the exception being a few subjects who uttered the structures "bruise, move" with rising intonation and slight evidence of an /ə/ glide to the final contoid.

Vocoid /ɜ:/

R.P. /ɜ:/ allows great latitude in the degree of tongue raising. For the dominant allophone the centre of the tongue is raised mid-way between half-close and half- open position. The opening between the jaws is narrow and the lips are spread. Duration is long or half-long. Three essential features of /ɜ:/ are:

(i) it is central;

(ii) it is long or half-long;

(iii) it is articulated with spread lips.

The Afrikaans central vocoid /ə/ is more akin to R.P. /ə/ than to /ɜ:/. It is always short with one exception which is morphemically conditioned, namely, "wîe" ("wedges").
The tongue height is just above central mid-low and the lips are neutral.

Although R.P. /ə/ may be considered an unaccented allophone of /ɜ:/, as no true opposition between the vocoids

Central vocoid: ɜ: .

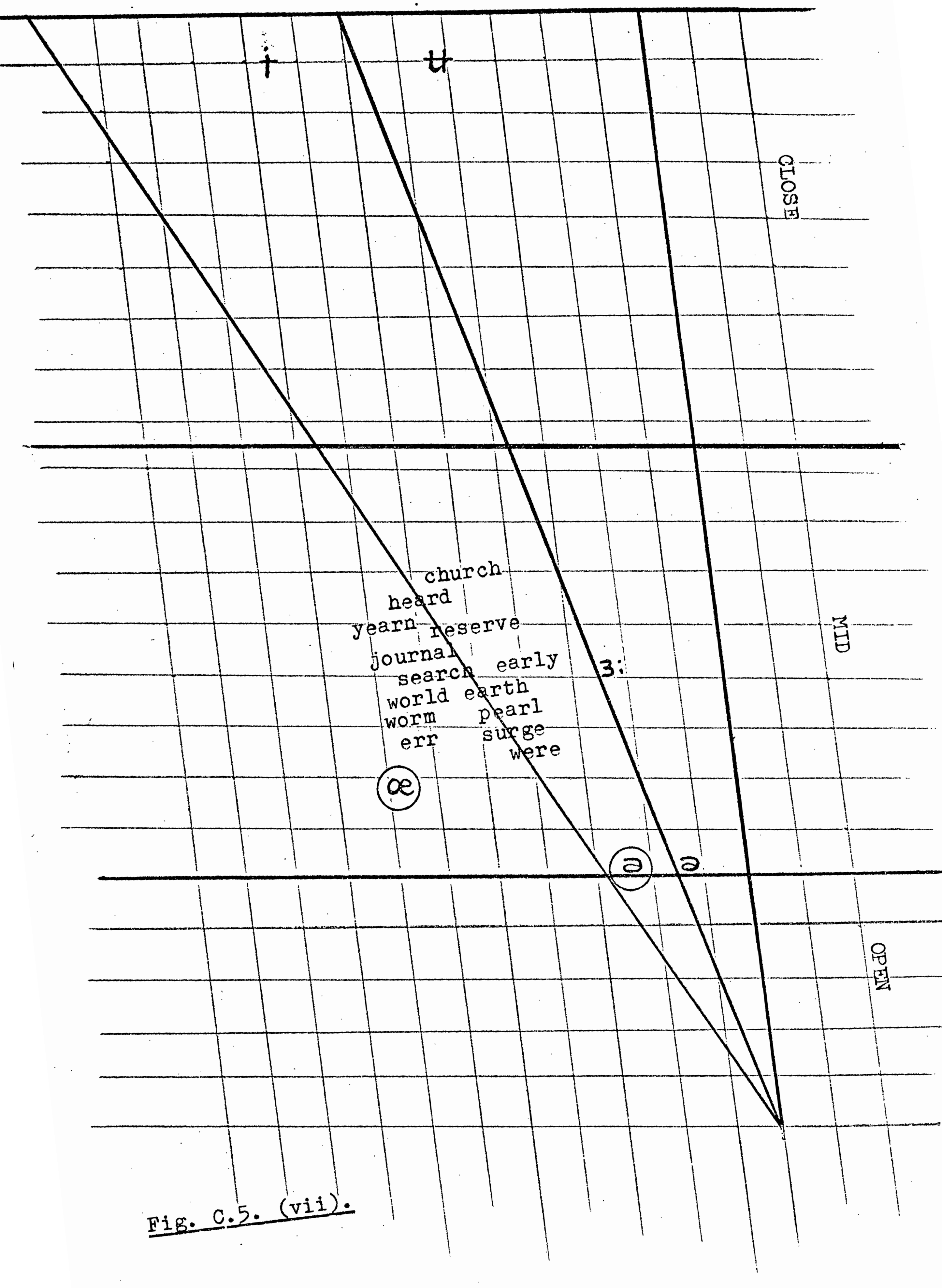


Fig. C.5. (vii).

exists, the two vocoids will be dealt with separately for the purpose of distinguishing A.-E. Bilingual renderings.

The specimen chart Fig.C.5.(vii) illustrates the distribution of utterances by A.-E. Bilinguals. Very few realizations approximate to R.P. /ɜː/. The reason is probably to be sought in the centralized rounded vocoid /œ/, heard in the Afrikaans structures "sug, hut", ("sigh, hut"). All realizations by Bilingual subjects are characterized by different degrees of lip-rounding. Allophones with close lip-rounding occur in all CVC structures with the initial semi-vowel /w/ and especially in those with post-nuclear /l/ or /m/, e.g. "world, worm", [wɜː˒+ld, wɜː˒+m] (the three diacritics in that order signify: long, rounded, and advanced / fronted.). This allophone approximates to Afrikaans /œ/. In these structures, in addition to native bias, close lip-rounding is reinforced by /w/ which entails lip-rounding in its articulation. Close lip-rounding also occurs in structures with initial /ɜː/ e.g. "err, earth, early", and in CVC with an initial alveolar fricative, e.g. "sir, search, surge". Other structures are marked by intermediate degrees of lip-rounding.

Structures with the least lip-rounding or with neutral lips are nuclear /ɜː/ patterned with affricates, e.g. "church", and not infrequently, between initial glottal fricative and lenis alveolar plosive, e.g. "heard".

In the continuum of free speech, oppositions such as "heard - hurt, surge - search" are frequently neutralized by virtue of final lenis contoids being devoiced. Likewise, in free speech, a retracted, open allophone approximating to close, fronted R.P. /ʌ/ is occasionally heard in e.g. "church", [tʃʌ̝+tʃ]. "World" is sometimes rendered with a retracted allophone, about mid-way between R.P. /ɜː/ and /ɔː/.

There is no evidence of diphthongization.

Vocoid /ə/

R.P. /ə/ has the quality of a central vocoid with the lips neutrally spread. Three degrees of tongue raising correlate with environments:

(i) high-open central final, e.g. "china";

(ii) high-mid central in the vicinity of velar contoids, e.g. "again", and,

(iii) somewhat between the two positions in non-final environments, e.g. "readable".

/ə/ is usually short, unstressed, and has a very high frequency occurrence. It is stressed in a rare utterance, such as: "He meant a man and not the man".

R.P. /ə/ has an Afrikaans cognate symbolized /ə/. The blade of the tongue is slightly higher than low-mid and the lips are neutral. It is a short vocoid except, as indicated above in one structure, namely, "wîe" ("wedges"), in which it is long. The dominant Afrikaans allophone appears to be low-mid central, so that it is not marked by the degree of instability which ties R.P. /ə/ to its environment.

In both languages the variants are not phonemic.

R.P. /ə/ features as the weak form of a large number of English sounds. English orthography does not indicate when the reduced forms should be used, with the result that A.-E. Bilinguals are inclined to give orthographic renderings, Central vocoid: ə.

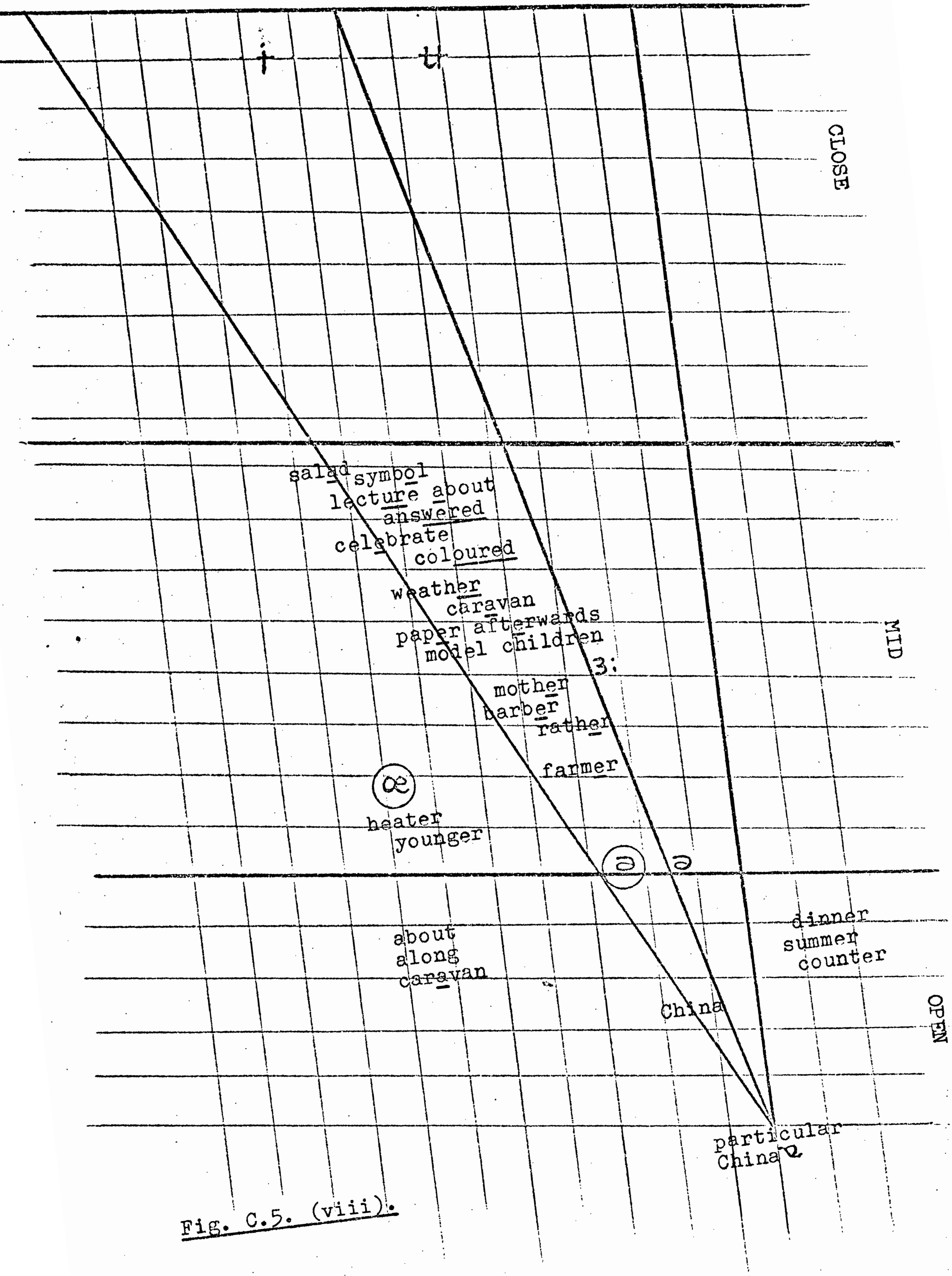


Fig. C.5. (viii).

especially in scripted versions. Correct manipulation of reduced forms demands a fair degree of proficiency in spoken, colloquial English. Free speech, which provides the most valid data, presents great difficulty in analysis, because of hesitations and incomplete utterances.

The allophones observed in the speech of Bilinguals may be reduced to five variants, the high-mid and mid-mid central allophones predominating.

(i) Most allophones cluster about the high-mid fronted central area. These include word initial, final and medial variants, e.g. "about, symbol, afterwards", [ə̣ˈbæut, ˈsə̣+mˌbə+l, ˈɑftə̣+ˌwɜ·dz(s)].

(ii) A second high frequency variant bunches about the fronted R.P. /ɜ :/ allophone. The variant is distributed word-finally and articulated with secondary stress and slightly prolonged duration, e.g. "mother, afterwards, rather, farmer", [ˈmʌˌðɜ· , ˈɑftə̣+ˌwɜ·dz(s), ˈrɑ·ˌðɜ· , ˈfɑ·ˌmɜ·(r)].

(iii) A third variant of low frequency, has a word final allophone intermediate towards /ʌ /, e.g. "dinner, summer, counter", [ˈdiˌnʌ̣+ , ˈsʌˌmʌ̣+, ˈkæuntʌ̣+]. This allophone may be regarded as a variant within an idiolect. It does not represent a trend, the more so, as final /r/ is not pronounced.

(iv) A mid-open central allophone occurs in structures ending in "--a" and "--ar", e.g. "China, particular". This variant has a high frequency burdening. It is probably conditioned by orthographic rendering.

(v) Another allophone of low frequency occurs initially and medially and has the quality of retracted R.P. /æ/, e.g. "about, along, caravan", [æ̠ˈbæut, æ̠ˈlɔŋ, ˈkæræ̠vɛn].

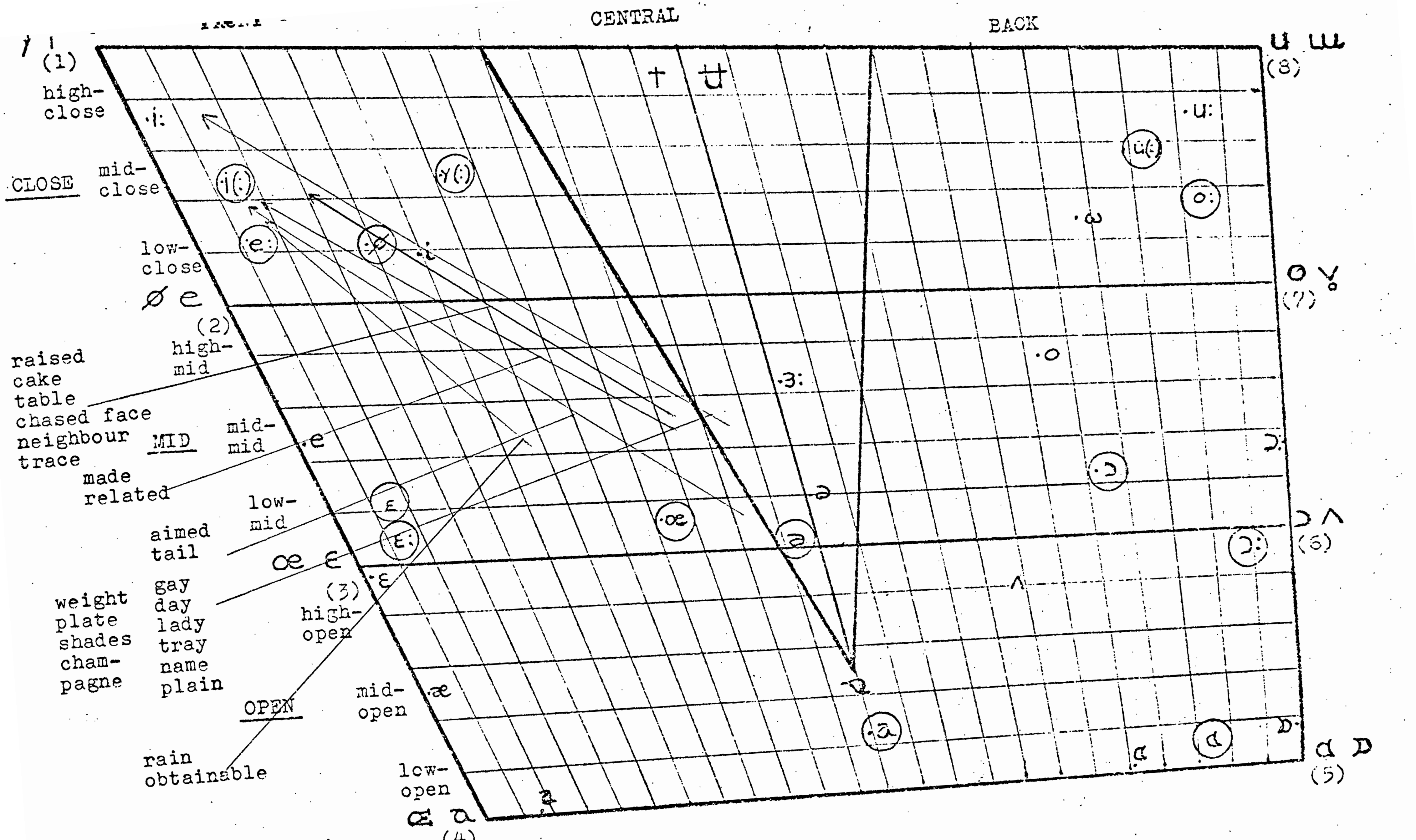
Vocoid /ei/

R.P. /ei/ is one of three diphthongal glides in the direction of /i/, the other two being /ai/ and /ɔi/. The vocoid element begins in the vicinity of mid-mid R.P. /e/, i.e. open C2 = [e̞] and the glide moves in the direction of slightly raised retracted C2 = [ë]. /e / is normally regarded as a narrow diphthong as the tongue moves through a small distance from the inception to the termination of the diphthong.

The inception of the diphthongal glide in Afrikaans is mid-mid, central /ə /. This is a neutral position as opposed to R.P. peripheral /e/. The glide moves in the direction of Afrikaans /i/ in high-close front area. It is a wider diphthong than R.P. /e / as its utterance entails greater articulatory range.

Allophones in the rendering of A.-E. Bilinguals are characterized by variants in the area of inception of the vocoid and the area in which the glide terminates.

Afrikaans realizations are diagrammatically illustrated in the specimen chart Fig. C.5.(ix). Citation forms and structures in scripted continuum have a prominent glide which terminates in the high-close front area and frequently assumes the quality of a consonantal vocoid [j], especially in final, unchecked VC structures, e.g. "gay, day"; in CVC structures with a post-nuclear nasal, e.g. "name, playing, plain,



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cake
table
chased face
neighbour
trace
made
related
aimed
tail
weight
plate
shades
cham-
pagne
gay
day
lady
tray
name
plain
rain
obtainable

Fig. C.5. (ix).

champagne", and post-nuclear plosive /d/, e.g. "lady, played". The diphthongs are usually prolonged. The same trend is observed in CVC structures with a post-nuclear fortis alveolar plosive /t/, e.g. "plate". In all the above structures the vocoid begins in a mid-mid or high-mid advanced central or central area: [plə̣+i̇ˑj, nəi̇m], (ˈ=consonantal vocoid) [ˈləi̇ˑˌdi] (play, name, lady). CVC structures with post-nuclear /l/ are usually realized with a high-mid fronted /ə/ glide on to /l/. Mono- and disyllabic structures with post-nuclear bilabial plosive, e.g. "tables, neighbour", with post-nuclear fricatives, e.g. "face, chased, save" condition an allophone with a curtailed and more open glide. The glide terminates in retracted mid-close area. The point of inception is about the same, e.g. [fəi̠̇-s, ˈtəi-ˌbəlz(s)].

In the continuum of free speech the vocoid element of variants of diphthong /eɩ/ begins in the same area as the above allophones but the length of the glide is arrested by the following word and it seldom reaches the stricture of a consonantal vocoid unless it occurs at open juncture or at clause terminal. On the whole the glide element terminates in a high-close or mid-close, front area and the vocoid begins in a mid-mid, central area. Bilingual subjects give insufficient length to the first element and are inclined to prolong the second element and render it with greater prominence than in R.P. in which it is lightly touched and is seldom raised above the C2 - C7 line i.e. [e] - [o].

Not infrequently CVC structures with initial /m/, have a vocoid allophone in a centralized low-mid area and with slight lip-rounding, e.g. "made" is realized approximately [mœi̠-d] or [mɜ̠i̠-d].

Vocoid /aɩ/

The vocoid element of R.P. /aɩ/ begins at a point slightly retracted from C4 = [a˗] and moves in the direction of R.P. /ɩ/, although the tongue is not raised to a level closer than centralized C2 = [ë]. The closing movement of the jaw is obvious and the lips change from neutral to loosely spread.

The Afrikaans counterpart begins in low-open central area marked by Afrikaans /a/ and moves towards front high-close position, Afrikaans /i/.

The specimen chart Fig. C.5.(x) illustrates the distribution of some of the allophones realized by A.-E. Bilinguals. The beginning of the vocoid element clusters about the central to the advanced low-open position. In relation to the dominant R.P. allophone the vocoid is centralized and the elevation of the glide is beyond the limit of the extension of the R.P. glide element.

In all structures with final /l/ the glide is usually weakened and absorbed into an /ə/ glide on to /l/, e.g. "I'll, child, while, crocodile". Inception of the vocoid is in central low-open area represented by Afrikaans /a/.

In VC structures, e.g. "I'm", the glide begins at low-open central position and extends to mid-close, Afrikaans /i/. In both "I'm" and "I'll" most realizations retain the glide prominently; in free speech the glide is sometimes reduced, but evidence does not point to a tendency to monophthongize the diphthong. In CV structures, e.g. "try, die, tie" the glide frequently extends to close stricture of the consonantal vocoid /j/: [trai˙ j - trai˙, dai˙ , tai˙] .

Vocoid: aɪ

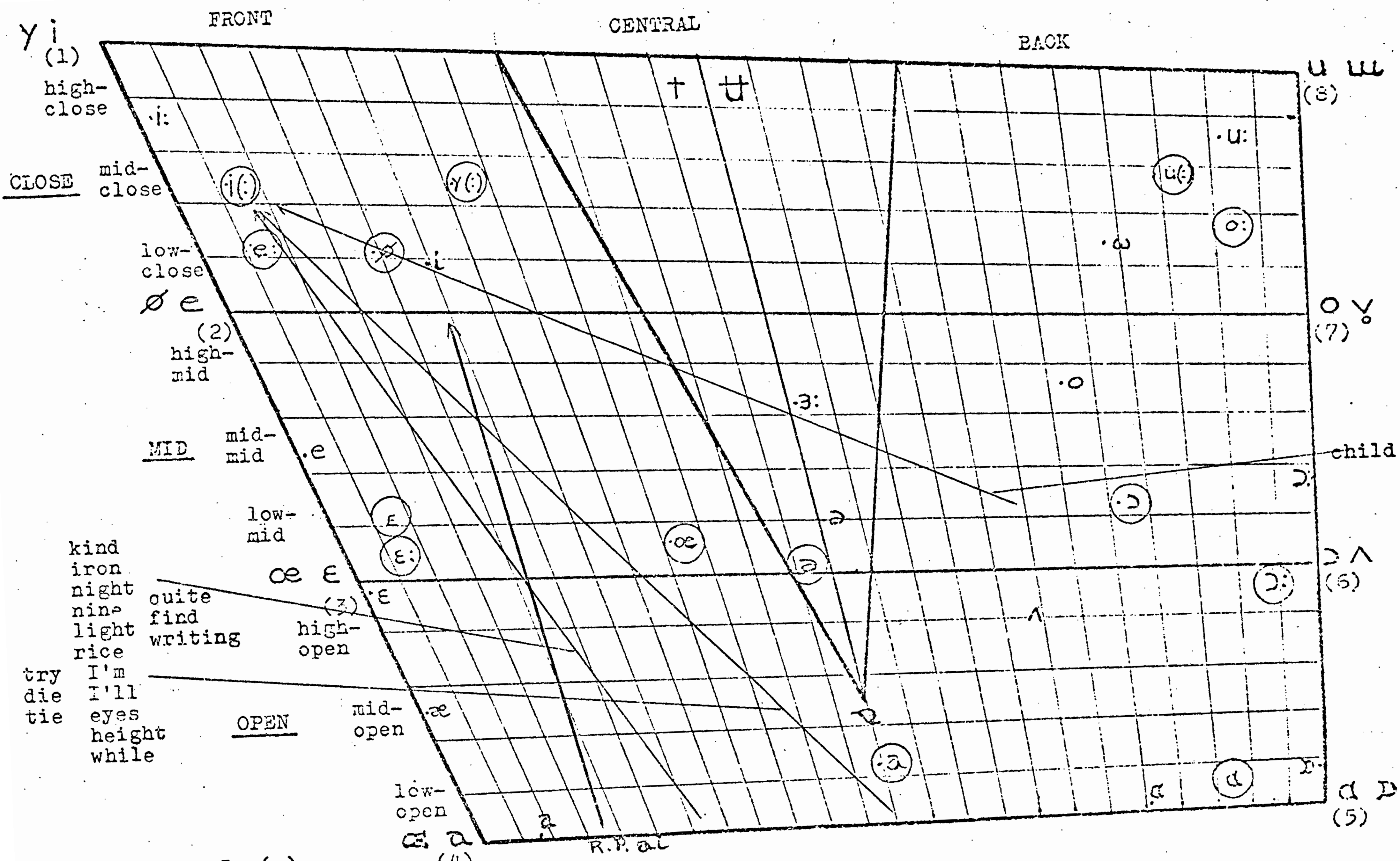


Fig. C.5. (x).

Structures with initial velar, e.g. "kind", fricative "r", e.g. "right", bilabial nasal, e.g. "mine", lateral, e.g. "light", are usually marked by a fronted vocoid, and a glide that, in the words quoted, terminates in the high - or mid-close area. The termination of the glide alternates between a front and a retracted close area.

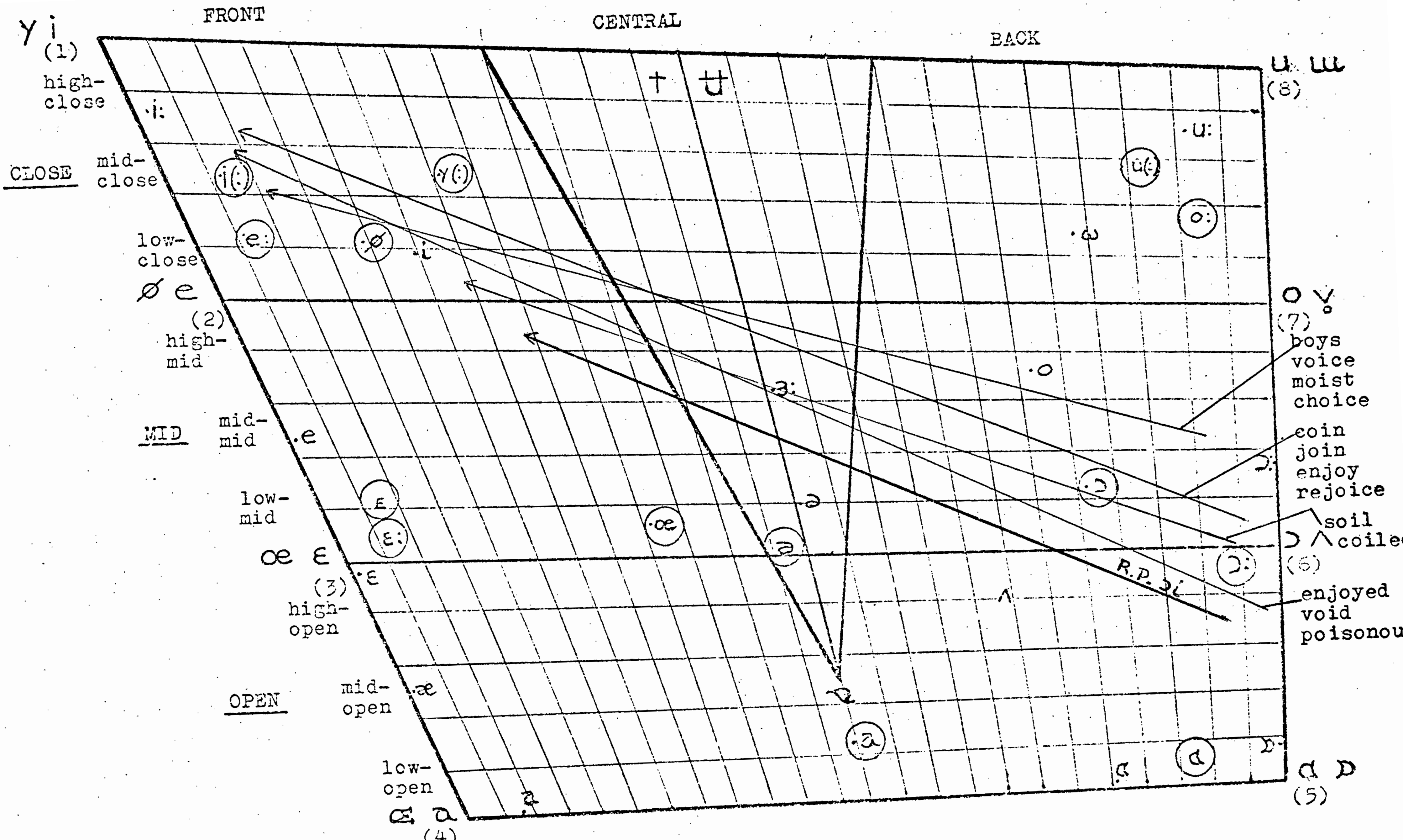
The very common triphthong "fire", is rendered disyllabically with the second syllable raised to secondary stress, e.g. [ˈfai̯ˌjə(r)], - final "r" is usually sounded - [ˈfaˑˌjə(r)].

A common free-speech variant observed in the renderings of low-prestige Bilinguals is a back vocoid element in, especially, "child" and not infrequently in the VC structure "I'll". The vocoid is a fronted variant of /ɔ:/, sometimes prolonged with reduction of the glide element, e.g. [tʃɔˑlt] or [tʃɔïlt]. Another allophone evident in the realization of low-proficiency Bilinguals is characterized by a low-mid central vocoid in a low schwa position with a glide alternating between a mid-close front position and low-close advanced central position, e.g. [wə̞ɩ̯-l, lə̞ɩ̯-ð (ø)] (while, lithe). The frequency burdening of this variant appears to be too low to be established as a trend.

In general, the renderings of Bilingual subjects are characterized by a prominent glide which is, not infrequently, unduly prolonged. The inception of the vocoid is distributed in a low-open central to fronted area.

Vocoid /ɔɩ/

The third member of the /ɩ/ glide triad is R.P. /ɔɩ/.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(3)
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(6)
(7)
(8)
boys
voice
moist
choice
coin
join
enjoy
rejoice
soil
coiled
enjoyed
void
poisonous
R.P. ɔi

Fig. C.5. (xi).

In the pronunciation of /ɔɩ/, the vocoid element begins at a point between back half-open and open positions and moves in the direction of /ɩ/. In conformance with the obscuration of /ɩ/ in the /ɩ/ - glides, the tongue does not reach a level closer than retracted, open C2 = [ë̠]. The range of closing in the diphthong is not as great as for /aɩ/. The lips are open-rounded for the inception of the vocoid and gradually change to neutral at the termination.

Organically, Afrikaans has two variants. One begins just below C6 = [ɔ̘], somewhat advanced, and moves towards a close front position. Duration alternates between half-long and short, e.g. [xɔi ∼ xɔiˑ], ("gôi", which means "to throw"). The other variant begins in a back low-mid fronted position and also moves to a close, front area. It occurs in diminutives of root words ending in /ɔt/ ɔnt/ ascribable to assimilation. (Pienaar, op. cit., p.61) e.g. [ˈrɔi̞ci] ("rotjie", "a small rat"). The frequency occurrence of the first variant is low and is limited to a few words.

Allophones in the renderings of A.-E. Bilinguals depend upon position of inception, the elevation reached by the glide element, and the degree of lip-rounding. The specimen chart Fig. C.5.(xi) illustrates the disposition of Bilingual renderings.

CV structures, e.g. "boy, joy", and CVC structures with post-nuclear continuant nasal resonant, e.g. "join, coin", condition a glide element of great prominence with most extensive elevation of the tongue not infrequently assuming the stricture of vocalic contoid /j/. The vocoid element begins at about C6 = [ɔ] position, e.g. [bɔiˑj, dʒɔiˑ, kɔiˑn], ("boy, joy, coin").

Final, post-vocalic /l/ appears to be consistent in reducing the elevation of the glide element and levelling it to an /ə/ glide on to /l/. Bilingual subjects very rarely articulate dark /ɫ/. e.g. [sɔˈə·l , kɔˈəld(t)], ("soil, coiled").

In mono- and polysyllabic structures, initial bilabial plosives and nasals condition a close vocoid element marked by close lip-rounding, e.g. [bɔ̹›iz(s), mɔ̹›ɪ st] ("boys, moist"). The glide element terminates in a mid-close, front position.

Shortened structures with a post-nuclear, fortis, alveolar fricative, e.g. "voice, choice", have a vocoid variant in a close, fronted C6 position with a tongue elevation raised to front low- to mid-close retracted position, e.g. [vɔ̹+i-s, tʃɔ̹+i-s].

On the whole, the dominant allophones, in relation to R.P., are: vocoid in close or fronted R.P. /ɔ/ position with open to close lip-rounding, and glide extending to front high- and mid-close position. Two variants in the continuum of scripted sentences and free speech that frequently occur are a centralized and an open fronted vocoid, the former with neutral lips and the latter with lips slightly more open than neutral. The vocoid of the former rendering approximates to an allophone of retracted /ə/ and the latter of close, fronted /ɑ·/, e.g. [dʒə-ind, ˌriˈdʒɑ̹ ist]: ("joined, rejoiced"). These allophones have a low frequency burdening.

In the continuum of free speech the elevation of the tongue for the glide element is restricted by the environment and terminates in front low-close to retracted low-close position.

Vocoid /ɩə/

R.P. /ɩə/ is one of three centring diphthongal glides, the other two being /ɛə , ωə /.

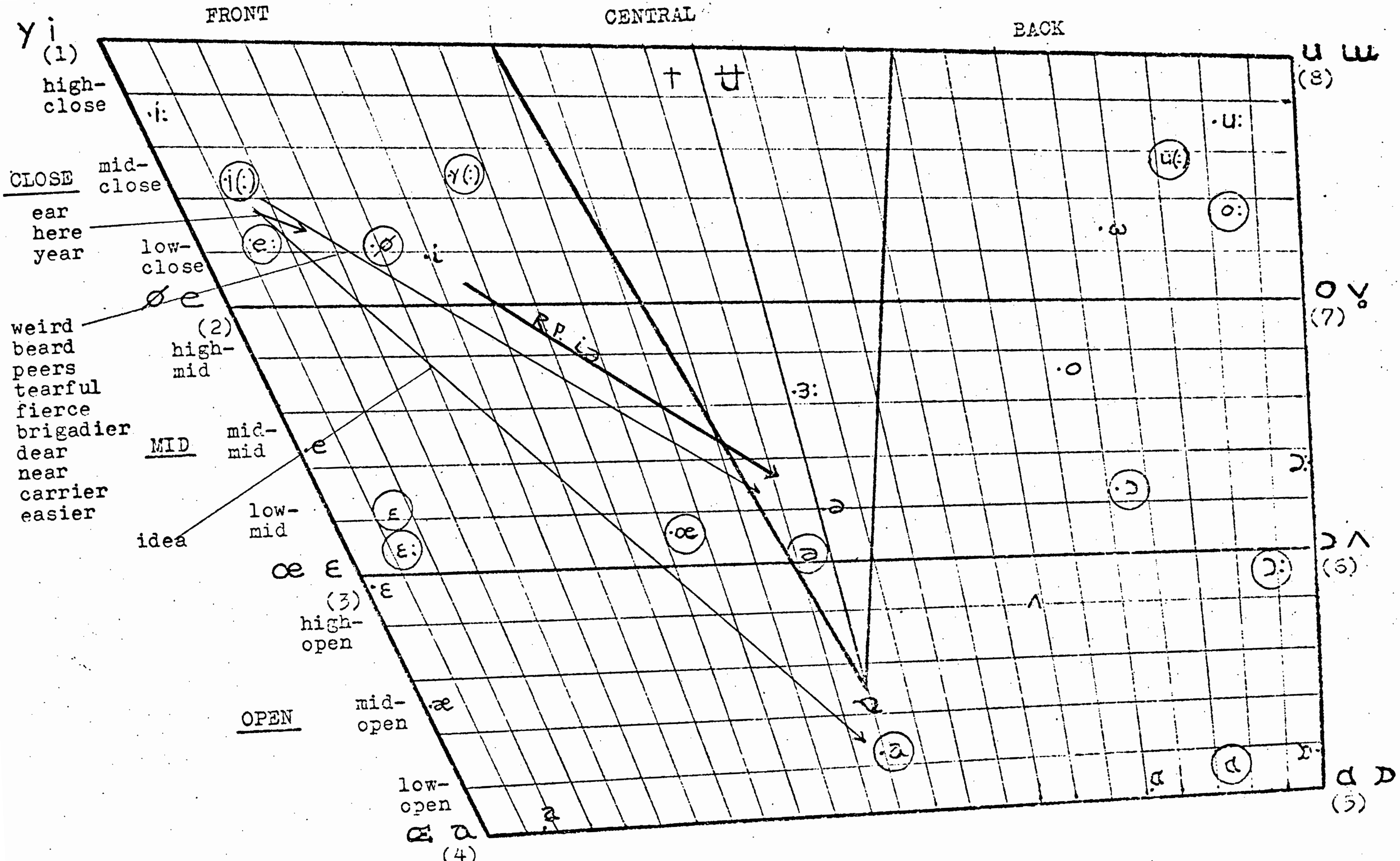
The vocoid element of /ɩə/ begins with the tongue in the position associated with R.P. /ɩ/, and the glide moves in the direction of a mid or open central position. In word final structures the glide usually terminates in the more open area. The diphthong is characterized by lax articulation, beginning in centralized low-close position and terminating in mid or open central position.

In the inventory of normal diphthongs Afrikaans has no similar vocoid.

The specimen chart Fig. C.5.(xii) illustrates the distribution of the renderings of A.-E. Bilinguals.

In CV and V structures the diphthong is either monophthongized or articulated with a narrow glide from very close to mid-close Afrikaans /e/, i.e. close, retracted C2 = [ḙ-], or fronted, close /ə/. In structures with an initial glottal fricative /h/, "h" is not aspirated. It is either a voiced variant of the ensuing vocoid, or it is assimilated into palatalized /j/. "Here" is thus realized either [ɦḭə/ ɦḙḙ̰], or as monophthongized "year". If "h" is assimilated into palatalized /j/, then "ear, here, year, hear" are homophonous, with the difference that "ear" is not rendered with an initial consonantal vocoid /j/, e.g. [ɩ̰ ḙ ~ ḙḙ̰ ~ ḙə˖, jḙḙ̰ ~ jḭə˖]: ("ear" and the dominant allophones of "here, year, hear").

CVC structures with an initial semi-vocoid /w/, e.g. "weird", bilabial /b/, e.g. "beard", and labio-dental fricative, /f/, e.g. "fierce", and structures such as "peers, tearful,



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year
low-close
weird
beard
peers
tearful
fierce
brigadier
dear
near
carrier
easier
high-mid
MID
mid-mid
idea
low-mid
high-open
OPEN
mid-open
low-open

Fig. C.5. (xii).

brigadier", are realized with a more perceptible, though still close glide, beginning in a mid-close front position and terminating in a close, fronted /ə/ position. The inception of the vocoid element is closer and more fronted than R.P. /ɩ/, e.g. [wẹə̣˖d, fẹə˔+s, 'tịə+ˌful]: (weird, fierce, tearful).

The CV structures "dear, near" have more pronounced glides terminating in mid-mid fronted schwa position. The widest allophone of /ɩə/ which involves considerable movement from the vocoid to the termination of the glide element, occurs in "idea", and is probably influenced by the orthography. The diphthong begins in a close or retracted front position and extends to close, central /a/, e.g. [aidiạ~aidija].

The three dominant allophones in the realizations of A.-E. Bilingual subjects appear to be:

(i) a tendency to monophthongize the diphthong - a trend which predominates;

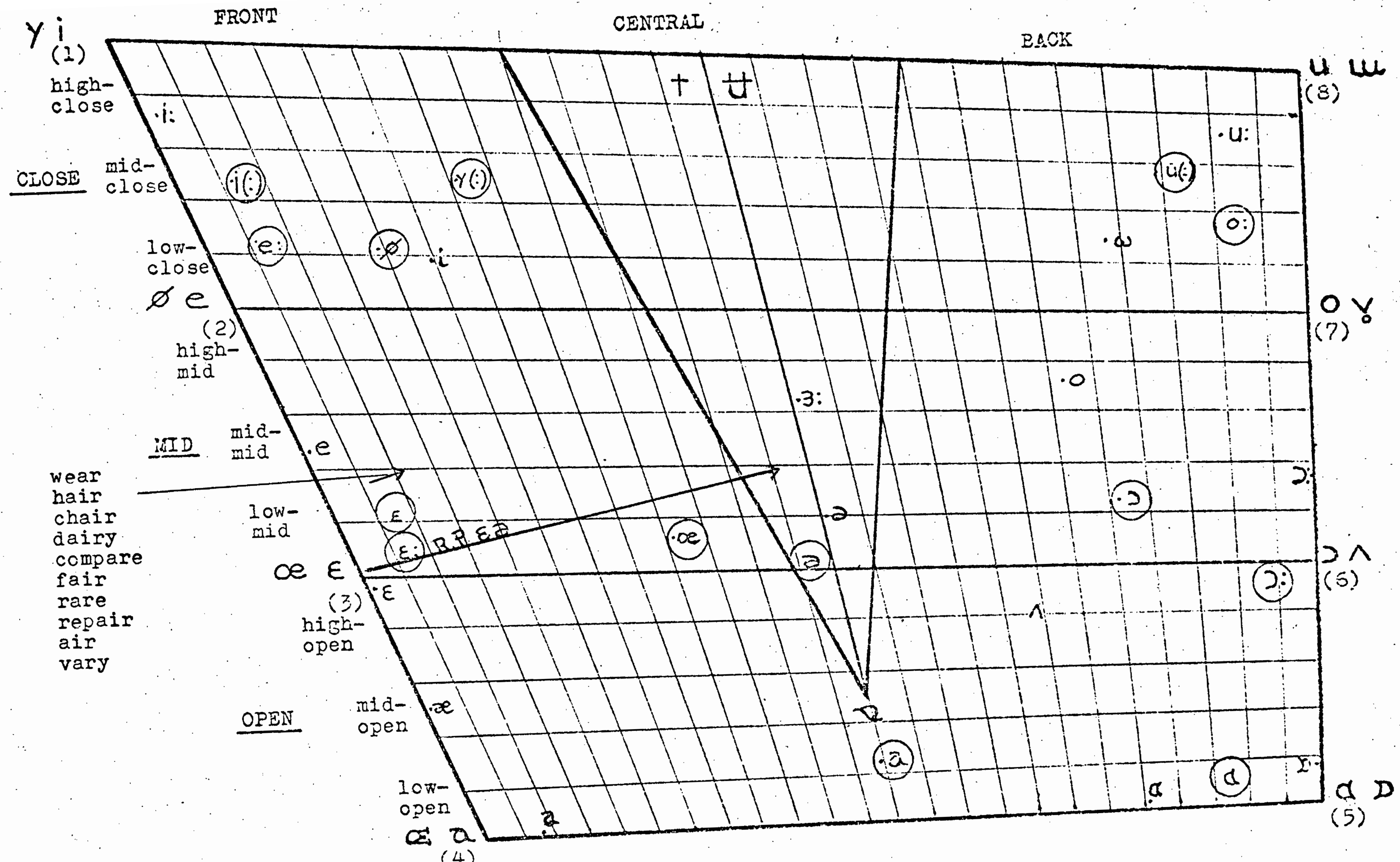
(ii) a narrow glide from fronted mid-close and retracted close position to close, fronted schwa;

(iii) a very wide glide involving movement of articulators from close, front position to mid-open central.

Variant (iii) above has a low frequency distribution. It is limited to "idea" and CV structures marked by an exaggerated rendering of the glide element of the diphthong.

<u>Vocoid /ɛə /</u>

R.P. /ɛə/ is a narrow diphthong. The vocoid begins in a position between R.P. /e/ and /æ/, i.e. at approximately C3 = [ɛ]. In unchecked syllables the glide moves towards open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wear
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chair
dairy
compare
fair
rare
repair
air
vary
low-
mid
(3)
high-
open
OPEN
mid-
open
low-
open
(4)
(8)
(7)
(6)
(5)

Fig. C.5. (xiii).

/ə/ and in checked syllables towards mid /ə/.

Afrikaans has no similar centring diphthong, but the Afrikaans system has a vocoid of approximate timbre in a slightly relaxed C3 which marks the inception of a glide towards Afrikaans /i/, e.g. [ɦɛi:, 'bɛi·ci]: ("hêi, bedjie" i.e. a call meaning "You, there!", and "a small bed").

There is virtually no evidence of diphthongal glides in the realization of A.-E. Bilinguals. The exceptions are a limited number of subjects who have attained a fair degree of bilingual proficiency and who have been alerted to render the diphthong "correctly".

The specimen chart Fig. C.5.(xiii) depicts the dominant variants of Bilingual subjects.

An interesting incongruency occurs in the realizations by elderly Bilinguals, especially, of structures such as "Mary" and "mere": "mere" is realized monophthongally, [mɛ̝·], whereas "Mary" is diphthongized and rendered, ['miəˌri·]. Initial /ɛə/ in "aeroplane" has two allophones that occur frequently: ['iəro(u)ˌpləin~'ɛ̝ro(u)ˌpləin]. The opposition /ɛə - ɩə/ e.g. "chair - cheer", is usually neutralized and realized with close, somewhat retracted C3 = [ɛ̝-] e.g. [tʃɛ̝·]. These renderings occur within a few moments of each other in scripted continuum and in free speech.

Bilinguals have supplanted two R.P. phonemes and substituted a "diaphonic" variant of inter-linguistic status which belongs to neither the native nor the target system.

The dominant allophone of R.P. /ɛə/ in the utterance of Bilingual subjects is close /ɛ̝/, somewhat retracted from the periphery. It is rendered as a long, pure vocoid, e.g.

[dɛ̣:d, wɛ̣:(r), 'vɛ̣:ri,əs, ,kɔm'pɛ̣:, ɛ̣:(r), 'kɛ̣:,ful] : (dared, wear, various, compare, air, careful).

As a result of the levelling of the diphthong in e.g. "dared", the qualitative - quantitative distinction between "dared - dead" is reduced to a quantitative opposition. When monophthongized, "dared" is shortened, with the result that "dared" and "dead" are homophonous and indistinguishable, without a prompting context.

Vocoid /ωə/

The R.P. diphthongal glide /ωə/ has a vocoid element with tongue position associated with /ω/ and a glide element terminating in a somewhat open /ə/ position in unchecked syllables, and a closer variety in closed syllables.

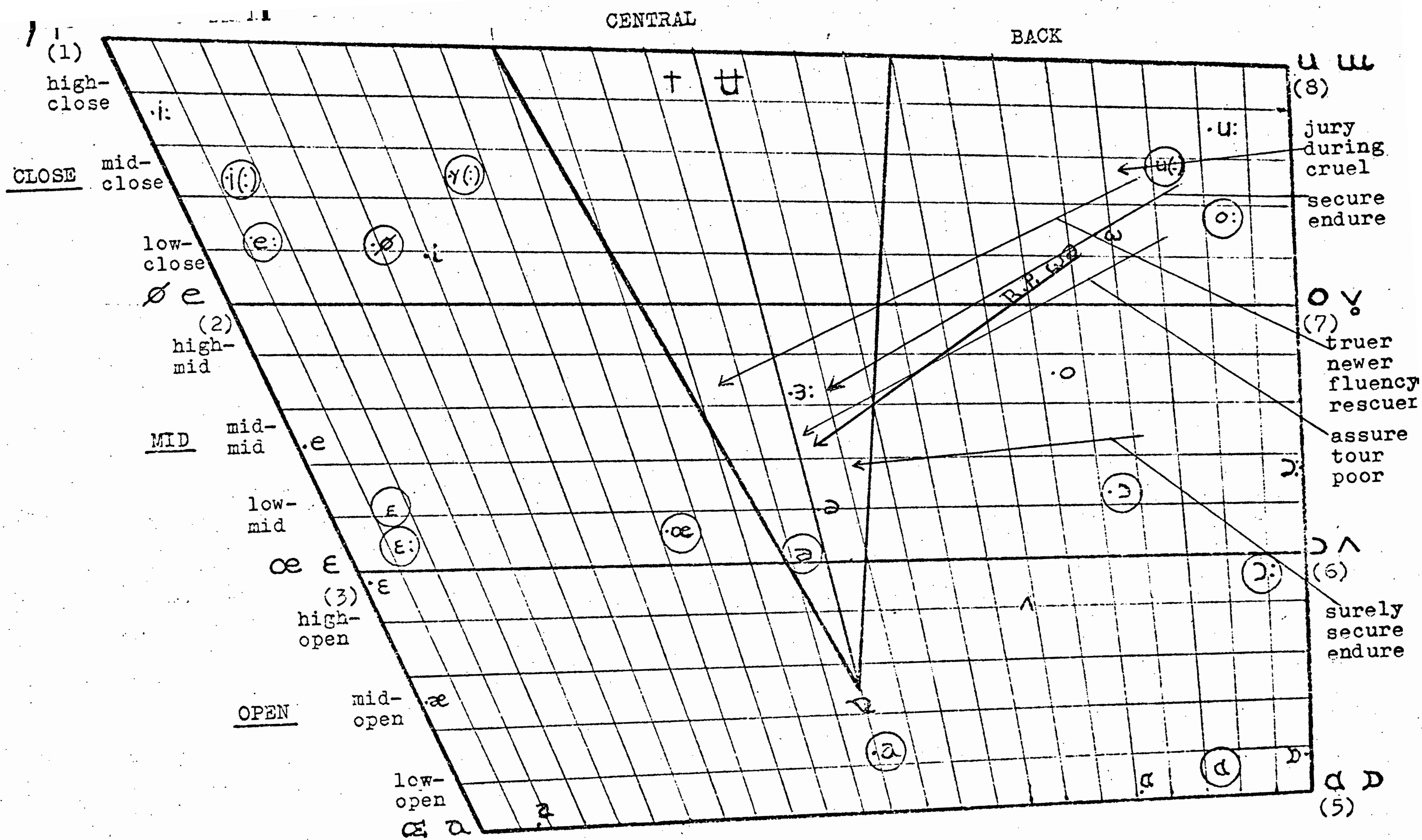
"Standard" Afrikaans has no similar diphthong.

The specimen chart Fig. C.5.(xiv) displays the distribution of the main allophones in the renderings of A.-E. Bilinguals.

CVC structures carrying a primary accent with post-vocalic /r/ + vocoid, are not diphthongized. The vocoid is a prolonged close /u:/ allophone with close lip-rounding, e.g. ['dʒụ:,ri , 'dʒụ:riŋ ~ 'dju:riŋ] : ("jury, during").

VC structures with an unchecked vocoid are seldom diphthongized. Occasionally a narrow glide to retracted, raised schwa occurs. The vocoid is open, half-rounded /u:/, somewhat similar to Afrikaans /o /, e.g. "assure, tour, poor", [æ,ʃọ·ᵊ(r), tọ·ᵊ(r), pọ·ᵊ(r)]. Not infrequently final /r/ is sounded, in which case the slight /ə/ glide is absorbed into /r/.

All structures, orthographically symbolized "ue",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(3)
high-
open
OPEN
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open
low-
open
(4)
(8)
jury
during
cruel
secure
endure
(7)
truer
newer
fluency
rescuer
assure
tour
poor
(6)
surely
secure
endure
(5)
B.P.

Fig. C.5. (xiv).

whether with primary or weak stress, are rendered with two allophones:

(i) either disyllabically, or,

(ii) with a narrow centring glide to close, fronted schwa.

In the disyllabic rendering the second syllable is raised to secondary stress. In a structure such as "rescuer", the stress pattern is usually: weak + primary + secondary. Alternate transcriptions are given in each of the following examples: [ˈtrụᵊ˖(r) ∼ ˈtru·ˌə˖(r), ˈfluᵊnˌsi· ∼ ˈflụ·ˌə̣˖nsi̠]: ("truer, fluency").

Structures with a prevocalic palatalized affricate /kj/ condition a centralized unrounded vocoid. The quality of the vocoid is that of close, centralized, secondary C 15 = [ɤ̥̈], e.g. "security": [sëˈkjω̈˖rəˌti̠].

Structures with post-vocalic /l/ are rendered, either with long, close /u:/ terminating in semi-vowel resonant /l/, or disyllabically with distinct diminuendo between the two syllables, e.g. [krụ:l ∼ ˈkru·ˌəl̠], (two variants of "cruel").

Allophones of weakly stressed /ωə/ appear to be conditioned by orthography: "--ua --" is usually monophthongized, but "--ue--" is diphthongized, or rendered disyllabically, e.g. "valuable, influence", [ˈvæ̣ljuˌbəl, ˈinfluəns∼ˈinflu·ˌə˖ ns̠].

<u>Vocoid /əω/</u>

The vocoid element of the dominant allophone of R.P. /əω/, begins at mid-mid central position and moves in the direction of R.P. /ω/. The lips are neutral for the vocoid element, but tend to gradual rounding for the termination of the glide element.

Vocoid:əω

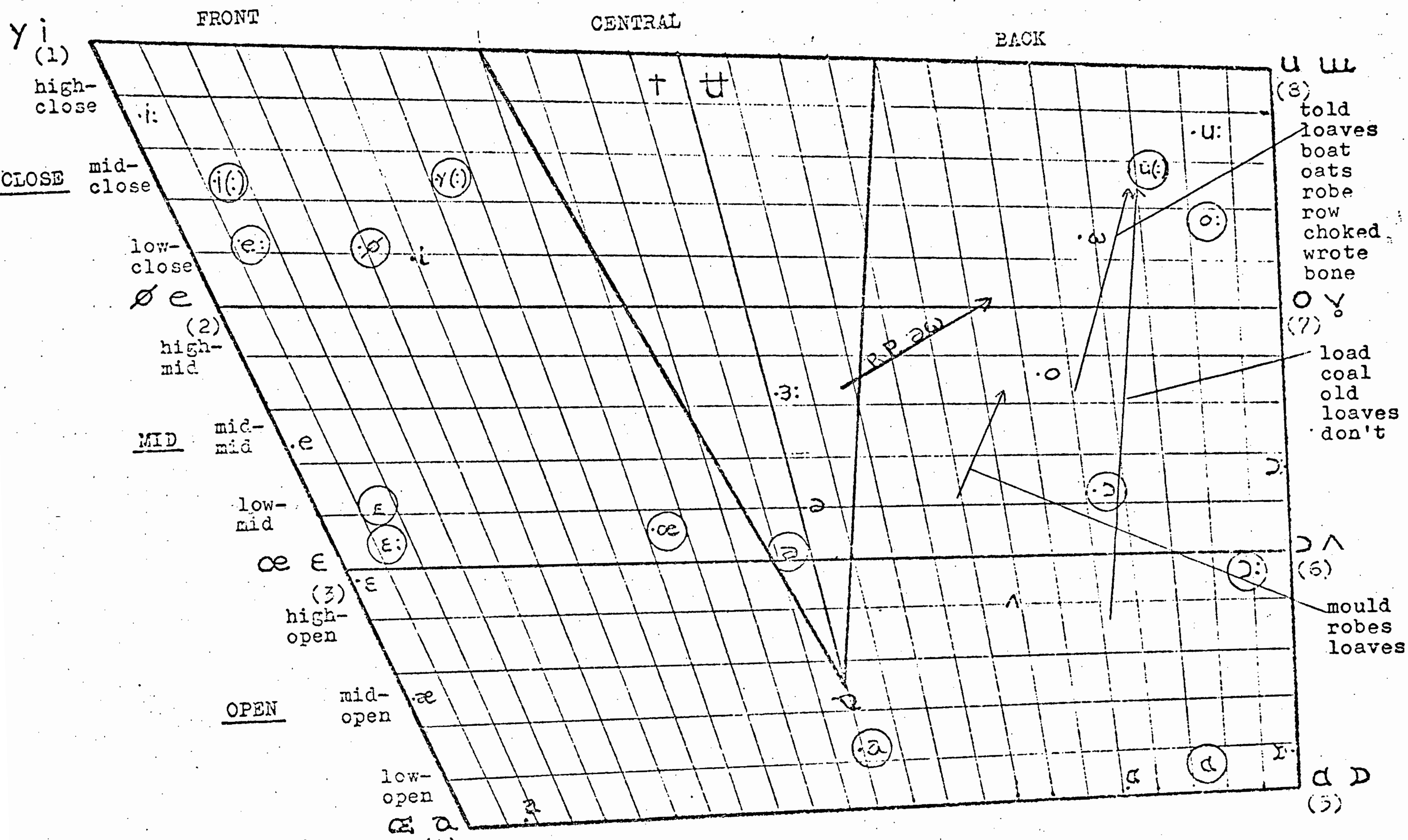


Fig. C.5. (xv).

Afrikaans has a somewhat similar diphthong in e.g. "koud" ("cold"). According to Pienaar, (op. cit., p.61) the initial element poses a problem. He defines the inception as a mid-high lax back vocoid with the quality of fronted $C_7 = [o+]$, which merges into Afrikaans /u/. It is a short, narrow diphthong in Afrikaans. In R.P. the duration varies between long and reduced, e.g. "home, post".

The specimen chart Fig. C.5.(xv) illustrates the distribution of realizations by A.-E. Bilingual subjects.

None of the structures of Bilingual subjects analysed by the speech segmentator has the inception of the vocoid in mid-mid central position with the quality of that of the Norm's rendering.

There are three dominant allophones in the renderings of A.-E. Bilinguals.

(i) The first is characterized by a somewhat rounded vocoid oscillating between the positions represented by Afrikaans short /ɔ/ and Daniel Jones's [o] in a word such as "molest". This variant does not appear to be conditioned to any great extent by the context as it occurs in such disparate structures as, "told, loaves, boat, choked, robe, coat". The glide element terminates in rounded mid-close lax /u/, e.g. [tɔ̣+u̜+ld, lɔ+u̜+vz(s), tʃɔ̣+u̜+kt]: ("told, loaves, choked").

(ii) The second variant is marked by a vocoid element beginning in open back area with a quality approximating somewhat retracted, and even open R.P. /ʌ/. The variant also occurs in relatively free distribution in that it is not bound to conditioning contexts, but it appears to be influenced mostly by contiguous lateral, e.g. "load, loaves, coal, old". It also occurs in other structures, e.g. "don't, going, towed".

(iii) The third variant is a monophthongized allophone. The quality may, perhaps, best be described as being between retracted R.P. /ɜ:/ and Afrikaans short /ɔ/. The vocoid is prolonged and terminates in a very brief /u/ glide on to the closing contoid. This variant is limited to long vocoids, e.g. "loaves, mould, robes". The frequency occurrence of the monophthongized allophone is low.

Triphthongs are usually rendered as disyllables, e.g. "mower, lower", e.g. [ˈmɔ̝+u̟+ˌə(r), ˈlɔ̝+u̟+ˌə(r)] .

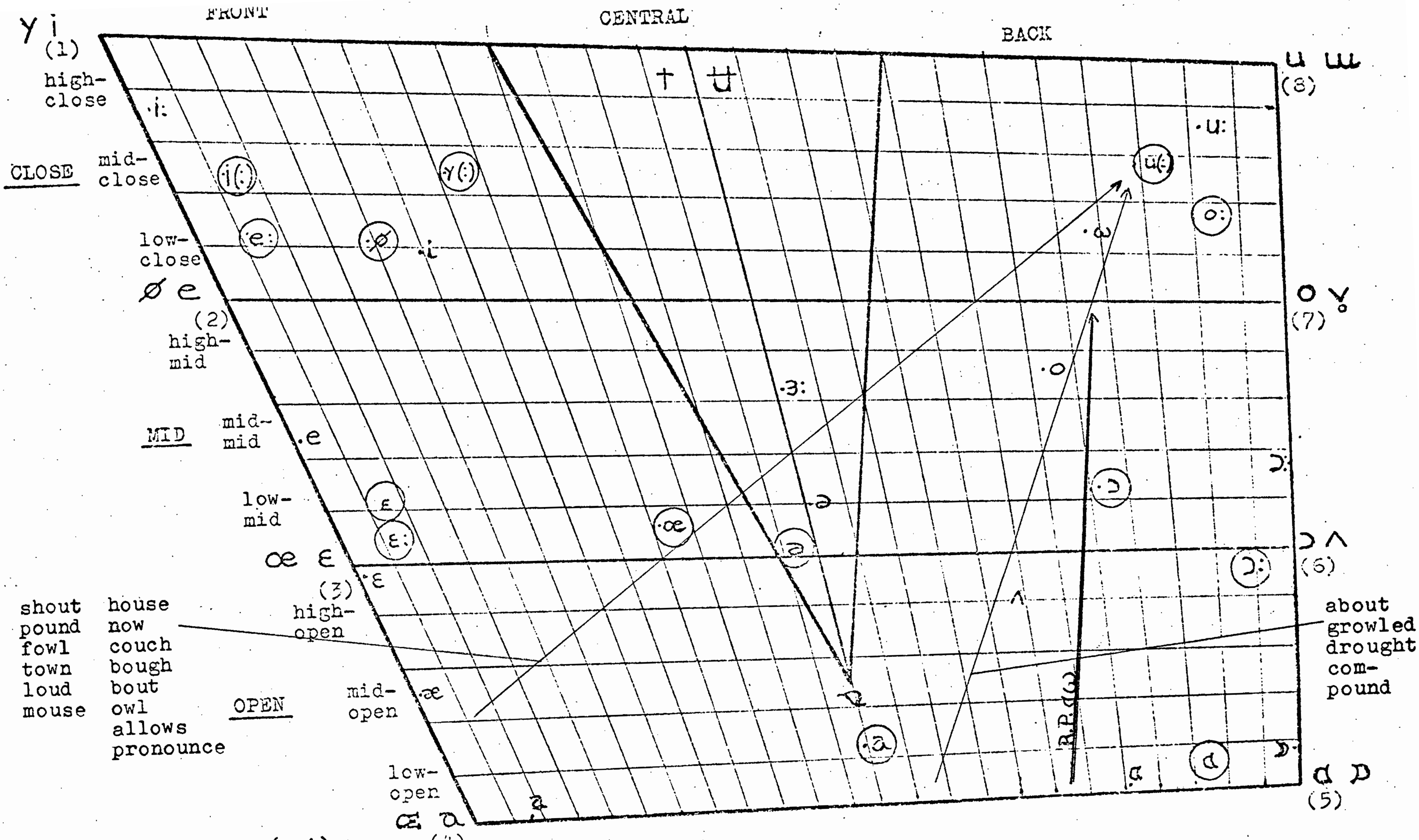
Vocoid /ɑω/

The dominant allophone of the R.P. /ɑω/ diphthong begins at a fronted C5 = [ɑ̈] position and moves in the direction of R.P. /ω/, though, as Gimson observes (op. cit., p.131), elevation of the tongue may not exceed centralized C7 = [ö].
Lips change from neutrally open to weakly rounded.

Afrikaans has a somewhat similar diphthong but the position of inception of the vocoid element is on the [a - ɑ] periphery, slightly nearer [ɑ], and the glide terminates in close back area in the vicinity of the positions represented by Afrikaans /u:/ and /o/. Its frequency occurrence is very low, being limited to two words.

The specimen chart Fig. C.5.(xvi) illustrates the distribution of the dominant A.-E. Bilingual allophones.

Realizations by Bilinguals cover a wide range of allophones. The vocoid element oscillates along the scale close R.P. /æ/ to fronted R.P. /ɑ/. The elevation of the


FRONT
CENTRAL
BACK
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(4)
(5)
(6)
(7)
(8)
shout
pound
fowl
town
loud
mouse
house
now
couch
bough
bout
owl
allows
pronounce
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growled
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R.P.

Fig. C.5. (xvi).

tongue terminating the glide element varies between open, centralized C7 = [ọ̈] and close Afrikaans /u/. As far as the vocoid is concerned, the diversity can be reduced to two allophones.

The dominant variant has a close C4 = [ạ̈] vocoid, somewhat akin in timbre to R.P. /æ/. Vocoid elements of the following CVC structures cluster in this area: "house, now, couch, bough, bout, owl". Disyllabic structures, "allows, pronounce", have vocoids of similar quality. Termination of the glide element varies. Final /l/ conditions a close, reduced, retracted /ə/ glide on to /l/, e.g. [ɦæʷəl̠], ("howl"). The glide element of the other words quoted terminates in about a mid-close back position, e.g. [ɦæu̥s, næu̥ː]: ("house, now").

Most subjects render the following structures with a vocoid having the quality of low-open centralized R.P. /ɑ/ e.g. "hour, about, growled, drought, compound", etc.. The glide terminates in mid-close, back position, e.g. [ˈɑ̈uə, drɑ̈ut, ˈkɔmˌpɑ̈und]: ("hour, drought, compound").

The renderings do not appear to be bound to conditioning contexts, with the exception of "house, now, cow, couch", which are predominantly rendered with a vocoid approximating to the quality of R.P. /æ/.

Disyllabic "mountain, announce, pronounce, around", are rendered with vocoids fluctuating in quality between R.P. /æ/ and centralized R.P. /ɑ/.

C.6.

Trends in the Pronunciation of A.-E. Bilinguals.

In an attempt to delimit trends in the pronunciation of Bilingual subjects, the object is not to draw discrete phonetic boundaries. Trends can be expressed only in terms of variables within ranges of variation.

It should be noted that a trend is usually marked by a dominant and one or more concomitant features, as a secondary feature is usually added to the utterance of the primary phoneme; i.e. the colouring of sounds rendered by A.-E. Bilinguals may be modified by the co-articulatory action of an organ or organs not directly involved in the dominant feature of the articulation. For instance, one of the trends listed is "centralization". This trend may be accompanied by a sub-contrast involving lip-rounding, but, because fronted or retracted tongue hump to a neutral, central position is the commanding characteristic of one or more co-articulatory features the trend is identified as "centralization".

C.6.1.

Uniformity of Tone.

By uniformity of tone is meant the inability of Bilingual subjects to observe the obscuration and shortening of a large number of structures which have reduced and curtailed forms in normal, colloquial English. Natural lilt of rhythm units is supplanted by a word rendering which gives prominence to structures that are usually weakened in normal contexts. This feature is more conspicuous in scripted versions and less so in free speech. For instance, the first two words in some renderings, neutralizes the glide completely, though this last /l/ influence has a low functional burdening, being limited to the structure "I'll", which is rendered: [a·ᵊl].

Vocoid /ɩ/ is centralized and lowered by post-vocalic /l/ so that "will, milk, pill" are rendered with high-mid fronted /ə/ and, not infrequently, with centralized /ω/ with neutral lips, e.g. [pə̣+l ~ pω̈l]. Pre-vocalic velar plosive /k/ appears to have the opposite influence, producing a close front allophone, sometimes preceded by /kj/, so that "kill" is realized [kjil]. In the rendering of "kill" and similar structures, the palatalization is conditioned by the "i" succeeding "k".

Mid-front vocoid /e/ is lowered to approximate to close or open retracted C3=[ɛ̣]. This is perhaps the most obviously perceptible influence of /l/, e.g. "well, bell" are rendered [wɛ̣-l, bɛ̣-l]. The lowering influence may extend to slightly retracted R.P. /æ/.

Summarily, the /l/ influence:

(a) produces transitional /ə/ glide on to /l/;

(b) centralizes close, front retracted /ɩ/;

(c) lowers mid-mid /e/;

(d) neutralizes the /ɩ/ element of /-ɩ/ diphthongal glides of complex nuclei.

C.6.3.

Centralization.

Apart from the centralizing influence of post-vocalic /l/ referred to above, the trend towards neutral articulation characterized by the prevalence of allophones of central /ə/

is a distinctive feature of the renderings of A.-E. Bilinguals, the more so as the Bilinguals' native system is characterized by predominantly lax articulation.

The predominating R.P. /ɩ/ allophone, in virtually all environments, is a centralized /ɩ/ variant, clustering about close, fronted /ə/. Exceptions to the centralizing trend are configurations with initial and post-vocalic palatal contoids and resonants, e.g. "pick, pink, ring, king, tin". Bilingual subjects render these with a mid- to high-close fronted allophone. "Tin" alternates between a high, close vocoid and fronted schwa.

The tendency to centralize articulation is not confined to front vocoids or to simple pure vocoids. Fronted, close back complex nucleus /ωə/ is rendered with a fronted vocoid element and with co-articulate monophthongization. This allophone is conditioned by pre-vocalic palatalized contoids, e.g. "cure, pure, endure", e.g. [pjω̈·, ẹndjω̈·] : ("pure, endure").

C.6.4.

Syllabification.

Bilingual subjects transfer the constraints of their native syllabic pattern to English. Three clearly defined vocoid allophones emerge from this trend.

(i) Syllabic contoids are extended to syllable status with an /ə/ nucleus, e.g. "trouble, bottle, couple, button", are realized with a final syllable [--əl, ---ən]. Schwa variants oscillate between a close, fronted allophone in "button" to a low-mid, central variant in "couple", e.g. [ˈbʌtẹn, ˈkʌpəl].

(ii) Structures with final, unstressed "---tion" in R.P., e.g. "correction, fiction, examination", and which R.P. speakers render with a syllabic /n/, are expanded to a full syllable by Bilingual subjects and realized with an allophone that varies in range between high-mid fronted schwa and low-close centralized /u/. Not infrequently the allophone is a close variant of R.P. /ʌ/, e.g. [kɔˈrek̟ˌʃün~kɔˈrek̟ˌʃʌn̩].

(iii) The majority of Bilingual subjects render some diphthongs and triphthongs as two syllables with distinct diminuendo between the two. The /ɩ/ glide is usually curtailed. The first syllable nucleus is a prolonged allophone of the vocoid element and the nucleus of the second syllable varies within the range mid-mid, fronted /ə/ and low-mid or high-open retracted /ə/, e.g. "quiet, player". Whenever "u" occurs in the orthography,in contexts in which it is usually rendered /ω~u/, the allophone of the first syllable is a mid-close fronted variant of /u/, e.g. "quiet, bluer", [ˈkwa·ᵊˌjə˖t, ˈblu·ˌə(r)].

C.6.5.

Under-differentiation.

Lowering of /e/ and raising of /æ/ to an allophone with the quality of somewhat retracted C3 = [ɛ̠], is an instance of under-differentiation. To Bilingual subjects the /e - æ/ opposition is not critical and they disregard the significant phonemic difference implicit in this opposition. A somewhat more involved process of under-differentiation affects reorganization of final lenis contoid and modification of the vocalic nucleus to accord with the phonological patterning of the modified structure. For example, in rendering "need", Bilingual subjects devoice /d/ - in line with the dictates of their native system which has no final /d/ phoneme - and simultaneously shorten the duration of the vocoid to half-long. Structures, e.g. "cord : court, bead : beat", are homophonous. No phonetic repercussions are involved for the vocoid, but the semantic difference is cancelled without a supporting text.

Direct shortening of the vocoid occurs in the rendering of "cheap", for instance, in the continuum "---a number of <u>cheap</u> beads". The allophone is a short, mid-close retracted variant approximating to close, fronted R.P. /ɩ/. This type of shortening affects the quantitative - qualitative opposition and threatens the semantic difference "cheap - chip".

<u>C.6.6.</u>

<u>Fronting of Vocoids</u>.

Fronted allophones are conditioned by both pre- and post-nuclear palatal contoids. Pre-vocalic velar /k/ in "kill" appears to have a stronger influence than post-vocalic /l/ as Bilingual subjects have a fronted, close allophone of /ɩ/ in this context. Similar articulatory processes are conditioned by pre- and post-vocalic affricates in "itches, chickens".

The usual allophone of /ə/ in renderings of structures with initial, orthographic "a", is fronted, open /ə/, approximating to retracted R.P. /æ/. "Above, admit" are realized: [æˈbʌ̧v(f), ˌæ-dˈmït]. Similar allophones occur in "account, advice, alone, annoy", etc..

A significant example of fronting is the fronted allophone of R.P. /ɒ/. All structures orthographically symbolized "a" and rendered /ɒ/ in R.P. are fronted to advanced, short /ɑ/ or to centralized Afrikaans /a/; e.g. "was, want, swan" are realized [waz(s), want, swaŋ]. "Dog" is usually rendered [dạk ~ dạ· k] (/g/ being devoiced), or with a high-open back allophone, e.g. [dɔ· g ~ dɔ· k]. The explanation of the fronted rendering of "dog" can probably be found in the primary school-years of Bilingual subjects. "Dog" is one of the first English words Afrikaans natives learn, as it has a very high frequency occurrence. They are taught that the vocoid is nearer /ɑ/ than Afrikaans /ɔ:/. English back, open /ɒ/ constantly eludes their linguistic repertoire and their closest approximate is a fronted rendering. The fronted allophones of the other words cited may be partially conditioned by orthography.

Fronting also occurs in complex nuclei. It is a common feature in allophones of /ɑω/. The vocoid element of the diphthong is fronted to open R.P. /æ/ and "house, town", for instance, are rendered [ɦæ̜us, tæ̜un].

C.6.7.

Raising of Vocoids.

The trend towards higher vocoids is a widespread feature in A.-E. Bilingual utterances.

Virtually all CVC structures not affected by the lowering trend of contiguous /l/ have a raised R.P. /e/ allophone. The vocoids in "kept, ten, bet, yes, met, sends" are rendered with raised hump of the tongue to close, somewhat retracted /e/, e.g. "ten, yes", [tẹ-n, jẹ-s].

Tongue positions for all /æ/ vocoids are raised. Organically, the nearest approximate to R.P. /æ/ is Afrikaans

/ɛ/, a retracted allophone of C3 = [ɛ-] , and most of the /æ/ allophones of Bilingual subjects cluster about the close and open retracted C3 position. These include mono- and poly-syllabic structures: "that, hat, fact, tapped, scattered, back, travelling", etc.. The vocoids /æ/ and /e/ are subject to marginal underdifferentiation in structures where /æ/ is raised and /e/ lowered, e.g. the opposition "bag : beg" is neutralized and rendered with retracted /ɛ/ allophone: [bɛ-g].

Initially, vocoid /ɩ/ has a raised allophone which, at the same time, is fronted, e.g. "is, if, in, England, impossible", have mid- to high-close front allophones.

It is a common feature in Bilingual renderings for R.P. /ɒ/ to be raised in the direction of open, shortened R.P. /ɔ:/. Medium lip-rounding is a co-articulate feature of these utterances, e.g. "pot, sorry, holiday, lock, gone". [gɔ˔˒n, lɔ˔k] ("gone, lock").

Short relaxed R.P. /ω/ is raised to mid-close back position. At the same time the hump of the tongue is slightly retracted and lips are medium-rounded, e.g. "pull, could, wool, wood, book". Frequently, orthographic "oo" is lengthened.

Complex nuclei also feature in the raising of vocoids. In the diphthongs /ɔɩ, əω/ both the vocoid and glide elements are affected. In /ɔɩ/, for instance, the trend is to raise the vocoid element and to round the lips somewhat, and to raise and front the glide element. The vocoid element of /əω/ is raised and retracted to close Afrikaans /ɔ/ and the glide element is raised to a mid-close back position with no appreciable change in the configuration of the lips which are already open- to medium-rounded for the inception of the diphthong, e.g. [kɔ̞›i· , lɔ̞›w] (coy, low).

C.6.8.

Monophthongization.

In the Norm's rendering of the five, long, relatively pure vocoids, there is virtually no evidence, based on aural perception, of diphthongization. R.P. long vocoids /i:, u:, ɑ:, ɔ:, ɜ:/ will therefore be regarded as monophthongal for the purpose of comparative analysis.

Most of the renderings of long vocoids by A.-E. Bilinguals are likewise monophthongal. Notable exceptions are vocoids followed by /l/ in scripted versions. In these structures articulation of the long vocoid is frequently accompanied by an /ə/ glide on to the /l/.

The most distinctive feature of monophthongization occurs in the complex nucleus /ɛə/. Diphthongization of this structure constitutes a pattern discrepancy for A.-E. Bilinguals with which they cannot cope. The diphthongal glide is rendered a close, long /ɛ̣/, e.g. "wear", [wɛ̣:(r)]. The raising of the vocoid element is a co-articulate feature.

A small minority of proficient Bilingual subjects diphthongize "year". The vast majority render a close, long /ɛ̣/ as for "wear" above.

The /ωə/ diphthongal glide, orthographically "u", and with pre-vocalic palatal contoids, is rendered as close, rounded /u:/, e.g. "during, jury, furious". In effect, the vocoid element is raised, retracted and rendered homorganically with medium to close lip-rounding, e.g. [ˈfju̹:rijəs] ("furious").

C.6.9.

Lengthening of Vocoids.

The physical resemblance of orthographic representation, tempts Bilingual subjects to identify phonemes astride the limits of English and their native Afrikaans. In Afrikaans geminate vocoids are rendered long, e.g. "oom, rook, naar" ("uncle, smoke, sick"). This feature of graphic and phonic similarity is transferred to English, and structures such as "book, cook, good" are rendered long with co-articulate retraction and lip-rounding. Such is the unconscious, automatic rendering imposed by the native system. Frequently, when challenged, Bilinguals render the structures of the target system with a short nucleus.

C.6.10.

Prominence of Glide Elements.

Bilingual subjects tend to render the glide elements of diphthongal glides /eɩ, aɩ, ɔɩ / with great prominence. In R.P. the vocoid element is the longer of the two and the glide element is reduced and terminates in a retracted high-mid area before it reaches the elevation of C2= [e]. In CV structures, with a primary accent, and before nasal resonants, Bilinguals prolong the glide element and frequently raise the tongue to the stricture of the vocalic contoid /j/, e.g. [kɔi̞ˑn, məi̞ˑ] ("coin, may").

C.6.11.

Lowering of Vocoids.

The lowering of vocoid /e/ in "shell", for instance, as a result of the influence of /l/, has already been referred to.

Lowering is a dominant feature in the allophones of R.P. /ʌ/. The hump of the tongue is lowered to such a degree that the allophone approximates to central, Afrikaans short /a/. The lowering appears to be most conspicuous in structures that have Afrikaans symmetries; e.g.

English	Afrikaans	Bilingual Realization
cut	kat ("cat")	[ka-t]
buck	bak ("bowl")	[bʌ̹+k]
duck	dak ("roof")	[da-k]

C.6.12.

Lip-rounding.

The most significant feature of Bilinguals' rendering of long, central /ɜ:/ is lip-rounding. The degree of lip-rounding is conditioned by the context but no renderings by Bilingual subjects are marked by lip-spreading. Initial "w" conditions the greatest degree of lip-rounding. Two major allophones emerge from lip-rounding: (i) an open, fronted variant, almost akin to Afrikaans rounded and centralized /œ/; (ii) a close, retracted allophone approximating to centralized C7 = [ö].

C.6.13.

Stress Pattern.

Both English and Afrikaans are characterized by culminative stress, which means that, in any polysyllabic word, one of the syllables carries the main accent; but this accent is not tied to the same syllable in the chain of syllables constituting words. Each of the two systems has its characteristic distribution of stress both at word and at sentence level. The reality which stress has for A.-E. Bilinguals is associated with their native Afrikaans usage, and in many realizations this reality is transferred to English structures.

In English, stress is phonemic in giving minimal pairs, e.g. "pre'sent, 'present", /prɩ'zent, 'preznt/. The stress shift entails a qualitative opposition in vocoids. Bilinguals rarely observe oppositions of accentual pattern manifested by a shift of the prominence pattern, and render the structures [pręzənt].

Stress plays a specific part in grammatical utterances, noun-verb opposition being distinguished by differences in stress placements. Bilinguals do not observe the obscuration of stress and the consequent recurrence of reduced vocoids deriving from grammatical categories. They neutralize the qualitative changes signalled by stress placement and /kən'trækt, 'kɔntrækt/ are both rendered ['kɔn,trækt].

Structures that are syntactically and semantically differentiated by stress distribution are not differentiated by Bilingual subjects. Differentiation, by stress placement, of e.g. "English lecturer", as either native English or a lecturer who teaches English without reference to his origin, is not observed and the structure is rendered [ˈiŋliʃ ˈlɛktʃœ-rər]. Both vocoids in the realization of "English" are mid- to high-close front allophones.

English morpheme shape variations entail different stress placements with concomitant quantitative and qualitative change in the vocoids, e.g. "admire, admirable". Only Bilingual subjects of high bilingualism observe the variant phonological realizations entailed by such changes. Average A.-E. Bilinguals render these structures, [ædˈmaiə, ædˈmaiᵊrəˌbəl].

The native stress pattern of A.-E. Bilinguals is also evident in the continuum of phrase and sentence structures. The question, "What on earth is it?" was consistently realized with the accent on "earth", approximating the stress distribution in Afrikaans, "Wat op aarde is dit?". There is both a quantitative and a qualitative difference between renderings by Bilingual subjects and the Norm, of the vocoid of "earth". The Bilingual subjects render a rounded, protracted variant, [ɜ˙› ø]. The word "process", in the continuum, "the key to the process" - a structure in reading test (a) - was not infrequently rendered with primary accent on the second syllable, and close, retracted or open allophone of [e], e.g. [ˈprəuˌsẹ-s ~ prọ̈ˈsęs].

Reference has already been made to the prominence given by Bilingual subjects to structures that are obscured in the continuum of speech, and also to the rendering of syllabic contoids with nuclear vocoid in a checked syllable. In such renderings the final syllable is realized with secondary stress, e.g. "button", [ˈbʌ̜ˌtən].

Correct placement and distribution of English stress demand a very high degree of proficiency from A.-E. Bilingual subjects.

C.7.

Perception Tests.

The object of the perception tests was to explore probable correlation between the variants of R.P. structures that have been decoded after aural perception and the variants observed in the oral rendering, by A.-E. Bilinguals, of somewhat similar scripted and free-speech structures. There were two perception tests.

C.7.1.

Perception Test (1).

In the first perception test - a copy of which is attached - A.-E. Bilingual subjects were required to give an orthographic rendering of fifty words in randomized sequence. The words and detailed instructions as to procedure, were recorded on tape. Each citation form was preceded by the words: "Word number one", etc. Each of the vocoids dealt with in the reading tests, featured in from one to five different configurations in the recorded words.

The test aims at recording the correlation that might be evident between visual perception and aural rendering, on the one hand, and auditory perception and orthographic symbolization on the other.

There were 150 Bilingual subjects who did the test. There was also a control group of 50 native English South

(contd on p. 133....

PERCEPTION TESTS

PERCEPTION TESTS

TEST ONE.

SCRIPTED VERSION OF RECORDED INSTRUCTIONS AND WORDS.

Good Morning, or should it be Good Afternoon? Please fill in the details required at the top of the page that has been handed out to you, namely: Your standard or course at school, college or university: ....
the name of the school, college or university that you attend:
....
indicate whether you are a boy or a girl by writing the word "boy" or "girl" as the case may be: ....
and lastly, where did you grow up? Please write down the name of the town and that of the province: ....
Thank you.

You have before you a sheet of paper with the figures 1 to 50. I am going to read fifty words and I want you to put in writing the words you hear.

Please note: this is <u>not</u> a spelling test. I want you to write down the words you <u>hear</u> and not the words you think they should be. If, for instance, you hear the sounds "coo", you may write down "koo" or "coo", as either spelling would represent the sounds you hear. And this is exactly what I want you to do: write down the spelling of the sounds you hear.

I shall proceed as follows: I shall first read the number of the word and then say the word twice. I shall then stop for a few seconds to allow you time to write down the spelling of the word you hear.

Are you all ready? Put your sheet of paper on some book to act as pad.

(The following words are then read according to the instructions above. Each word is prefixed by the number. Thus: "Word number one", etc..)

Words in randomized sequence:

1. cat
2. pull
3. fade
4. nought
5. coat
6. bomb
7. I'm
8. balm
9. hand
10. cut
11. noise
12. dad
13. year
14. dead
15. hum
16. harm
17. dared
18. more
19. pure
20. reach
21. turn
22. pin
23. Mary
24. rich
25. pen
26. dear
27. merry
28. loud
29. shell
30. heels
31. marry
32. search
33. ridge
34. such
35. shall
36. surge
37. main
38. pool
39. poor
40. lark
41. dog
42. dare
43. dark
44. luck
45. caught
46. cart
47. dock
48. cord
49. cot
50. arm

Perception test one.

Words in vocoid sequences:

heels reach

pin rich ridge

dead pen merry shell

dad cat marry shall hand

cut hum such luck

arm balm cart harm dark lark

bomb cot dog dock

nought caught cord more

pull

pool

search turn surge

fade main

coat

I'm

loud

noise

dear year

dared dare Mary

poor

pure

TEST TWO.

SCRIPTED VERSION OF RECORDED INSTRUCTIONS AND WORDS.

This is a second test that I should like to give you.
First fill in the details at the top of the page: namely,
Number one: the standard you're in or the course that you're doing at college or university............................
Number two: the name of the school, college or university that you attend...
Number three: indicate whether you're a boy or a girl by writing down the word "boy" or "girl" as the case may be......
Number four: where did you grow up? Please write down the name of the town and the name of the province...................
Thank you.

You have on the sheet of paper, sets of words.
Each set consists of four words. I'm going to read only one word from each set. Underline the word that you think you hear.
Remember: I'll say one word from each set once only, and you have to underline the word you think you hear. I'll allow you time to study the words in each set before I say the word.
(Set A is accompanied by recorded instructions, which are reduced in set B and from set C onwards only the number of the set and the underlined word are read. The sets and words are on the attached sheet.)

PERCEPTION TEST.

TEST TWO.

Standard or course at College or University...............

Name of school, College or University.....................

Boy or girl...

Where did you grow up? Town.............. Province............

Set A.

1. bead
2. beat
3. bid
4. bird

Set B.

1. wit
2. wet
3. wheat
4. weed

Set C.

1. hid
2. had
3. heard
4. head

Set D.

1. tin
2. turn
3. tan
4. ten

Set E.

1. cuff
2. cough
3. calf
4. curve

Set F.

1. lurk
2. luck
3. lark
4. lock

Set G.

1. cord
2. curd
3. cod
4. card

Set H.

1. stalk
2. stark
3. stock
4. stuck

Set I.

1. pool
2. pull
3. Paul
4. pole

TEST TWO. (continued,)

Set J.

1. fowl
2. fool
3. full
4. foal

Set K.

1. jug
2. joke
3. jerk
4. Jock

Set L.

1. red
2. ride
3. raid
4. reared

Set M.

1. gall
2. gull
3. goal
4. girl

Set N.

1. tail
2. toll
3. tell
4. tile

Set O.

1. bays
2. bows
3. buys
4. boys

Set P.

1. pose
2. parse
3. poise
4. pause

Set Q.

1. fur
2. fair
3. far
4. fear

Set R.

1. stair
2. steer
3. star
4. stir

Set S.

1. sure
2. shore
3. sheer
4. share

African subjects. A high percentage discrepancy between the recorded test and the control group would invalidate the test. It would reflect, either, that the dialect of the recording differed substantially from that of the control group, or, in case there was close correlation between the results obtaining from the A.-E. Bilingual subjects and those of the control group of native English subjects, that the control group had the same linguistic inhibitions as the Bilingual subjects. Close correlation between the recorded instructions and the realizations of the control group, would indicate that the dialect of the instructions approximates to the dialect of native English speakers in South Africa.

C.7.2.

Perception Test (2).

The purpose of the second perception test - a copy of which is attached - was to investigate and record the correlation of the quality of renderings obtaining from auditory perception and visual identification. The test consisted of nineteen sets of four words each. All the words were monosyllabic and each set had four different vocoid nuclei in, as far as possible, similar syllabic boundaries for each set. The instructions were recorded on tape. One word from each set was recorded, and the subjects were required to underscore the word they thought they heard. There were 102 A.-E. Bilingual subjects. The test was also done by a control group of 20 native English subjects.

C.7.3.

Detailed results of perception test (1).

No.	Recorded word.	Type and number of dominant variants.	Variants by control group.
1	heels	/hilz/ ... 9	0
2	reach	/ritʃ/ ...11	0
3	pin	/pen/ ...44	0
4	rich	/ri:tʃ/ ...10	/ridʒ/..1
5	ridge	/ri:tʃ/ ...31	0
6	dead	-	0
7	pen	-	0
8	merry	/mæri/ ...12	/mæri/..1
9	shell	/ʃæl/ ... 6	0
10	dad	-	0
11	cat	-	0
12	marry	-	0
13	shall	/ʃel/ ...68	/ʃel/..2
14	hand	-	0
15	cut	/kat/ ... 3	0
16	hum	/hæm/ ... 4	0
17	such	/satʃ/ ... 4	0
18	luck	/lak/ ... 1	0
19	arm	/ha:m/ ...43	/ha:m/..26
20	balm	/bɒm/ ...11	0
21	cart	/ka:d/ ...13	0
22	harm	-	0
23	dark	/dɒ:k/ ...18	0
24	lark	/lɒk/ ...14	0

No.	Recorded word.	Type and number of dominant variants.				Variants by control group.
25	bomb	/bɔ:n/	...7.	/ba:m/	...7	/ba:m/..1
26	cot	/kɒd/	..16.	/ka(t)/	..10	/kat/ ..1
27	dog	/dag/	.. 6.	/dɒ·k/	.. 3	/da·k/.1
28	dock	/dɒg/	..19.	/da·(k)/	..18	0
29	nought	/nɒt/	..11			/nɒt/.1
30	cord	/kɔ:t/	..14			0
31	caught	-				0
32	more	-				0
33	pull	/pu:l/	..12			0
34	pool	/pωl/	..10			0
35	search	-				0
36	turn	/təʊn/	.. 7			0
37	surge	/sɜ·tʃ/	..25			0
38	fade	-				0
39	main	-				0
40	coat	-				0
41	I'm	/hai/	..25			0
42	loud	-				0
43	noise	-				0
44	dear	-				0
45	year	/hiə/	..28			0
46	dared	/dæd/ ..73.	/ded/ ..52.	/diə(d)/.11.			/ded/.1 /dæd/.1
47	dare	/dæ(d)/ ..32.		/diə/ ..16		0
48	Mary	/mæri/ ..34.		/meri/.. 6		/meri/.1
49	poor	-				0
50	pure	-				0

C.7.4.

Perception test (1). Dominant variants.

Vocoids.	Variants.
/i:/	shortened allophone, /i/ ...20
/i/	open allophone, /e/ ...44 long, close allophone, /i:/ ...41 long, close allophone with devoiced post-nuclear contoid ..33
/e/	open allophone, /æ/ ...18
/æ/	close allophone, /e/ ...68
/ʌ/	open, fronted allophone, /a, æ/ ..12
/a:/	close allophone, /ɔ/ ... 43 initial /h/ inserted, .. 43
/ɒ/	lengthened, retracted /ɔ:/ ... 26 more open allophone, /ɑ ~ a/ ...41
/ɔ:/	shortened allophone, /ɒ/ ...11 devoiced final /d/ ...14
/ω/	lengthened and raised allophone, /u:/ ..12
/u:/	shortened allophone, /ω/ ..10
/ɜ:/	devoiced final contoid, ...25
/ei/	-
/əω/	-
/ai/	-
/ɑω/	-
/ɔi/	-
/iə/	-
/ɛə/	monophthongized allophone, /æ/ ...139 monophthongized allophone /e/ ...58 diphthongized allophone /iə/ ... 27
/ωə/	-

C.7.5.

Perception test (2). Summary of variants.

Set.	Word recorded.	Words underscored by A-E Bilinguals.	Words underscored by control group.
A	bead	beat ...17	bead
B	wit	wet ...12. wheat ...3.	wet ...1
C	head	head	head
D	tan	ten ...3	tan
E	cuff	cough ...6	cuff
F	lark	lark	lark
G	cod	card ...23. cord ...4.	cod
H	stalk	stark ...11. stock ..4.	stalk
I	pull	pool ...2	pull
J	fool	full ...25	fool
K	jerk	joke ...17. jug...2.	joke ...1
L	raid	reared ...1	raid
M	goal	girl ...36	goal
N	tile	tail...1	tile
O	bows	bows	bows
P	poise	poise	poise
Q	fear	fear	fear
R	stair	stir ...14	stair
S	sure	shore ...3	sure

C.7.6.

Correlates between reading tests and perception tests (1) and (2).

Item.	Reading test.	Perception test (1).	Perception test (2).
1 /i/	devoicing of final plosive and change of duration, e.g. "bead"-"beat".	"ridge" rendered "reach" by 20% of subjects.	"bead" perceived as "beat" by 17% of subjects.
2 /ɩ/	/i/ centralized and lowered, e.g. "still" rendered [stə̝+l].	/i/ perceived and rendered /e/ by 29% of subjects.	/i/ perceived /e/ by 12% of subjects.
3 /e/	vocoid /e/ lowered to low-mid, e.g. [fε-lt].	/e/ perceived /æ/ by 6% of renderings.	no similar variant.
4 /æ/	dominant allophone of /æ/ is raised variant clustering about [ε].	/æ/ raised towards /e/ by 45% of subjects.	/æ/ perceived as /e/ by 3% of subjects.
5 /ʌ/	open /ʌ/ one of dominant variants.	/ʌ/ lowered and fronted by 2% of renderings	/ʌ/ perceived as /ɒ/ by 6% of subjects.
6 /ɑ/	open rounded realization of /ɑ/=[ɒ+] is common variant.	/ɑ:/ retracted towards /ɔ/ by 9% of renderings.	not relevant.
7 /ɒ/	fronted, unrounded variant /ɑ~ɑ/ one of dominant allophones.	fronted, unrounded variant of /ɒ/ viz. /ɑ~ɑ/ by 14% of renderings.	/ɒ/ perceived as /ɑ/ by 23% of subjects.
8 /ɔ:/	variant approximating Afr. /ɔ/ is common allophone	/ɔ:/ shortened to /ɒ/ by 7% of subjects.	/ɔ:/ perceived as /ɒ/ by 4% of subjects.

Item.	Reading test.	Perception test (1).	Perception test (2).
9 /ω/	/u:/ is dominant allophone of /ω/.	/ω/ rendered as /u:/ by 8% of subjects.	/ω/ perceived as /u:/ by 2% of subjects.
10 /u:/	/u:/ realized /ω/ is variant of low burdening.	/u:/ perceived and rendered as /ω/ by 7% of subjects.	/u:/ perceived as /ω/ by 20% of subjects.
11 /ɜ:/	dominant /ɜ:/ variant is rounded.	/ɜ:/ in "turn" rendered /əu/ by 5% of subjects.	/ɜ:/ perceived as /əu/ by 17% of subjects.
12 /ei/	-	-	-
13 /əω/	-	-	/əω/ perceived as /ɜ:/ by 36% of subjects.
14 /ai/	-	-	-
15 /aω/	-	-	-
16 /ɔi/	-	-	-
17 /iə/	-	-	-
18 /ɛə/	dominant allophone is /ɛ̣/.	rendered /e/ by 39% of renderings.	perceived as monosyllabic "stir" by 14% of subjects.

C.7.7.

Comments on Perception Tests.

The absolute correlation between the recorded instructions and the results of the control groups, proves that the dialect of English used in the recording is about the same as that of the control groups, who are native English South Africans.

It must be remembered that in perception test (2) - nineteen sets of four words each - the scope of tolerance is limited by the choice of one out of four, whereas in perception test (1) - in which the subjects wrote down the words they thought they heard - the tolerance is wider, as it is correlated to the constraints of the recording and to the native system of the subjects.

The percentage distribution of renderings in column two of C.7.6. above, namely, perception test (1), is low by virtue of the fact that the figures reflect absolute percentages of renderings of up to four individual structures, ranging from lowest to highest number of variants. If only the words with the largest number of variants are taken into account, the percentages would be two to three times as high.

A detailed analysis of the results and correlations tabulated above is beyond the compass of this investigation. Such an analysis would involve a psycho-linguistic approach to the process of listening comprehension. But, the limitations of psychological investigations into bilingual phenomena became abundantly clear at the Second International Congress of Applied Linguistics, held at Cambridge, 8 - 12 September, 1969. The papers read at the congress were published under the title, "The Psychology of Second Language Learning", and edited by Paul Pimsleur and Terence Quinn. From the divergent premises and theses reflected in the papers, it is clear, as the editors observe on pp. vii - viii of the preface, "that there is as yet no common approach to the psychology of second language learning".

The following brief observations will, therefore, be stated in linguistic terms.

In the main body of this section of this investigation, the impact of native Afrikaans prejudices on the overt rendering of English as L2 has been explored and analysed. It would be of interest to investigate to what extent native linguistic habits inhibit the auditory perception of L2. In the two perception tests, the A.-E. Bilingual subjects were required, first, to encode structures from English - a system which had only been partially "internalized". The likelihood of structures being perceived correctly, hinges on the familiarity of Bilinguals with the phonological and morphological structures of English. Bilinguals perceive English, as it were, through a "filter" imposed by their native Afrikaans. The object of perception test (1) was to investigate to what extent deviations in decoded material, aurally perceived, correlate with the deviations observed in the overt realizations, namely, the reading tests. The tabled summary above, of the correlates in the first and second columns, reveals a significant, almost one to one correlation in the deviations, e.g. item (4): in the overt realization by A.-E. Bilinguals, the dominant allophone of R.P. /æ/ is a raised variant that clusters about retracted [ɛ-]. In the orthographic rendering of aural perceptions, this variant is matched by 45% of the subjects who rendered the phoneme /æ/ with the written symbol "e".

Perception test (2) is slightly different. Encoding of English is, as in the case of perception test (1), dependent upon aural perception. But, instead of being allowed "free" decoding, the subjects are required to identify their decoding with one of four visual structures given. Auditory information has to be converted and related to visual symbols within a fixed range of tolerance combinations. The phenomenon which has been investigated is whether this "decoding-cum-identification" process would produce results that correlate with those of perception test (1), (i.e. column two in the summary of correlates), and also with the results in column one, which displays the overt variants. The tabulated results reflect a high degree of correlation between perception test (2) and the other two tests.

The inference appears to be clear. Conclusions to be drawn from these tests may be briefly summarized as follows:

(1) The native linguistic system is firmly entrenched and its influence in a bilingual state is dominant. Its dominance is evident in that:

(a) deviations in the norms of L2, which occur in the speech of bilinguals, may be observed and categorized;

(b) vocoid variants in the English speech of A.-E. Bilinguals correlate with variants obtaining from aural perception of English structures.

It is obvious that much could be said about this theme.

But, the object is merely to explore and record deviations deriving from aural perception of L2, and to compare these with deviations observed in the L2 utterances of A.-E. Bilinguals. In any bilingual state, perception and rendition appear to be intimately associated, and the findings in this subsection may constitute the theme for further research.

SECTION D.

ACOUSTICAL ANALYSIS

D.1.

Instrumental Phonetics.

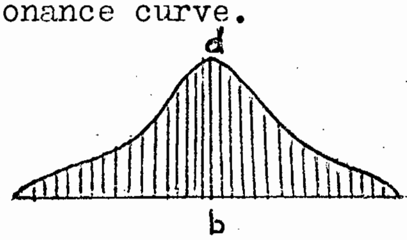
The formation of any sound requires that a vibrating medium should be set in motion by some kind of energy. It is generally assumed that in the case of the human speech mechanism egressive pulmonic air pressure activates the vocal cords and causes them to vibrate. Vocal "folds" would be a more appropriate and descriptive term as the so-called cords physiologically resemble folded bands. In conformance with general usage, however, the folds will be referred to as vocal cords. The vibration of the vocal cords produces sound and as the air swirls or sound waves pass up the vocal tract from the larynx to the lips or nose, the laryngeal sound is modulated by a number of cavities or resonating chambers. These are the pharynx or pharyngeal cavity; the mouth, referred to as the oral cavity; if the lips are rounded or pouted an additional resonating "cavity" is added to the oral cavity. It could hardly be regarded as a cavity in the approved sense, but the configuration of the lips may have an important influence on the timbre of a sound. Finally, the nasal cavities may modulate certain sounds produced by the excitation of the vocal cords.

Excitation of the vocal cords causes the air molecules to vibrate at the same rate or frequency as the vibrating vocal cords. These vibrations set up a chain reaction which, in the supra-laryngeal cavities, culminate in the oral and nasal radiators. In speech, these vibrations may,

(i) be of a complex but regular pattern producing the type of phonation designated by "vocoid" (manner of production) i.e. a tone having a measurable pitch on the musical scale;

(ii) the vibrations may be irregular and differ from tones by not having a measurable pitch on the musical scale. Such vibrations produce noises e.g. the initial sound in the word "shut". Or the vibrations may be both regular and irregular, i.e. combining both tone and noise, as in "z". Articulations may also be characterized by inactivity of the vocal cords, i.e. lack of vocal cord vibration, and constriction or complete occlusion at a point in the vocal tract.

The vocal cords vibrate in such a way as to produce two types of vibration: a fundamental frequency or rate of vibration, i.e. a basic vibration over their whole length; and a series of overtones or harmonics whose frequencies are multiples of the fundamental frequency. "There is no reason to suppose that the glottal vibrations in the case of [a:] are very different from those for [i:] when both sounds are said with the same pitch", (Gimson, op. cit., p.19) so that the vibrations of the vocal cords are only partially responsible for the quality of the vowels. But the number and strength of the harmonics or component frequencies of the complex glottal tone must differ from one individual to another otherwise different speakers could not be identified by significant differences in voice quality. By means of resonance any frequency in a complex sound may be reinforced and its timbre modified, and it is the modification of the harmonics of the glottal tone that enables us to produce sounds as different as "me" and "more". The frequencies are modified in the cavities referred to above, viz. pharyngeal, oral and labial. The shape and volume of each of these cavities may be modified by volitional muscular activity. The shape and size of the nasal cavities, however, are fixed as they contain no volitionally movable organs. Each of these cavities acts as a resonance chamber and any rearrangement of these coupled resonating chambers exercises a different resonance influence on the complex sound created in the larynx. In addition, the resonating capacity of these cavities is selective so that certain frequencies of the complex sound are weakened, while others are reinforced. Any mechanism that has the power of selective weakening and reinforcing of frequencies is called a filter, so that the cavities in the vocal tract act as acoustic filters. This is the principle of vowel production. Malmberg (op. cit., p.10), has the following figure to illustrate a resonance curve.



On the X axis different frequencies are reinforced with the help of a resonator. The Y axis represents amplitude. The amplitude reaches its maximum at the middle d - b, since this is where the peculiar frequency of the resonator lies. The amplitude diminishes rapidly on either side of d - b as the difference between the peculiar frequency of the resonator and the reinforced tone increases.

The resonating cavities are capable of assuming an infinite number of shapes, each of which is characterized by a distinctive vibrating resonance. Should the cavity's resonance correspond to any of the harmonics of the glottal tone, they vibrate in sympathy and are considerably reinforced. "Certain bands of strongly reinforced harmonics are characteristic of a particular arrangement of the resonating chambers which produces, for instance, a certain vowel sound. Moreover, these bands of frequencies will be reinforced whatever the fundamental frequency. In other words, whatever the pitch on which we say, for instance, the vowel [a:] , the shaping of the resonators and their resonances will be very much the same, so that it is still possible, except on extremely high or low pitches, to recognize the quality intended",(Gimson, op. cit., p.20).

The arrangement of the coupled resonance cavities has an illimitable potential, but of this vast scope each language employs a restricted number of resonance notes. Vocoids, which are the subject of this investigation, are characterized acoustically by formants, which are frequency regions of high energy concentration corresponding to the passbands of the resonance cavities in the vocal tract. The complex range of frequencies that make up the quality of a sound is called the complex frequency acoustic spectrum. Such a complex wave pattern may be analysed by an instrument called the sound spectrograph. It was originally developed at the Bell Telephone Laboratories for the purpose of rendering speech patterns visible to the deaf and is now commercially available under the name "Sona-graph". It takes 2.4 seconds to give a visual presentation of the spectrum and the various intensities of sound contained in it.

A number of filters, covering a range of frequencies from zero to 8000 Hz respond to the various sound intensities at different frequencies and on a length of teledeltos paper of 325 mm give a three-dimensional display of the acoustic spectrum: frequency is shown on the ordinate or Y axis, time on the abscissa or X axis and the spectral energy at any frequency level by a pattern of variable density black marking. A spectrogram provides a reference for the formal contents of a speech message.

According to Fant (Acta Polytechnica No. 2-1958) M. Joos was the first linguist to make use of the sound spectrograph. Fant regards Joos's work as a valuable contribution to the physics of speech, but is of the poinion that it does not go very far into the general applications of spectrographic techniques for studies of speech and language. Robert B. Skelton, in an article entitled: "Phonetics, Phonemics, and Pronunciation: Dialect and Standard Language", published in the July 1954 volume of the Monograph Series on Language and Linguistics, claims that the advent of these "objective means", that is, the sound spectrograph, "has provided the dialectologist with a satisfying basis for drawing phonological comparisons, establishing norms, noting dialectal divergencies, and for describing the phenomena on an acoustic as well as an articulatory basis, the former obviously being equally justifiable since it is acoustic material with which we are dealing", (p.39). He then proceeds to give a fairly detailed analysis of six dialectal variants of the Spanish lateral illustrated in the sequential ordering of six spectrograms. Delattre's appraisal of the possibilities of the spectrograph may sound exaggerated. "Spectrography", he says, "makes the complex patterns of syllables accessible to the naked eye in a three-dimensional display of <u>time</u>, <u>frequency</u> and <u>intensity</u> and shows a different pattern for every vowel, every consonant, as well as dialectal and individual traits of pronunciation or marks of a foreign accent. On spectrograms, differences of duration, intensity, pitch, syllabification, diphthongization, affrication, aspiration, nasalization, vowel colour, consonantal place of articulation, and so on, can be located and measured", (op. cit., p.7). However, all the information found on spectrograms is not linguistically relevant and speech researchers have not yet succeeded in interpreting the multiplicity of cues on a spectrogram.

"A basic problem in speech analysis is to formulate the complex transforms whereby the phonetically significant aspects may be extracted from the mass of data available", Fant-Readings by Lehiste- 1967 in paper "Descriptive Analysis of the Acoustic Aspects of Speech", p.94).

<u>D.1.1.</u>

<u>Relation Between Acoustical Structure and Physiological Arrangement of Resonance Chambers in Vocal Tract.</u>

Much research work has been done to find out what relationships exist between the formants of vocoids and the resonance chambers of the vocal tract. In 1954, Gordon E. Peterson, one of the most authoritative of the earlier researchers on instrumental phonetics, wrote that "the complex muscular actions and breath stream dynamics create a complex acoustical wave whose ever-changing form presents many problems in analysis.

It is a matter of some importance that the acoustical speech signal does not completely represent the positions and movements of the speech mechanism....... There is little reason to anticipate, for example, that every detail of the motor production can be found in the acoustical speech wave. ..... In fact, certain basic difficulties are to be anticipated in attempting to distinguish in detail those features of the acoustical speech wave which are produced by the laryngeal or other generating sources from those features which are due to the cavity resonances and shapings which lie above the particular source", (p.63). Five years later Ernst Pulgram drew attention to the fact that, although no two speech sounds or articulations can be acoustically alike, because the physical act of articulation could hardly be exactly repeated, all members of a linguistic community speaking the same language produce sameness of sounds within fixed scales of tolerance. In terms of anatomy no two speakers probably possess identical speech organs, but, after allowance has been made for personal peculiarities, linguistically same sounds can be produced by all. Spectrographic analysis has proved that there is enough acoustical sameness in the vast majority of implementations to limit the tolerance of personal arbitrariness to discrete realizations. Potter, Kopp and Green remind the researcher that it is important to recognize that visible speech patterns are natural phonetic symbols and correspond, therefore, to the way sounds, syllables and words are spoken.

Visible speech sounds classified according to manner of production fall into six groups used generally in phonetic classifications:

1. Voiceless stop sounds [p t k], the patterns of which are characterized by a blank space followed by a spike or transient representing release of breath and then irregular vertical striations resulting from frictional modulations. There is no dark bar representing phonation at the base.

2. Voiced stop sounds [b d g], the voiced correlates of class one, produced by a combination of stop, vocal cord-cavity and frictional modulation. A dark bar at the base, known as the voice bar, indicates vocal cord vibrations.

3. Voiceless fricative sounds [h f θ s ʃ], characterized by frictional modulations and no voice bar.

4. Voiced fricative sounds [ɦ v ð z ʒ], characterized by vocal cord-cavity and frictional modulations and by a voice bar at the base.

5. Vocoids produced by a combination of vocal cord-cavity modulation. The particular combination of vocal cord and cavity modulation used for a certain vowel produces the vocal resonances characteristic of this vowel.

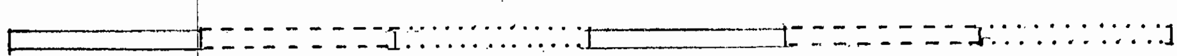
6. Combinations of sounds, articulatorily referred to as diphthongs. The patterns of these sounds are characterized by transitional bars starting and ending in the vicinity of the conspicuous feature positions of their sounds.

7. Frictionless resonances [m n ŋ], characterized by vocal cord-cavity modulation and a voice bar at the base.

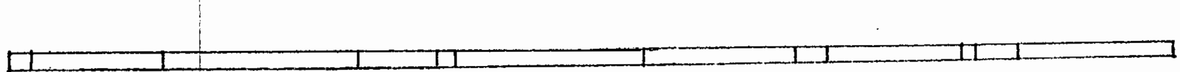
In the continuum of speech, articulators change from positions characteristic of one sound to positions characteristic of adjoining sounds and these changes are reflected in the patterns appearing in the acoustic spectrum. It is generally assumed that the resonance cavities do not, in normal speech, maintain a steady static arrangement for more than a moment, so that sustained vocoids would hardly ever appear. Reciprocal influence is continually exercised by preceding and succeeding vocoids and contoids, that is, by the temporal structure of sounds in an utterance. In running speech the point of no influence by contoids is not readily observable as the areas of the influence of contoids overlap.

Schematic representation of the different shapes of the sequential elements in an utterance may be given as follows. (After Fant - Lehiste - op. cit., p.7).

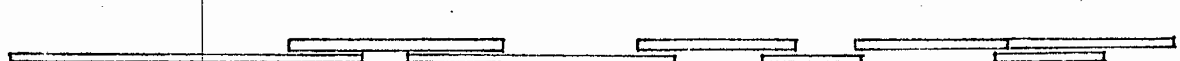
1. A sequence of ideal, discrete, non-overlapping phonemes.



2. A sequence of minimal sound segments, the boundaries of which are defined by relative distinct changes in the speech wave structure.



3. One or more of the sound features characterizing a sound segment may extend over several segments.



4. A continuously varying importance function for each phoneme describing the extent of its dependency of particular events within the speech wave. Overlapping curves without sharp boundaries.

Fant adds that, although these diagrams may appear to present quite different views of the nature of speech, they are not contradictory. The temporal overlapping as represented by(4)does not invalidate the concept of the phonemes as being discrete and sequential as in (1). The representation in (1) relates to the message aspect of the speech communication, whereas (2) and (3) pertain to the speech wave, and (4) to the perception of the speech.

Fig. D.1. is a complex frequency spectrum of the utterance: "play begins at nine-fifteen" by an A.-E. Bilingual. It forms part of a longer recorded utterance which was analysed by a spectrograph. The utterance was read from a scripted version after the subject had been allowed time to read it silently at first, and then been advised: "Please read the dialogue as you would normally speak it", with the result that the utterance did not consist of a series of carefully pronounced test-words. The broad fluctuating band running across the upper part of the picture is the amplitude display of the utterance. The vertical lines below the spectrum segment the utterance into its component words and phonemes which are indicated between the lines. A very cursory examination along the time axis of the

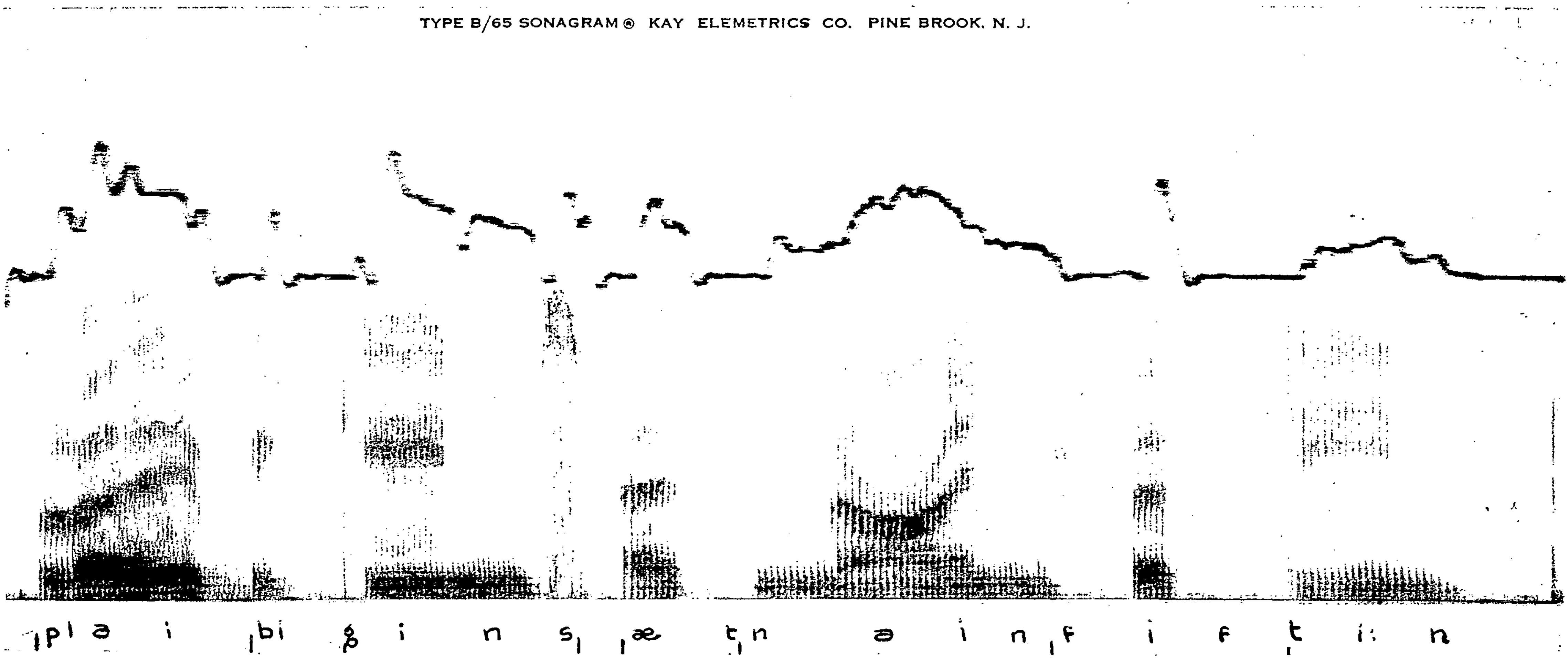


Fig. D.1.

A.-E. Bilingual: "Play begins at nine-fifteen."

spectrum gives the impression of a number of discrete elements marked by distinct boundaries, somewhat akin to schematic representations (1) and (2) above. This would represent the message aspect of the utterance. The blank spaces represent moments when the vocal mechanism is silent. The sequential dissection of the utterance patently does not represent the perception aspect, but the duration of this utterance was less than 2.4 secs., and the distinct break between the -s of "begins" and the inception of "at", which measures a conspicuous 7½ mm., represents only slightly more than .05 seconds in duration - too minute a period of time to be perceived by the ear. Clearly, the phoneme-sound correlation which represents the perception of the message is not obvious on the spectrographic record from a superficial examination. It is noteworthy that, as viewed from an X-ray moving film, articulation is a continuity of movements (Fant - Lehiste - op. cit., p. 100). The transitional cues in a spectrum are dependent upon manner and speed of the speech event, but even the eye cannot detect, in an X-ray film, the "segmentation" as revealed in the acoustic spectrum. The spectrograph has no linguistic prejudices and only analyses objectively the speech structure that it receives.

We have seen that sounds, classified by articulatory criteria as vowels, are characterized in the acoustic spectrum by peaks of energy around the frequencies corresponding to the natural frequencies of the resonance cavities as they are arranged during the articulation of the sound concerned. The concentrations of energy at frequencies which characterize the timbre of a sound and distinguish it from other sounds of different timbre are called formants. Different vowels are characterized by different frequencies. Dissimilar frequency responses and passbands correspond to different shapes of the vocal tract and the divergent positions of the articulators, the tongue, the velum, the cheeks and the lips, and these give rise to vowel sounds with different formants.

Before listing the relationships that appear to exist between the formants of vowels and the resonance cavities in the vocal tract it is advisable to refer to the following diagrammatic representation combining the traditional two-dimensional vowel diagram with its acoustic correlate for four polar points of articulation.

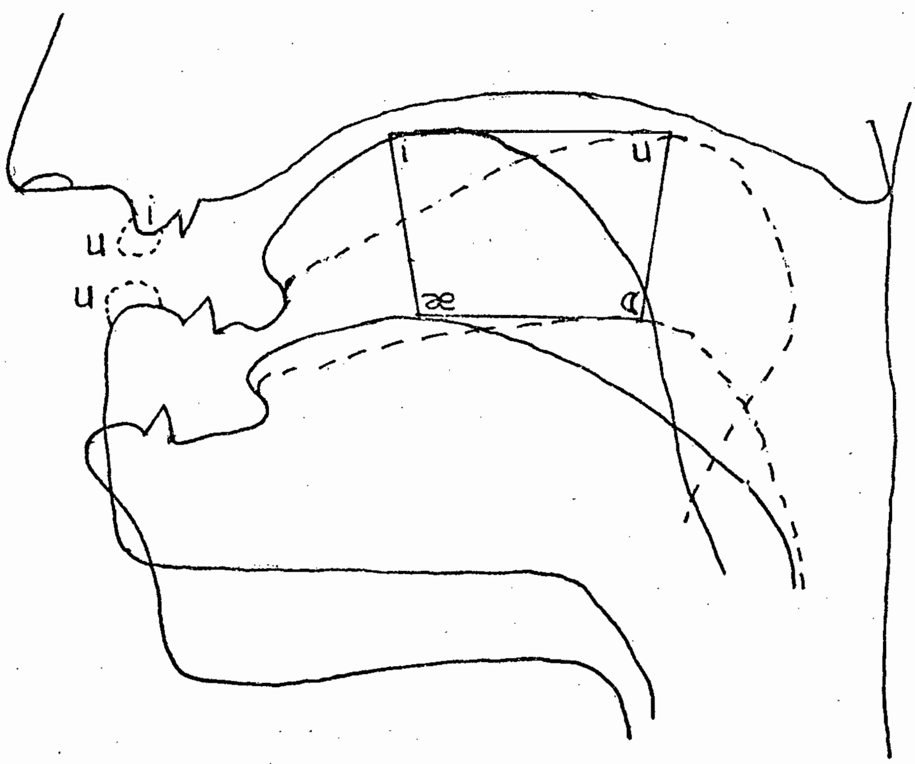


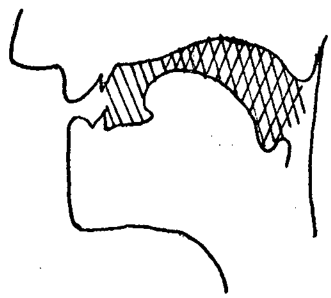
Fig. D.1.2. (After Delattre)

The vocoid positions on the chart correspond more or less to the highest point of the tongue hump as seen from profile. The diagram illustrates the highest point of the tongue in regard to actual auditory results and also the point of constriction. In the case of [i] it is midpalatal and in the case of [u] it is velar. For [æ] it is a low central position and for [a] a retracted low back position. In addition to the point of constriction the relative size of the resonance cavities which determines their natural resonance frequency is illustrated. In the case of [i] the prepalatal cavity is small and open while the pharyngeal cavity is large. For [u] the oral cavity is large and in addition slightly modified by labialization. The pharyngeal cavity is small by comparison. For [æ] and [a] the oral cavity is very large and very open. For [a] the pharyngeal cavity is slightly constricted and for [æ] more open.

In designation the formants are usually numbered from the lower frequencies in the sequence F1 for the first formant, and F2, F3 etc. for the higher formants. In the following schematic representations only the grosser arrangement of the coupled cavity configurations will be illustrated. The finer grained distinctions will be discussed when the complex frequency spectra of the Norm's articulation and those of the A.-E. Bilinguals are compared. The figures indicating the frequency distribution of the formants are those of the Norm.

If the articulatory opposition of phonemes is tongue height they differ in F1. The lower vocoid has the higher F1. The difference in tongue height between /i/ and /æ/ is illustrated in Fig. D.1.2.

Articulatory and spectrographic illustrations are as follows:



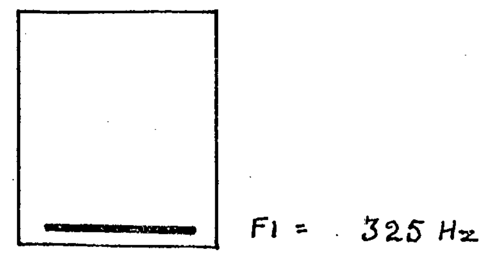
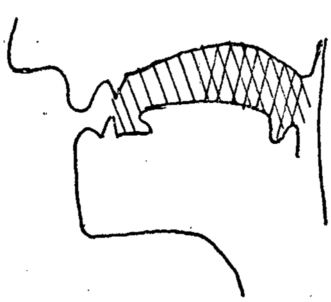


Fig. D.1.3. /i/ /i/

Vocoid /æ/, which is maximally compact with a neutrally low tongue position, may be represented as follows:



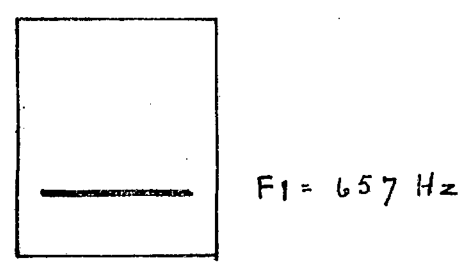
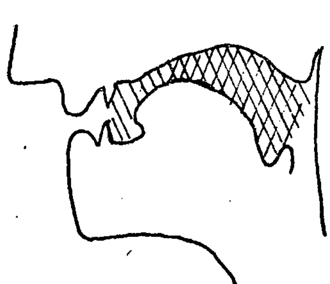


Fig. D.1.4. /æ/ /æ/

If the opposition is in a front-back dimension, the smaller F1-F2 distance is in the more retracted member of the opposition, as illustrated in the following diagrams:



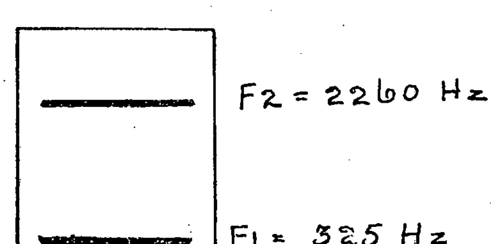
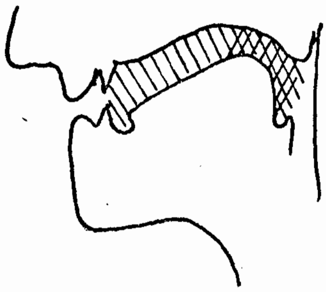


Fig. D.1.5. /i/ /i/

F1 - F2 difference 1937 Hz.



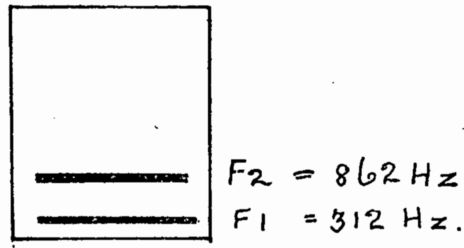


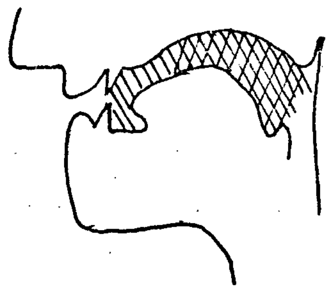
Fig. D.1.6. /u/ /u/

F1 - F2 difference 550 Hz.

From Figs. D.1.3 to D.1.6 it is obvious that a high F2 is the acoustic correlate of a more fronted point of articulation.

According to Fant (op. cit., p.19) the effect of lip-rounding or lip-protrusion is to lower the frequencies of all formants. Fant adds that F1 - F2 - F3 is an even more effective criterion. This should be read in conjunction with Potter, Kopp and Green's observation on pp. 39 to 40 of their : "Visible Speech". F1 is limited in movement to the lower half and base of the spectrum, and F3 is both limited and frequently absent or weak. F2 is changed in position and shape more than the other two and is the most significant formant in identifying sound patterns and sound combinations. But it should be emphasized that F2 derives its significance from its relationship with F1 and F3. The total visual impression is a configuration which is related both to the baseline and to the top of the pattern. F2 plays the greater role in changing the total configuration than do the other formants. The lowering of the formants in the upper frequencies as a result of lip-rounding is illustrated by the following schematic representations of the two Afrikaans words "dier" /di:r/ and "duur" /dy:r/

articulated by the same subject within a few moments of each other. The latter is the labialized correlate of the former. (The subject had had a four-year course in "speech-training").



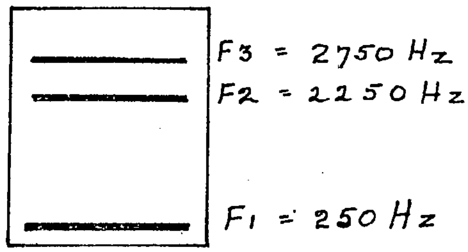
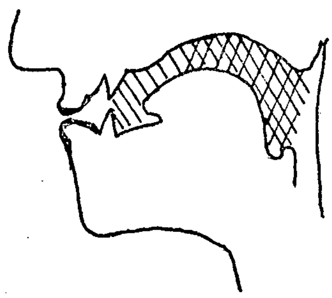


Fig. D.1.7. Afr. /di:r/



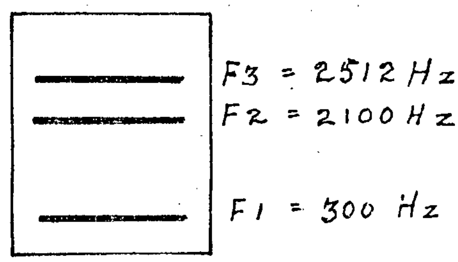


Fig. D.1.8. Afr. /dy:r/

Tabulated comparison illustrates the lowering of the formants at a glance.

	/di:r/	/dy:r/
F1	250	300
F2	2250	2100
F3	2750	2512

The lowering effect of lip-rounding is evident from the distribution of F2 and F3. The absolute position of F1 is not affected as a maximally low F1 is characteristic of an advanced tongue articulation causing a small front resonance cavity. Lip-rounding enlarges this resonance cavity with a resultant rise of F1. The articulatory opposition to lip-rounding namely lip-spreading or delabialization could therefore be expected to cause a rise in all formants - which it does.

In their quest for acoustic correlates to the two main articulatory resonance chambers, researchers ascribed F1 to the pharyngeal and F2 to the oral resonance chamber. Although the first two formants - subject to the arrangement of the resonance chambers - correlate predominantly with the pharyngeal and oral cavities respectively, in general every part of the vocal tract contributes to the tuning of the formants in vocoids as these cavities are linked and the degree of constriction exercised by humping the tongue for the articulation of a particular vocoid never reaches a state of occlusion; indeed, in English and in Afrikaans the greatest degree of narrowing is assumed in the production of the high front /i/, which, in the spectrum, shows F2 - F3 affinity and, the more advanced and raised the tongue position becomes, the more definite does the affiliation become with a concomitant lowering of F1.

One of the greatest problems in speech analysis is the mass of data to be dealt with, the difficulty of translating the visual patterns "into short concise statements as scientific records", (Fant, 1958, p.9). In 1962 Fant echoed a similar view in his summary of the then status of speech analysis techniques. "A spectrogram provides an over-detailed reference for the formal contents of a speech message. A basic problem in speech analysis is to formulate the complex transforms whereby the phonetically significant aspects may be extracted from the mass of data available", (op. cit., p.4).

As has already been intimated, in spite of the fact that it is virtually impossible to reproduce an identical articulation, and in spite of the physiological differences in the structure of vocal tracts, different speakers of Southern British English have a similar- but not identical- acoustical pattern for the same sounds. This is primarily because the similarities in the oral use of English are greater than the differences. Similarities are promoted by the uniformity imposed by what is socially acceptable during the learning process and "by the modification of acquired speech habits to eliminate outstanding and handicapping differences from the general norm of understandability",(Potter, Kopp and Green, "Visible Speech", op. cit., p.44). The non-same but similar sounds which are categorized into phonemes are displayed in the spectrographic pattern by a constant correlation between established articulatory parameters and some of the observed acoustic data. From the timbre of the auditorily perceived utterance certain parameters of the acoustic display are predictable. Likewise there exists predictability in the reverse direction. Given the complex frequency spectrum, fairly accurate deductions of the articulatory movements involved, can be made.

D.1.2.

Recording Procedure.

The recording of the Norm was a direct dubbing from a master tape: "English Pronunciation Practice", by A.C. Gimson and G.F. Arnold, published by University of London Press Ltd. The male voices are those of the authors, respectively Head of the Department of Phonetics and Reader in Phonetics at University College London, henceforth to be referred to as the Norm, representing Standard British English or R.P.. The Norm's master recording was made in ideal acoustic conditions and the dubbing was made by direct cable link.

The recording of the A.-E. Bilinguals was done in a normal speaking environment, in the lounge of a house, in a study, in offices of different sizes with the usual office furniture. The Bilinguals spoke directly into a microphone attached to a Philips cassette recorder model 2205 and their speech was recorded on a low noise C 90 cassette. The language of communication was English only. Before recordings the Bilingual subjects were given time to "wear off" microphone shyness, by being allowed to speak into the microphone and then to listen to the recording of their own speech. They were advised to speak and pronounce the words and structures as "you normally speak English". Studied, formal and stylized rendition would have little validity for the purpose of this investigation, hence the attempts to create conditions conducive to "normal" delivery. The subjects were allowed time to study the scripts before recordings were made. In the free speech, prompted by wordless photographs and pictures from newspapers and magazines, the subjects were allowed time to study the pictures before their comments were recorded.

The structures were analysed by a Sona-Graph 6061 A, a sound recording spectrograph of the Kay Electric Co., Pine Brook, N.J.. The sensitized paper used for analysis was type

B/65. Analyses were made at the University of Pretoria and at the University of South Africa during 1970 and 1971 respectively and at the University College London during the first half of 1972.

The technical specifications were as follows:

V U input signals with the indicator fluctuating between 7 and 10.

Calibrations at 500 Hz.

H-s setting for the analysis of the higher frequencies of the vocoids.

The record level varied from 20 to 24.

The input selector was set at 600 ohm.

The reproduce level varied between 20 and 24.

The mark level was at 4 for the complex frequency spectra and at 7 for the momentanic intensity-frequency spectra.

The frequency scale was linear and normal.

The A.G.C. was set at 1½.

The wide band filter was 300 Hz and the narrow band 45 Hz.

The spectrograph was fitted with an amplitude display unit including a scale magnifier.

The spectrograph at the University College London was connected to a stabilizer.

The complex frequency spectra were taken with the wide band filter and the sections with the narrow band filter. However, when it proved difficult to determine the formant value from a narrow band section, due to a disarray of peaks, the same section was taken with a wide band filter. This is a novel device which facilitates the location of the concentrations of energy. A zero frequency line calibration was marked on all spectrograms taken at the University College London.

Durations.

The length of the teledeltos paper used for the spectra, allowing for the overlap, measured approximately 318 mm.. Speech utterances of a maximum duration of 2.4 seconds can be handled, so that the following scales were used in determining durations:

318 mm	-	2.4 sec.		
132.5 mm	-	1 sec.		
13.25 mm	-	.1 sec.		
6.625 mm	-	.05 sec.	-	50 msec.

These measurements are approximate as it is impossible to determine the exact point of onset and point of disintegration of the vocoid resonances. In the measurements of duration the point of onset was taken to be the point where vocal cord-cavity modulations began and the point where these modulations stopped or the point at which the frictional modulations began again or predominated, was taken to indicate the termination of the duration of the vocoid. The measurements were taken in millimetres and then converted into seconds.

Distributional Values.

The measurement of the vocoid should be made ideally at a point in time where the influence of the preceding contoid has died away and that of the succeeding contoid has not yet appeared, subject to there being an initial and / or a final contoid. The measurements may be taken at the point of greatest intensity indicated by the most intense degree of blackening of the resonance bars. With sustained vocoids, articulated with a steady-static arrangement of vocal resonance cavities, the same formant and section values would result for any momentanic section taken during the period of no conditioning impact by contextual contoids. However, as sustained vocoids, as completely independent segmentable units throughout their articulation, rarely occur in speech, the point of no influence of adjoining sounds is not readily observable.

Another problem in determining the resonance bar values by means of sections, is that it is virtually impossible to determine two coinciding points in the same utterance by two individuals, at which to take a section. A section displays the frequency and intensity values at a particular moment in an utterance. To determine comparable - as distinct from the same - moments in a contextualized segment of utterance "a" by speakers "X" and "Y" is possible in a sustained form, but in short vocoids the possibility is remote. The problem of establishing comparable moments does not, therefore, discount the validity of sections as a means of demonstrating the relative intensity and frequency values in pure, long vocoids. Another method of determining the frequency locations of formants, suggested by A-J Abramson in his thesis, "The Vowels and Tones of Standard Thai: Acoustical Measurements and Experiments: Columbia University: 1960", is to make a resonance bar tracing along the middle of the formant as the eye judges it. This is the method used in this investigation before I was acquainted with Abramson. This is done several times to reduce gross experimental errors. The height of this line at a chosen point above the base line represents its frequency. "The great advantage of this technique is that in evaluating formant frequencies at a particular moment it takes fully into account the preceding and subsequent values which no technique based on sections can do", (Wells, op. cit., p.17). The frequency values of the formants were determined by matching the formant locations with the calibrations at 500 Hz intervals at the edges of the teledeltos paper for each spectrogram individually.

Structures Analysed.

The following words and phrases spoken both by the Norm and by A.-E. Bilingual subjects and highlighting the relevant vocoids were analysed by the sound spectrograph. The Bilinguals varied in age from 13 to 60 with about 90% of the subjects between 19 and 24. The object is to investigate the pronunciation of subjects whose linguistic habits have been established. The subjects are members of the white population groups.

Vocoid /i:/

ceased, leave, teeth, teethe, wheat, wheel.

Vocoid /ɩ/

big, chicks, chilled, sin, wit.

Vocoid /e/

bench, left, legs, sends, well.

Vocoid /æ/

ham, racks, shall, shanks, trash.

Vocoid /ɜ :/

pearl, perch, surge, world.

Vocoid /ʌ/

fudge, gush, hum, jump.

Vocoid /ɑ/

hard, heart, march, staff, starve.

Vocoid /ɒ/

pond, shone, stock, want, watched.

Vocoid / ɔ:/

drawled, gorged, jaunt.

Vocoid /ʊ/

cook, couldn't, pull.

Vocoid /u:/

bruise, move.

The following diphthongal glides, spoken both by the Norm and by A.-E. Bilinguals, were analysed. (In the recording these are referred to as "vowels" by the Norm.)

Vocoid /eɪ/

name, raised.

Vocoid /aɩ/

tied, tired, wives.

Vocoid /ɔɩ/

coiled, poison, voice.

Vocoid /əω/

code, loaves, robe.

Vocoid /ɑω/

drought, drown, howl.

Vocoid /ɩə/

fears, fierce, hears.

Vocoid /ɛə/

shares, stairway, where.

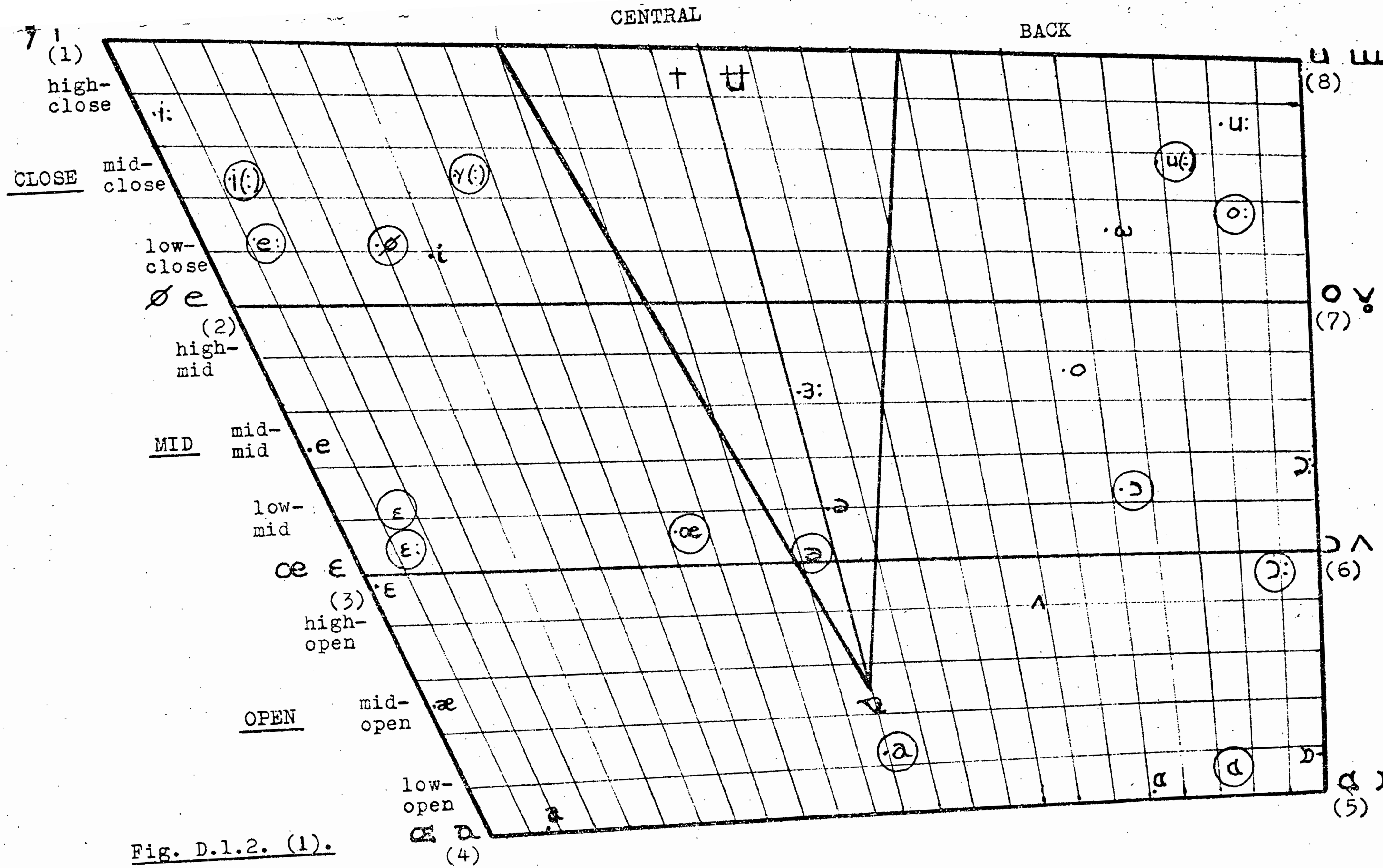
Vocoid /ωə/

fewer, fluency, truer.

Analysis of the following connected utterances is compared:

"What on earth is it?" (Recording from a scripted version read both by the Norm and by a Bilingual.)

"That fair girl lives near to us". (Recording from a scripted version read by a Bilingual.)


CENTRAL
BACK
(1)
high-close
CLOSE
mid-close
low-close
ø e
(2)
high-mid
MID
mid-mid
low-mid
œ ɛ
(3)
high-open
OPEN
mid-open
low-open
Œ ɒ
(4)
ɑ ɒ
(5)
ɔ ʌ
(6)
o ɤ
(7)
u ɯ
(8)
ɨ ʉ
i:
i(:)
y(:)
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ɛ
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ə
æ
a
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u(:)
o:
ω
o
ɔ:
ɔ
ʌ
ɑ

Fig. D.1.2. (1).

".....playing golf on a lovely green lawn". (Free speech by a Bilingual, prompted by a picture.)

A number of Afrikaans words that have vocoids phonetically similar to some vocoids of the English words, were spoken by an Afrikaans native informant. These were recorded and analysed and will be referred to when the relevant vocoids are discussed.

Articulatory Correlates.

The articulatory correlates of the acoustic parameters will be referred to areas on the two-dimensional diagram Fig. D.1.2.(1). To facilitate the location of fine-grained distinctions, the vowel diagram will be divided into seven main areas:

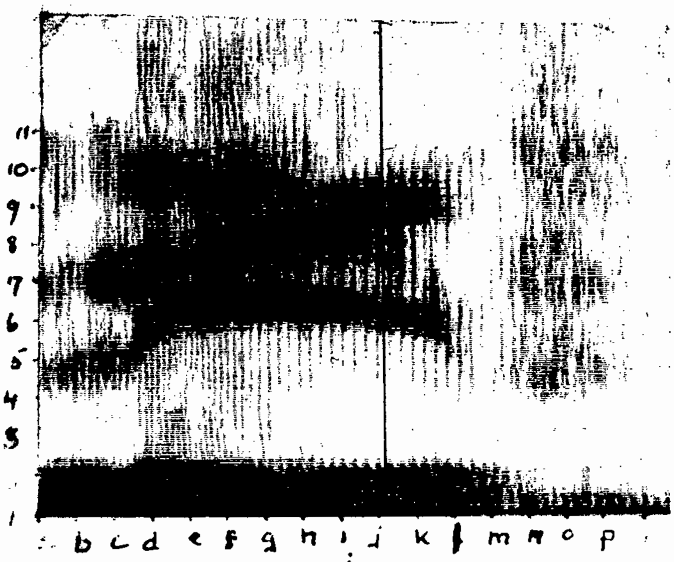
Front : close, mid, open.
Back : close, mid, open.
Central.

Each of these areas will again be subdivided into three smaller areas: high, mid, low; e.g. the front close area will be divided into: high-close, mid-close and low-close. Furthermore, accepted reference terminology such as "retracted", "centralized", "advanced", etc. will further narrow down the areas of articulation represented by the spectrographic analysis.

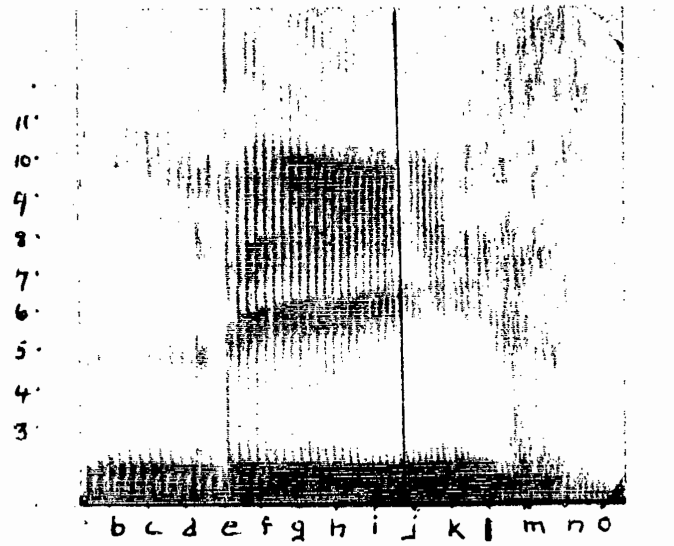
Spectrographic Analysis.

Vocoid /i:/

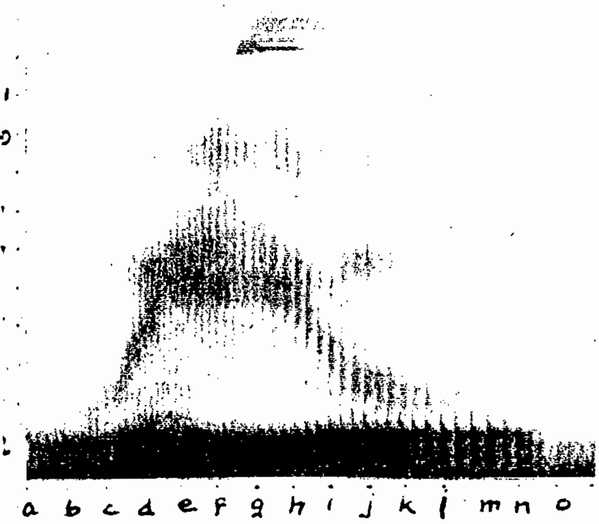
The first two spectrograms that will be discussed in



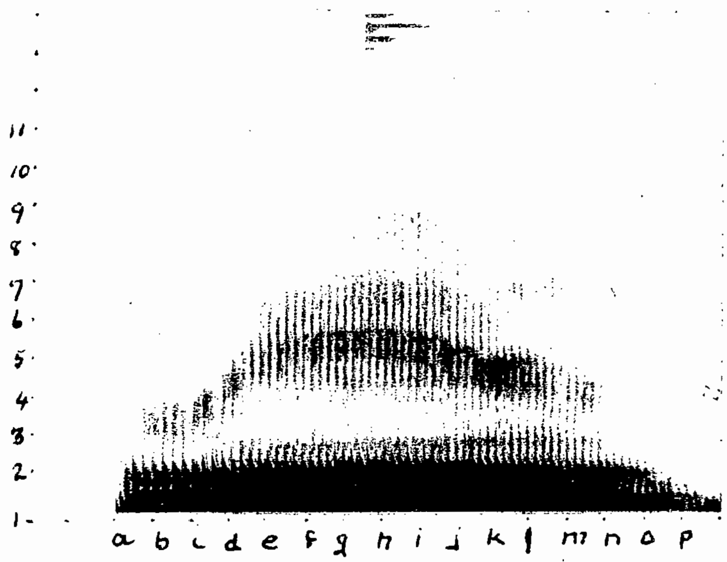
i.
Leave - N.



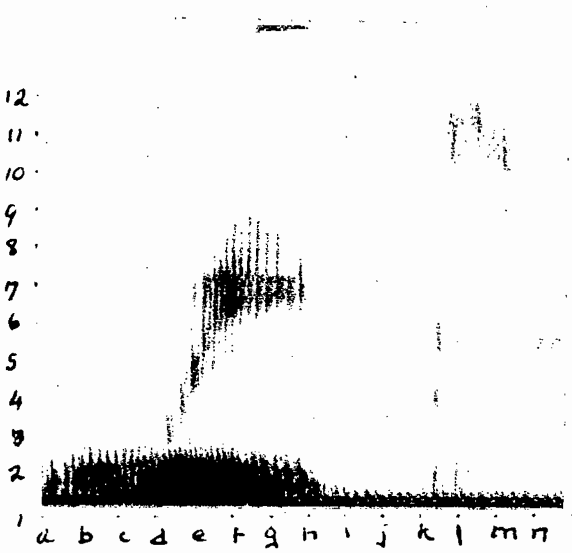
ii.
Leave - Bil.



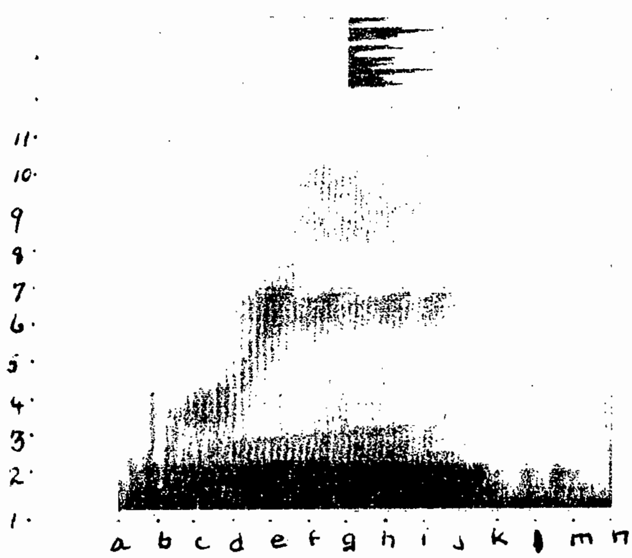
iii.
Wheel - N.



iv.
Wheel - Bil.



v.
Wheat. - N.

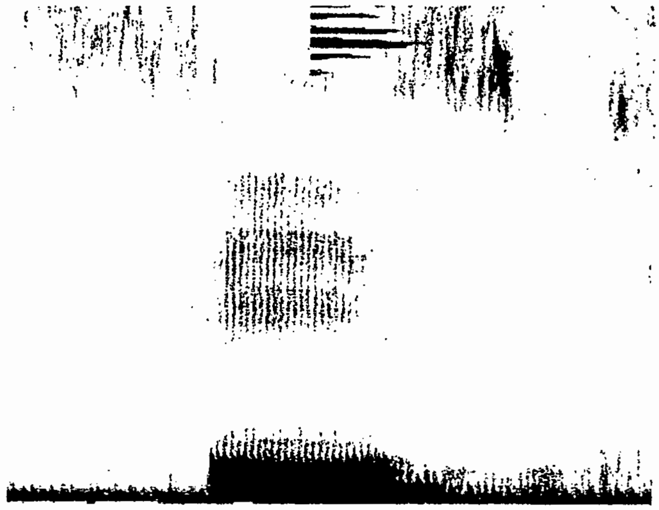


vi.
Wheat - Bil.

Figs. D. 1.2. (2: i-vi)

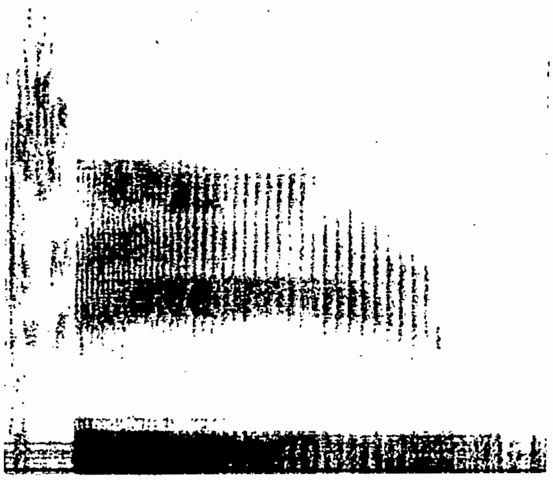
vii.

Ceased. — N.



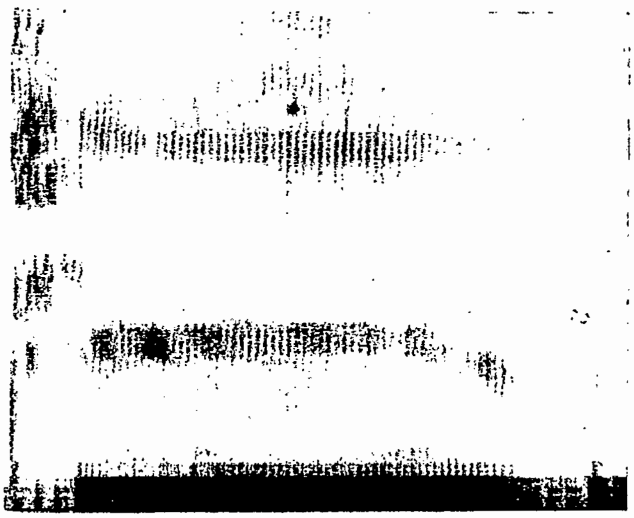
viii.

Ceased. — Bil.



ix.

Teethe - N.

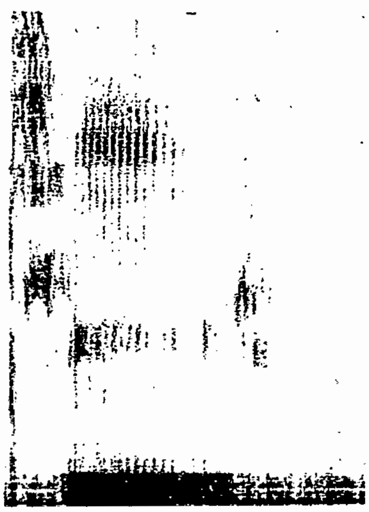


x.

Teethe — Bil.

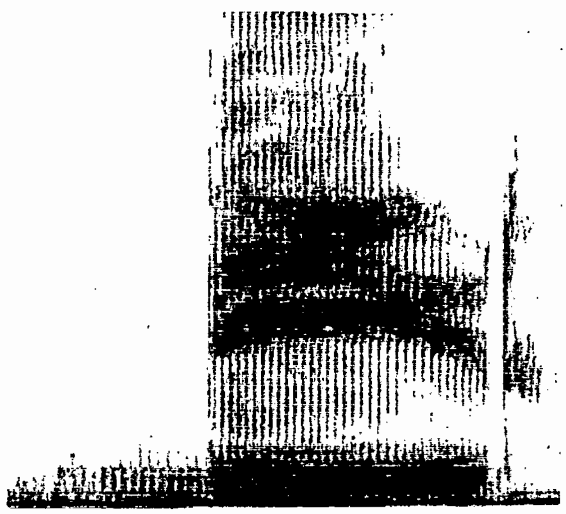
xi.

Teeth - N.



xii.

Teeth — Bil.

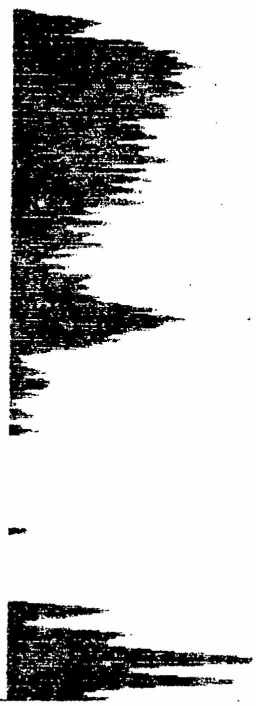


xiii.

Diet — Aft.

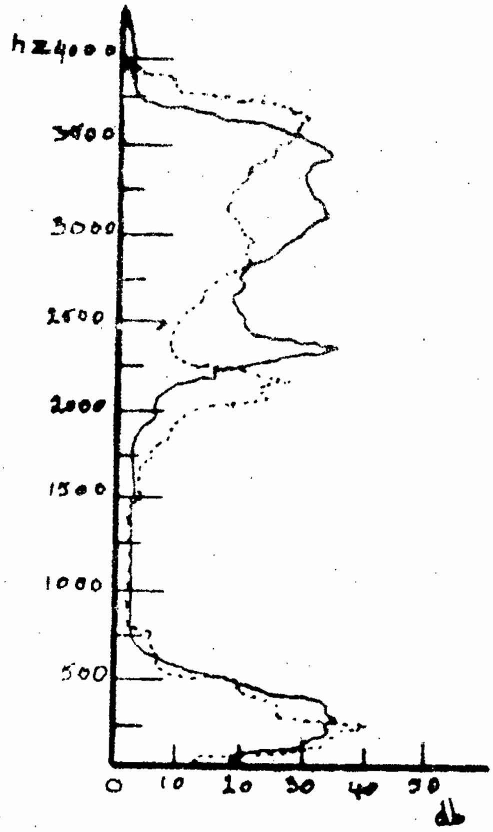
Figs. D.1.2. (2: vii — xiii.)

TY



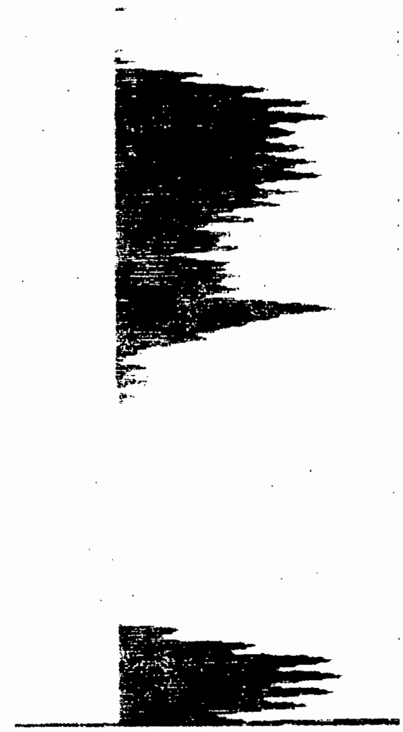
xiv.

Leave - Bil.



xv.

Leave.
N. ——
Bil. ····



xvi.

Leave - N.

Figs. D.1.2. (2: xiv - xvi).

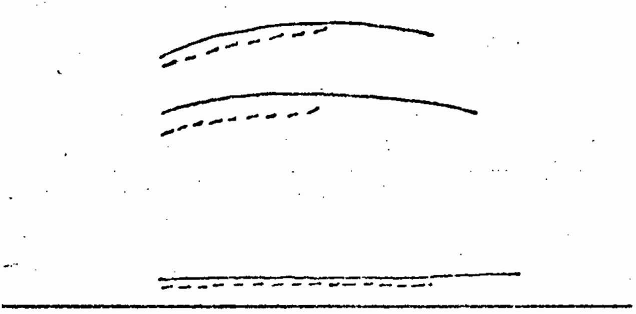


Fig. D1.2. (2:XVII)

Leave: Norm: ——

Bil: -----

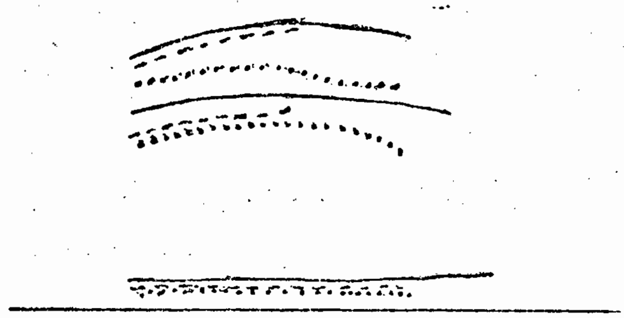


Fig. D1.2. (2:XVIII).

Leave: Norm: ——

Bil: ----

Afr: .....

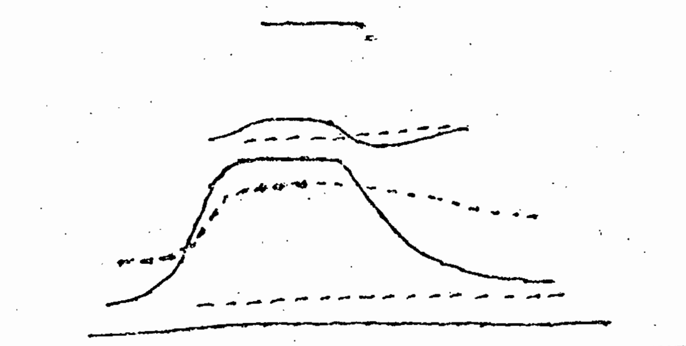
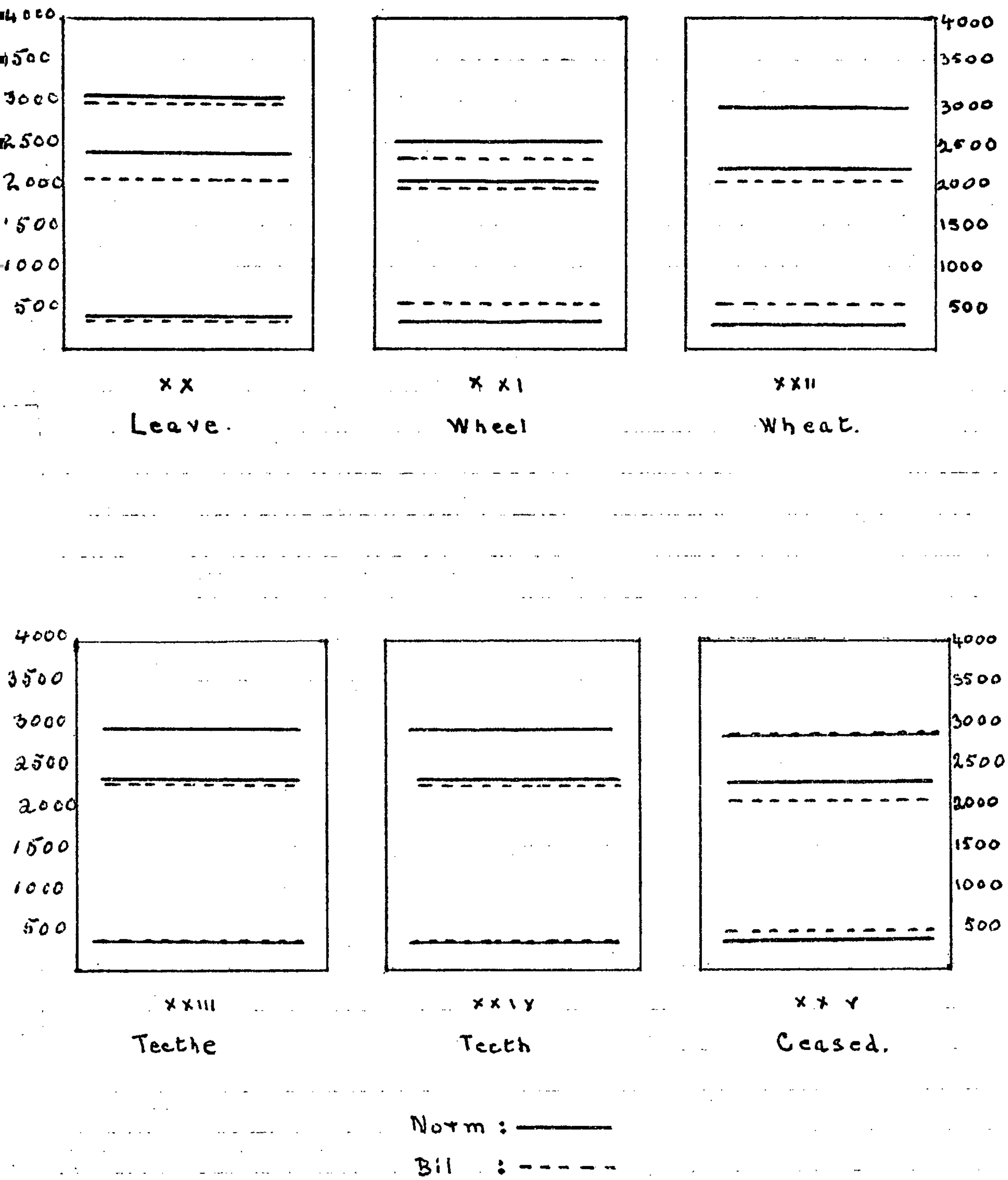


Fig. D1.2. (2:XIX)

Wheel: Norm: ——

Bil: ----

Figs. D1.2. (2:XVII, XVIII, XIX)



Figs. D1.2. (2: XX – XXV)

some detail are those of the word "leave", Fig. D.1.2.(2: i,ii) articulated by the Norm and by an A.-E. Bilingual respectively. It must be borne in mind that all the spectrograms represent male voices. The citation forms by the A.-E. Bilinguals are test words uttered singly with instructions as detailed previously in this chapter. The scales, both abscissa and ordinate, are purely arbitrary, though it may be pointed out that the ordinate runs from zero to about 4300 Hz at the upper limit - adequate to register the upper vocoid frequencies of a male voice. The abscissa indicates the time element proceeding from left to right. Intensity is shown by the degree of blackening of the striations. In the process of reproduction some markings of slight intensity have been faded out.

The main features that will be discussed are the formant patterns. "A spectrogram that shows mainly the formants - but shows them clearly and extensively as does one produced with a wide rather than a narrow filter - renders a linguistically valid, instructive and distinctive visualization", (Pulgram: op. cit., p.136).

Fig. D.1.2.(2: xiv - xvi) displays expanded momentanic intensity frequency spectra of the word "leave" at the points indicated by the vertical lines on the spectra. The umbrella tracing has the section of the Bilingual subject superimposed on that of the Norm. The ordinate registering frequency is calibrated at 250 Hz intervals to an upper limit of 4000 Hz. The abscissa is calibrated at 10db intervals to a limit of 50 db.

A comparison of the two complex frequency spectra reveals important differences in the formant patterns. These are correlated to the resonance chambers whose arrangement determines the timbre of the sound produced by the subject. F1 of the Norm (Fig. D.1.2.(2:i)) runs parallel to the base line from (a) to (m) with virtually no fluctuations. Its position at a low frequency of just below 300 Hz - see sectional tracing (Fig. D.1.2. (2: xv)) - combined with a large F1 - F2 separation of about 2000 Hz, represents the typical configuration of a fronted tongue at a pre-palatal point of articulation, creating a small front resonance cavity and large pharyngeal cavity, articulatorily a high-close front area of articulation, (Fant - Lehiste - op. cit., p.14). The operative and most significant formant in the complex frequency spectrum is F2, referred to as the "hub" by Potter, Kopp and Green (op. cit.,). F2 is the most versatile and "plays a greater role in changing the total configuration than do the other bars, (Potter, Kopp and Green, op. cit., p.40). However, the values of the frequencies of F1 and F2 are not always sufficient specification of vocoids. F3 is essential, especially in the close front vocoids. The sectional tracing reveals a fourth formant at 3425 Hz, but it seems to be generally accepted that the role of the higher formants is non-linguistic. They contribute to distinctive personal voice quality and also increase the redundancy and therefore the intelligibility of the speech signal, (Wells, op. cit., p.20). F2 - F3 separation is about 700 Hz. In broad outline the formant distribution of the Bilingual subject, Fig. D.1.2. (2:ii) is similar, but by no means identical. The significance of the dissimilarities will be discussed below.

The sectional tracing reveals a large margin of difference in intensity between the two articulations. With the exception of the first peak, the intensity in decibels of

F2, F3 and F4 is appreciably greater than that of the Bilingual. The following table demonstrates the difference:

	Norm	Bilingual
F2	36 db	28 db
F3	34 db	22 db
F4	34 db	30 db

F2 of the Norm is more sustained, running almost parallel to the base and extending from (d) to (l), where it marks the termination of the vocal cord-cavity modulation with an abrupt down thrust towards F2 of the final voiced fricative /v/. There is a distinct break (l) - (m) before the onset of the noise modulations of /v/. The fricative is continued from just beyond (m) to (q). There is no discontinuation of phonation between the vocoid and the final /v/ in the case of the Bilingual. The resonance bars of the vocoid disintegrate at (j) with an uninterrupted transition to the fricative type modulations of /v/.

There is a marked difference between the resonance bars of the initial lateral. The Norm's reflects a deliberate, brief articulation with clearly defined bars of the /l/ extending from (a) to (c) with an abrupt upthrust of F2 (4) - (5) of the /l/ to F2 at (6) of the vocoid. By contrast the Bilingual's initial /l/ extends for almost four calibrations (a) to (e), where F2 gradually and briefly angles upward to a transient at just beyond (e) marking the onset of F2 of the vocoid between (5) - (6). The transient marking the onset of the vocoid is an interesting feature. The momentary break is too brief for auditory detection, but it may signal a transition in intensity.

The regularly spaced fine vertical striations observable along the vocal cord-cavity modulations, correspond to the pitch of the voice. In the Norm's spectrum these striations amount to 13 per centimetre at the beginning of the vocoid and gradually decrease to 6½ per cm. toward the termination of the vocoid. The Bilingual's spectrum, on the other hand, shows an increase - and not a decrease - from 8½ to 10 per cm. The difference in the intonation is thus clearly portrayed: the Norm lowers the pitch level, indicating termination or finality; the Bilingual raises the pitch level signalling expectation.

The voice fundamental or Fo could be translated into figures, but as pitch is one of the ancillary concomitants of timbre, references in usual terminology such as sustained, rise-fall, fall-rise are regarded as adequate.

The most significant spectral feature of visible speech reflecting the quality of a vocoid is the relative distribution of the bands of reinforced harmonics. Fig. D.1.2. (2: xvii) depicts a resonance bar tracing of the formants of the word "leave". The tracings have been equated in time at the inception of phonation.

It is generally sufficient to refer to the higher F2 as the acoustic correlate of a more fronted position, (Fant: Acta Polytechnica etc. op. cit., p.20; and again Fant - Lehiste - op. cit., p.14). The highest point of the tongue in very close vocoids in English and Afrikaans comes close to the position of the major constriction separating a front cavity from a back cavity. The height of F2 is inversely related to the length of the front cavity, (Gimson, op. cit., p.21). Hence, the smaller the front resonance cavity, the higher F2. The size of the front resonance cavity is determined, chiefly, by the position of the tongue relative to the palate. A fronted tongue produces a small front cavity, with a high F2 as the spectral correlate. In articulatory terms this means a close front vocoid. By the same token the relative distribution of the resonance bar tracings of the Bilingual, viz. the broken lines in the tracings, reflect a close front articulation, but less close and less fronted than that of the Norm. The Norm's would be an open Cardinal 1 = [i] in the front high-close area, and that of the Bilingual slightly more open, in the front mid-close on the specificational chart Fig. D.1.2. (i).

A dictionary summary in binary terms of the relative features discussed above that portray articulations of different quality of the word "leave" by the Norm and the Bilingual subject, may be given as follows:

Norm	A.-E. Bilingual
Tense deliberate articulation.	Lax articulation.
Brief lateral of .09 sec.	Diffuse lateral of .135 sec.
Abrupt, short upshift of F2 to inception of vocoid.	Brief gradual transition of F2 to inception of vocoid.
Sustained, clear vocoid of .32 sec.	Lax, short vocoid of .16 sec.
Termination of vocoid distinct.	Termination of vocoid diffuse.
Falling pitch.	Rising pitch.
Pure vocoid.	Evidence of glide.
High-close front articulation.	Less close front articulation.

Fig. D.1.2. (2: xviii) depicts the resonance bar tracings of the word "leave" referred to above, with the tracings of the resonance bars of the Afrikaans word "dier", represented by the dotted lines and as articulated by an Afrikaans native informant, superimposed. The informant's speech can be regarded as representing "standard, educated Afrikaans". Although no valid generalizations could be made on the slender data supplied by three utterances, the differences are significant and representative of a similar vocoid in two different languages. The context of the vocoid varies, but, as both the Afrikaans and English utterances are prolonged, it may be assumed that the middle portion of the formants would represent an area of no influence by preceding and succeeding contoids. The tracings reveal that the Afrikaans articulation is in the close front area, but, it is slightly more open than the A.-E. Bilingual's and a further degree more open than the Norm's. In addition, the spectrum of "dier", Fig. D.1.2. (2: xiii) reveals a deliberate, sustained articulation, with lowering pitch and of almost the same duration as that of the Norm's. The Afrikaans informant's articulation is in the mid-close front area of the vowel diagram Fig. D.1.2.(i).

Summarily, the evidence of the complex frequency spectra is that the quality of the rendition of vocoid /i:/ by the A.-E. Bilingual is neither that of the Norm nor that of an Afrikaans word of similar vocoid uttered by an Afrikaans informant. It is neither R.P. nor "standard educated Afrikaans". It has a quality of its own, which can best be described as being a diaphonic variant of cross-language quality between two linguistic systems.

Figs. D.1.2.(2: iii and iv) depict the spectra of "wheel" as articulated by the Norm and by a Bilingual subject respectively. The following brief discussion will be limited to the main features of the vocoid resonances. It will be observed that the F values of the Norm's spectrum are similar to those of the word "leave" discussed above, i.e. the typical distribution of a close front vocoid. F2 and F3 of the Bilingual's spectrum are again lower than those of the Norm, but there is a significant difference in the value of F1, which, in the case of the Bilingual, is at a higher frequency than that of the Norm. A raised F1 and closer F1 - F2 proximity is the acoustic correlate of a lower - relatively - and somewhat retracted tongue position, (Gimson, op. cit., p.20). In comparison with the Norm's, the Bilingual's articulation is a lower, somewhat retracted close front vocoid. F2 of the Norm portrays the three phases of the structure /w-i:-l/, with the transitions, very clearly. The great distances in the transitional shifts, as for instance, of F2 of the word "wheel", from one position to the other, are the acoustic correlates of a considerable shift in the vocal resonances and in the articulatory positions. The arrangement of F2 of the Norm reflects the component phonetic segments of the utterance more distinctly than does the F2 tracing of the Bilingual. The difference in the phases /(w)-i:-l/ of the Bilingual is less clearly defined. The steep slope of the curve of F2 of the Norm to terminate at a close F1 - F2 separation is the acoustic correlate of a retracted and raised back of the tongue giving the velarized or back vocoid resonance of the dark /l/. "The lower the frequency (of F2) the 'darker' the [ɫ] sound", (Gimson, op. cit., p.194).

The slight incline of F2 of the Bilingual does not reflect this configuration but that of the palatalized resonance of the clear /l/. The dark /l/ does not occur in Afrikaans, hence the articulation of the A.-E. Bilingual. The final /l/, succeeding the nuclear /iː/ has a marked effect on the quality of the vocoid of the Bilingual. It assumes the timbre of a fronted /ə/ glide on to /l/. Clear evidence of this is the moderate shift to a comparatively high F2 of the lateral.

Fig. D.1.2.(2:xx) presents a schematized assembly of formant values of the vocoid /iː/ in different configurations. Only the first two formants are clearly defined in each spectrum. It will be observed that all patterns reflect the typical distribution characteristic of a close front vocoid. There is very little variation in the F1 and F2 values of the Norm. The F1 values of the Bilingual subjects are in close proximity to the Norm's with the exception of F1 of "wheel" - the significance of which has already been referred to. The acoustic correlates of finer articulatory discriminations are displayed in the complex frequency spectra. The differences between the articulation of the Norm and that of the A.-E. Bilinguals, which determine the quality of the /iː/ vocoids, may be briefly summarized as follows:

(1).In general the articulation of the Norm is tense and that of the A.-E. Bilinguals lax.

(2).Transitions portraying phonetic segments are clearly defined in the spectrum of the Norm and less clearly in the spectra of the Bilinguals.

(3).In the context of an initial labio-velar and a final lateral, e.g. "wheel" the Bilingual has a more open articulation, somewhat retracted with an advanced /ə/ glide on to /l/. The resonance bars of "wheat" indicate that an initial /w/, apart from the native linguistic bias, prompts a similar velarized articulation of /i:/, irrespective of the final vocoid.

(4). In the context of an initial alveolar plosive and a final dental fricative, both lenis and fortis, e.g. "teethe, teeth", /i:/ is closer and more fronted than in (3) above, but not as peripheral as that of the Norm. Unless the Bilingual subject is alerted to the contrast between a voiced and unvoiced final dental fricative, he fails to observe the difference.

(5). In the context of an initial voiceless alveolar fricative and a final fricative-plosive ligature e.g. "ceased", the Bilingual's articulation is less close than the Norm's, and retracted.

(6). There is little evidence of change of pitch in the Bilingual's rendition.

(7). The duration of the relative phonetic and phonemic segments of an utterance in the Bilingual's articulation, differs appreciably from that of the Norm's.

The data contained in a spectrogram cannot be exhausted; and, as the object of the acoustical analysis of this investigation is to establish to what extent the spectrogram supports the testimony of the auditory analysis, in the discussions that follow, interpretations of the spectrographic analysis will be brief and limited to features that reflect more directly the quality of the vocoids.

Vocoid /ɩ/

Figs. D.1.2. (3: i - xii) display the complex frequency spectra and Figs. D.1.2. (3: xiii - xix) the resonance bar tracings of vocoid /ɩ/, articulated by the Norm and by different A.-E. Bilinguals in the following contexts:

big (two)

chicks

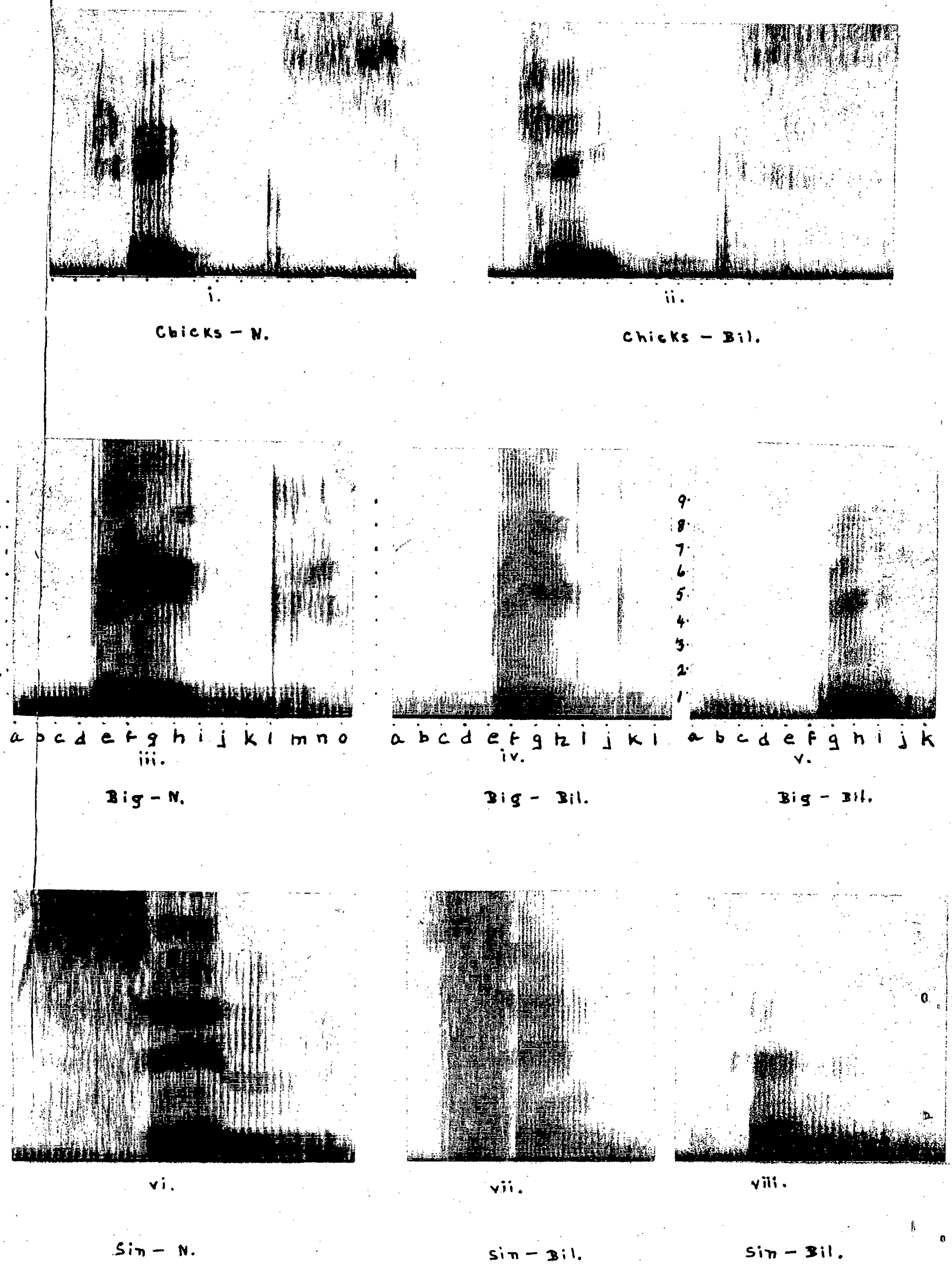
chilled

sin (two)

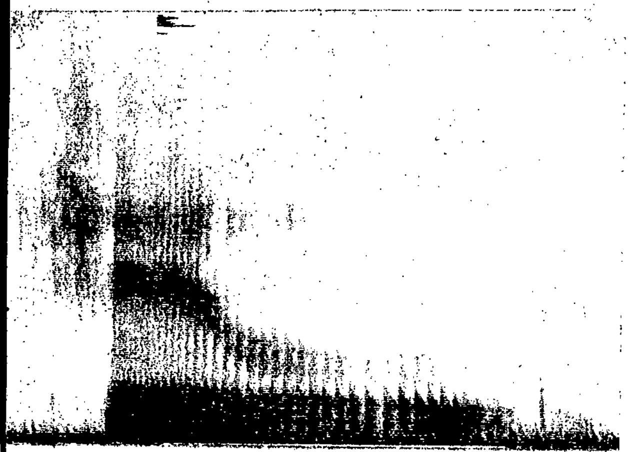
wit.

The resonance bar tracings have been equated in time at the inception of phonation. The scales, as for vocoid /i:/, are purely arbitrary and used only for comparative purposes.

With reference to the spectra of "big", it will be observed that the first three formants at about (2), just above (5) and at (7) of spectrogram Fig. D.1.2. (3: iii), depicting "big" by the Norm, are clearly defined. The formants of spectrogram Fig. D.1.2. (3: v), depicting the same utterance by a Bilingual subject, are distinguishable at (2) and at between (5) and (6), but the bar at (7) is only partially visible with frictional modulations dominant. The relative distribution of the formants, as displayed in the resonance bar tracings Fig. D.1.2. (3: xv), shows a slightly lower F1 of the Bilingual, but both F2 and F3 are higher than those of the Norm. This pattern is the acoustic correlate of a fronted tongue position. By comparison with the bars of vocoid /i/, F1 is higher and F2 and F3 at lower frequencies respectively. This distribution displays the acoustic correlate of the

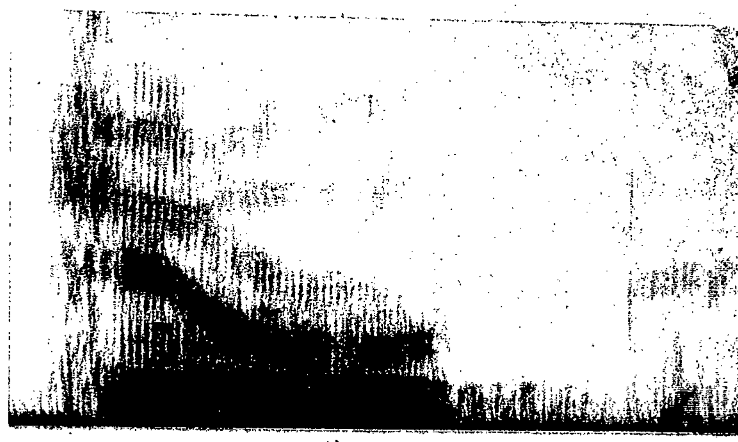


Figs. D.1.2. (3: i–viii).



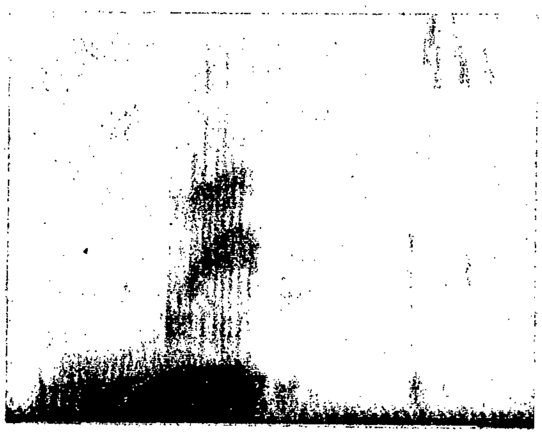
ix.

Chilled - N.



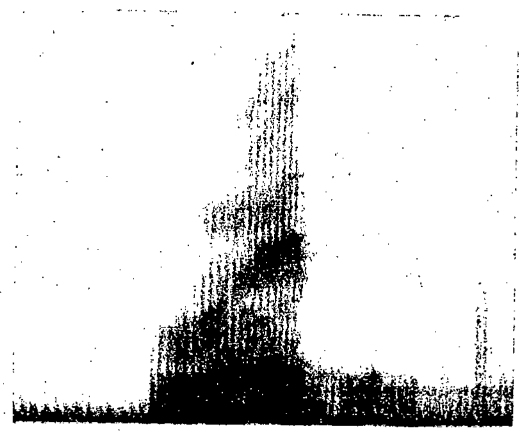
x.

Chilled - Bil.



xi.

Wit - N.



xii.

Wit - Bil.

Figs. D.1.2.(3: ix – xii).

Fig. D1.2.(3:xiii)
Chicks : Norm : ———
Bil : - - - -

Fig. D1.2.(3:xiv)
Big (a) : Norm : ———
Bil. : - - - -

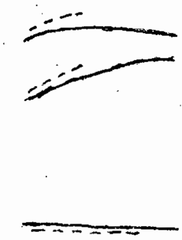


Fig. D1.2.(3:xv)
Big (b) : Norm : ———
Bil : - - - -

Fig. D1.2.(3:xvi)
Sin (a) : Norm : ———
Bil : - - - - -

Fig. D1.2.(3:xvii)
Sin (b) : Norm : ———
Bil : - - - - -

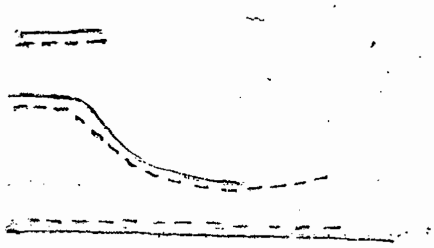


Fig. D1.2.(3:xviii)
Chilled : Norm : ———
Bil : - - - -

Fig. D1.2.(3:xix)
Wit : Norm : ———
Bil : - - - - -

Figs : D1.2.(3:xiii — xix)

following arrangement of resonance cavities, relative to the arrangement for the articulation of /i:/ : blade of tongue withdrawn towards palate; back of tongue retracted creating a slightly enlarged oral cavity and consequent smaller pharyngeal cavity. A schematized distribution of the formants in question is displayed in the following figure:

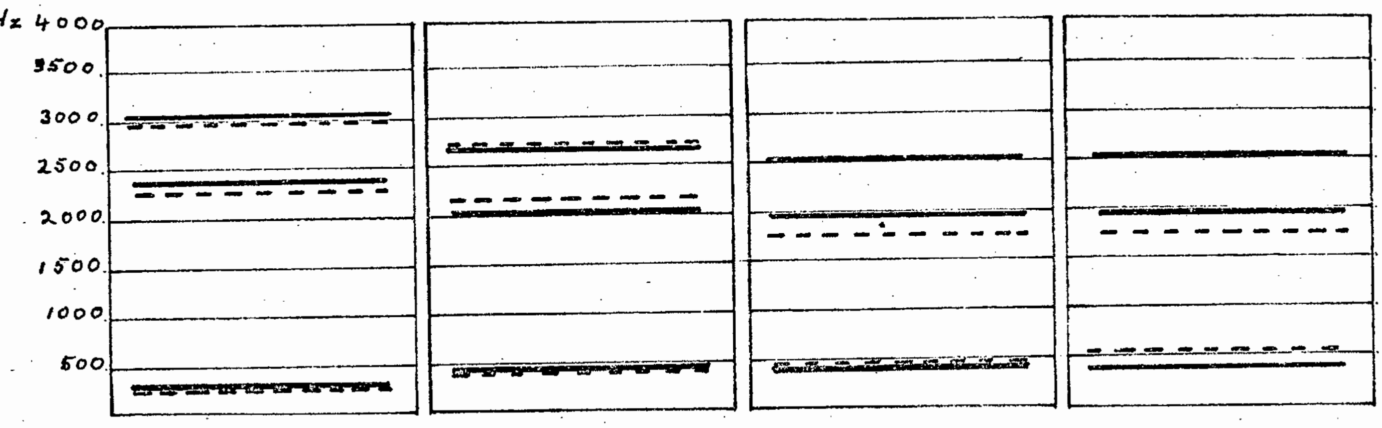


Fig. D.1.2.(3: xx) D.1.2.(3:xxi) D.1.2.(3:xxii) D.1.2.(3:xxiii)

Leave Big Sin(a) Sin(b)

Figs. D.1.2.(3: xx - xxiii)

Norm: ————

Bil: - - - - - -

The resonance bars of "big" and "sin" illustrate the lowering of F2 and F3 and the corresponding upward movement of F1 for the more open and retracted vocoid /ɩ/. Figs. D.1.2. (3: xxii and xxiii) illustrate articulation of the word "sin" by two Bilingual subjects. The more open and retracted articulation represented in "big" is consistent, but the resonance bar pattern of "sin"(b), Fig. D.1.2.(3: xxiii) reflects an arrangement of resonance cavities of a close, advanced schwa, phonemically a fronted /sən/. The spectra of "big" and "sin"(b), Figs. D.1.2.(3: v and viii) respectively, illustrate polar arrangements of the resonance chambers for variants of vocoid /ɩ/. The consistency in the arrangement of the vocal resonance chambers for the articulation of /ɩ/ by the Norm in different contexts, is illustrated by the uniformity of the formant patterns displayed in the assembly Figs. D.1.2. (3: xxi - xxiii).

The following variants of vocoid /ɩ/ represent the allophones observed in the speech of A.-E. Bilinguals, as displayed by the spectrograms.

In a CVC structure with an initial bilabial plosive and a final voiced velar plosive, e.g. "big", the spectrum reveals an unvoiced velar, a vocoid of very brief duration and in a close front area of articulation; an open Cl = [i̞]. A similar location of resonance bands is depicted in the spectra and resonance bar tracings of "chicks", Figs. D.1.2.(3: i and xiii) respectively. A schematized distribution of formants of "chicks" is indicated in the following figure.

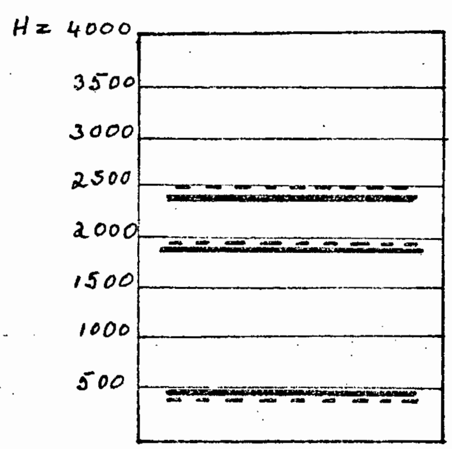


Fig. D.1.2.(3:xxiv)

Chicks

Norm: ———

Bil: - - - - - -

The pattern of the A.-E. Bilingual reflects a closer vocoid than that of the Norm.

The two spectra of the word "sin" articulated by two A.-E. Bilinguals have already been referred to. In addition to the fact that the two spectra display two variant quality pronunciations, they indicate a trend, revealed by spectrograms of English articulations of words by Bilinguals, that have similar Afrikaans counterparts. The English /sɩn/ has an Afrikaans symmetry of identical orthography, phonemically /sən/. The conditioning factor in the articulation of the Bilingual would primarily be his native linguistic habits, and combined with this, the resonance effect of the final nasal.

A post-nuclear lateral appears to have a somewhat similar impact as is evident from the resonance bar tracing of the word "chilled", Fig. D.1.2.(3: xviii). The same effect was observed in the spectrum of the A.-E. Bilingual's utterance of "wheel", Fig. D.1.2.(2: iv).

With the exception of the spectrum of the word "sin", all the spectra of the A.-E. Bilinguals reveal no change in pitch, as is illustrated by the unvarying distance between the parallel vertical striations in the wide-band spectrograms.

Devoicing of a final velar plosive, as in "big", phonemically /bɩ̣k/ for the Bilingual, is accompanied by a high-close articulation.

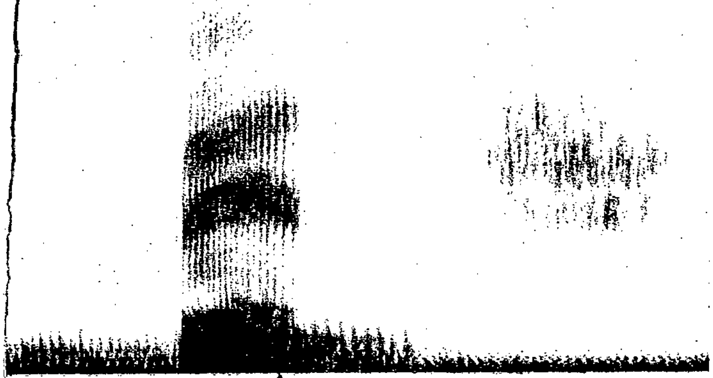
The two main variants revealed by the spectrograms in the quality of vocoid /ɩ/ are: in the context of a final lateral and nasal the Bilingual's articulation is retracted and less close than that of the Norm; in other contexts it is closer and fronted.

Vocoid /e/

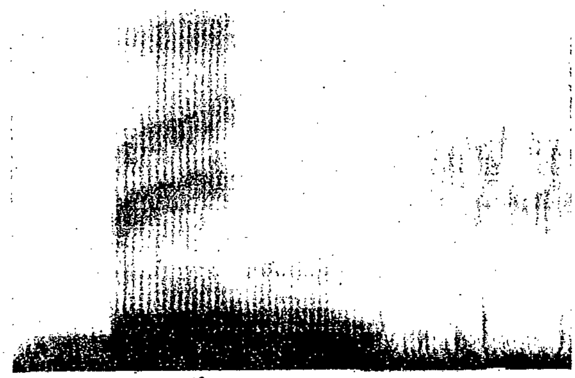
The complex frequency spectra in Figs. D.1.2.(4: i - x) depict articulations by the Norm and a number of Bilingual subjects of vocoid /e/ in the following contexts:

bench
left
legs
sends
well

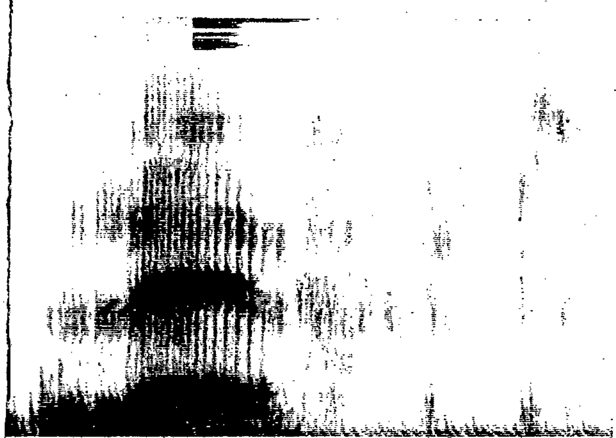
Figs. D.1.2.(4: xi - xiv) display the resonance bar tracings and a schematized assembly of the formant values, in terms of figures, is revealed in Figs. D.1.2.(4: xvi - xx). The wide-band spectrograms display the distribution of the formants as conditioned by their contexts. The resonance bar tracings have been equated in time at the inception of the vocoid phonation. The most significant aspect of the formant patterns revealed by the resonance bar tracings is the consistent relative distribution of F2 and F3 of the Norm and that of the A.-E. Bilinguals. In each of the patterns, with the exception of that of "legs", F2 and F3 of the Bilingual subjects are at higher frequencies than those of the Norm. The relative distribution of F1 varies. Whenever a lateral is involved, either initially or finally, Figs. D.1.2.(4: xii, xiii, xv), F1 is at a higher frequency than that of the Norm. A raised F1 is the acoustic correlate of a half-low tongue and a corresponding enlarging of the oral cavity. This arrangement is most clearly reflected in the spectrum and resonance bar tracings of "well", Figs. D.1.2.


i.

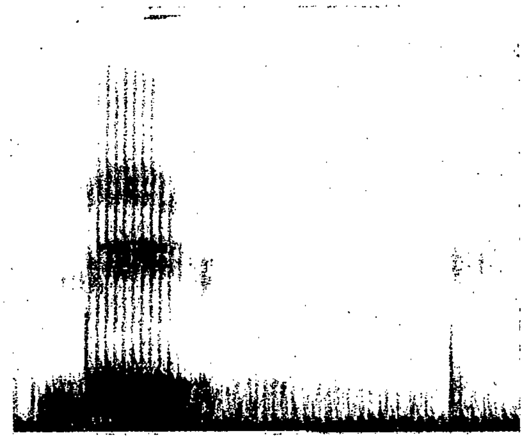
Bench – N.


ii.

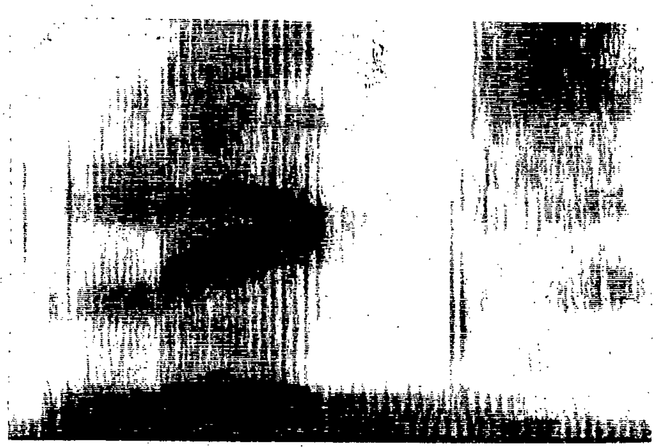
Bench – Bil.


iii.

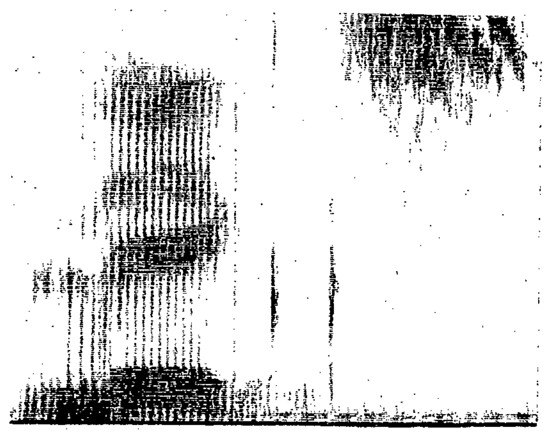
Left – N.


iv.

Left – Bil.

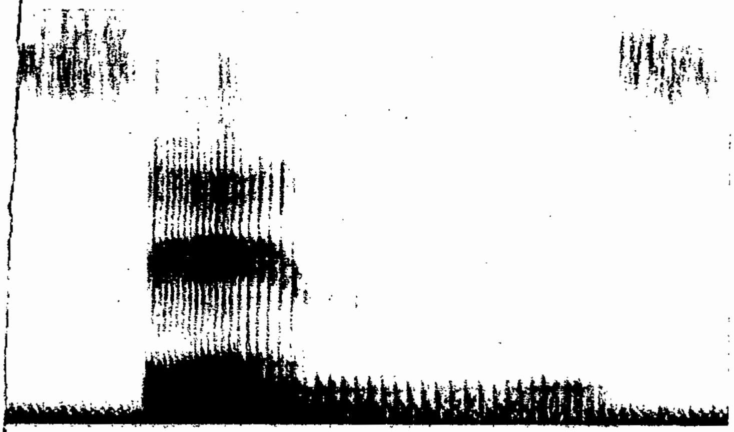

v.

Legs – N.


vi.

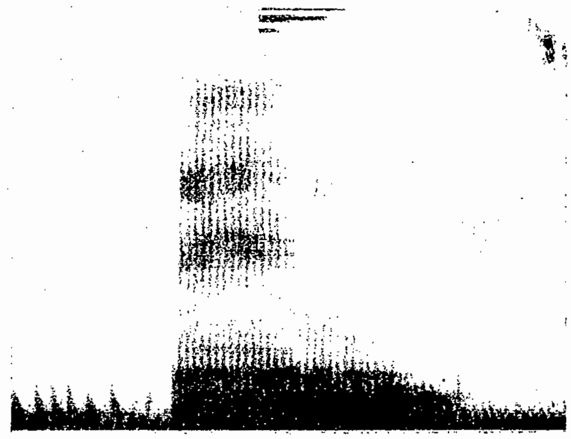
Legs – Bil.

Figs. D.1.2. (4: i – vi).



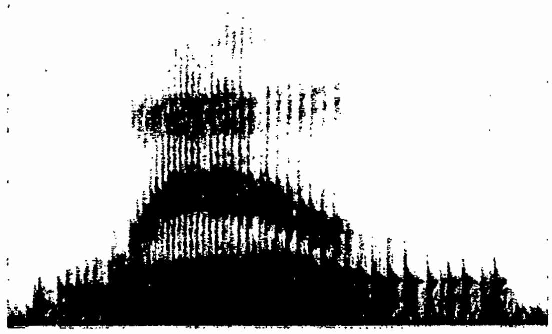
vii

Sends – N.



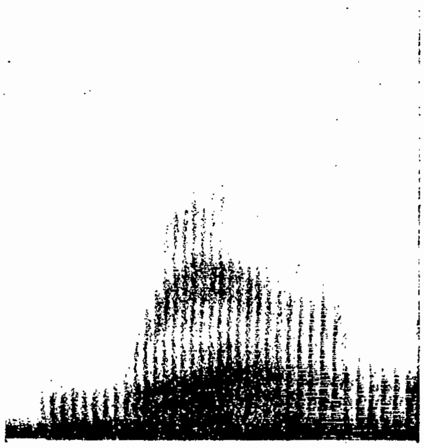
viii.

Sends – Bil.



ix.

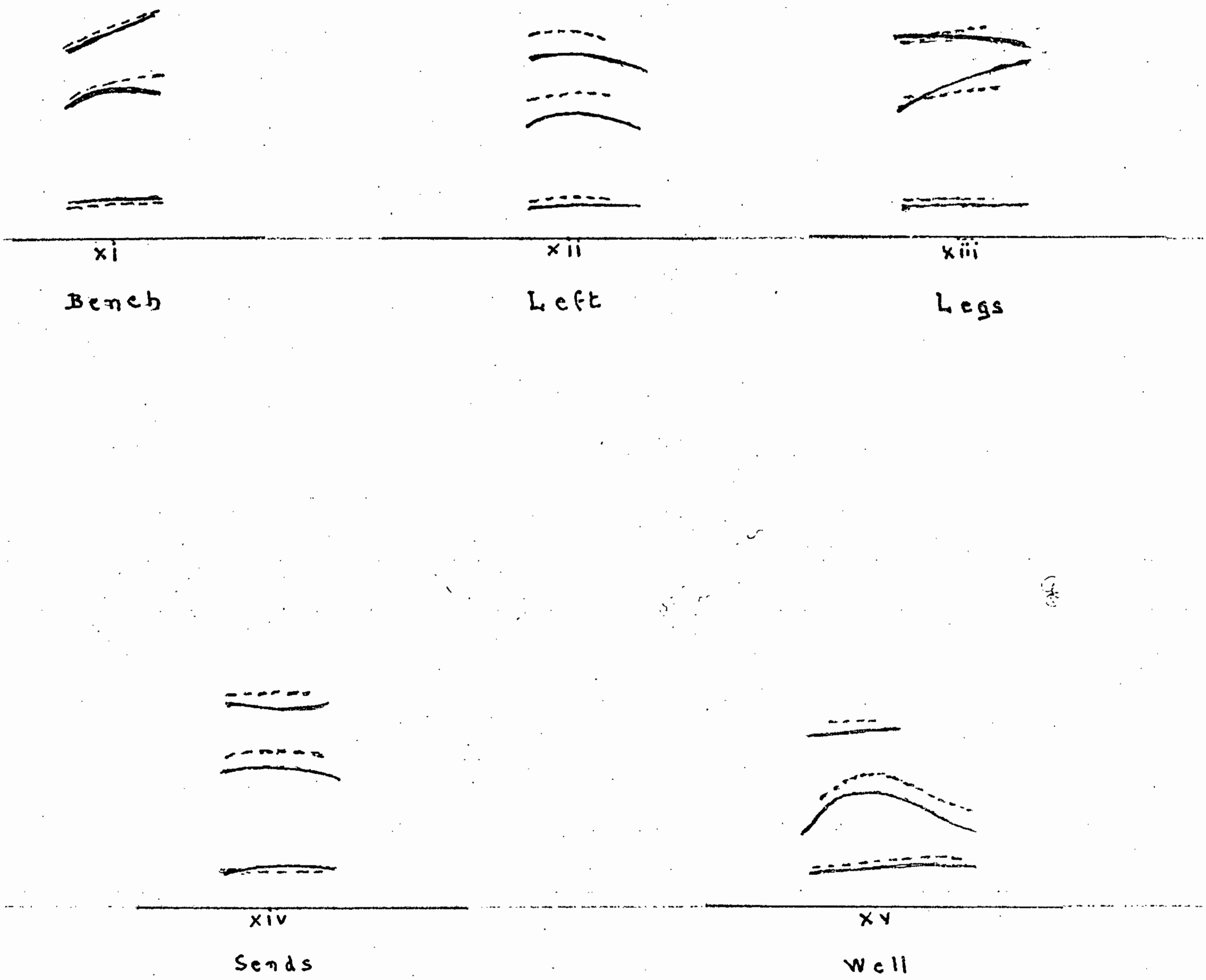
Well – N.



x.

Well – Bil.

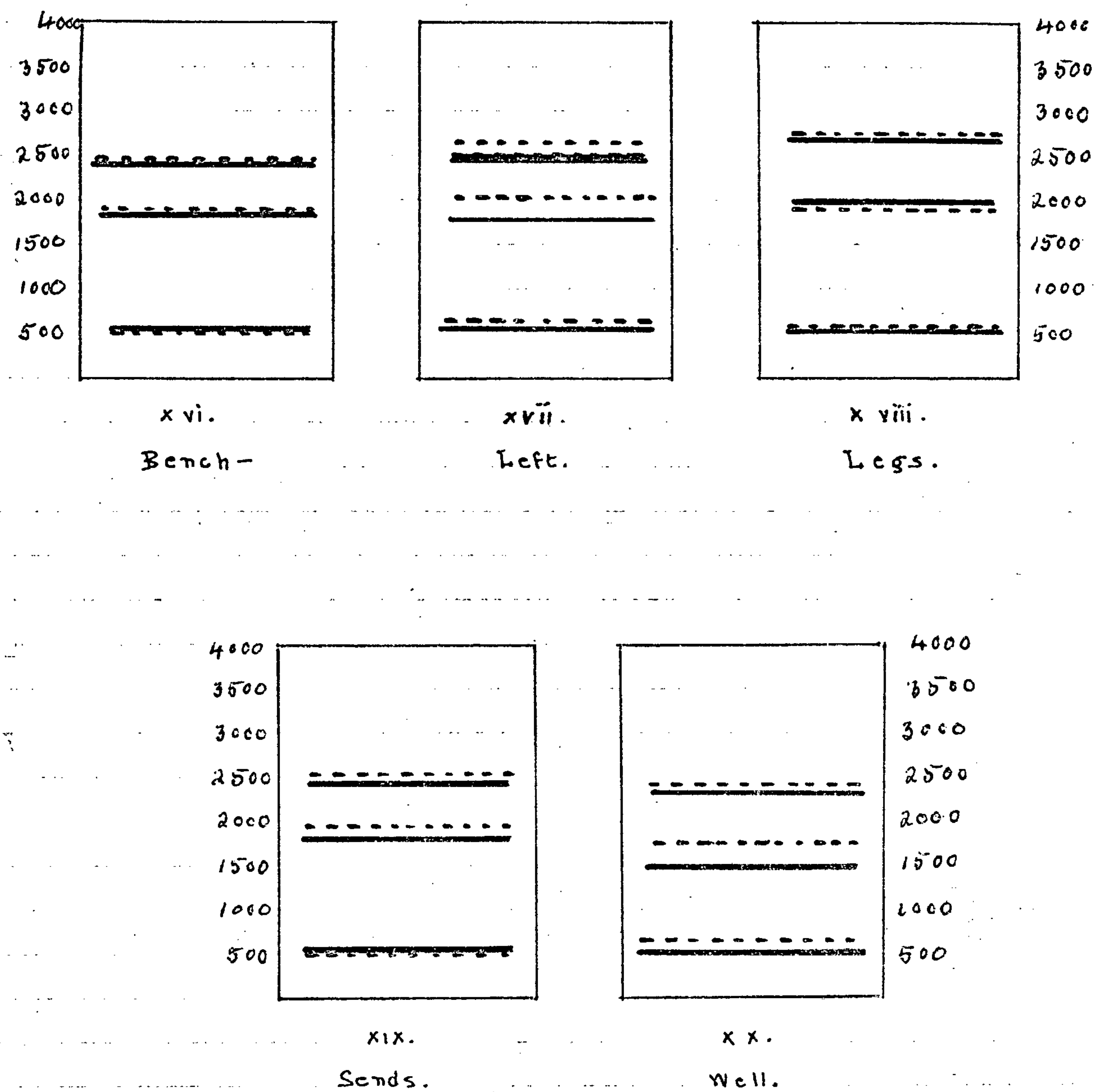
Figs. D.1.2. (4: vii – x).



Figs. D.1.2. (4: xi - xv).

Norm : ———

Bil. : - - - - -



Figs. D.1.2. (4: xvi – xx).

Norm ———

Bil. - - - - -

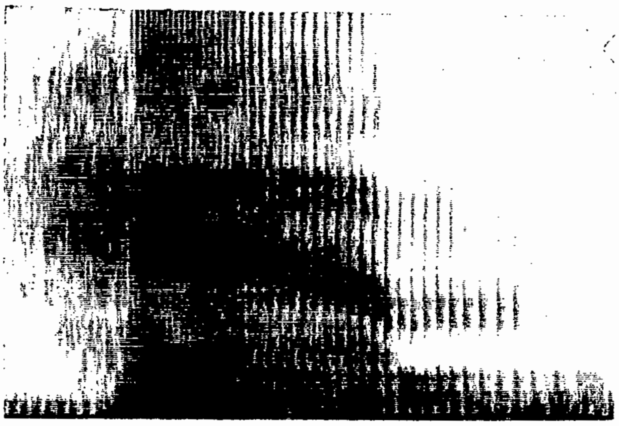
(4: x and xv). The transition from the vocoid to the lateral is indicated by a gradual slope of F2. The now familiar /ə/ glide of the Bilingual's front vocoids to a final /l/ is again evident. It will be noticed that the F2 - F1 separation is the smallest in "well", Fig. D.1.2.(4: xx), when compared with the formant distribution of the other articulations. In their relative positions the F pattern of the vocoid of "well" reflects a centralized articulation. The relative formant patterns of "legs" reflect a more open articulation than that of the Norm.

The difference in the quality of the vocoids between the articulation of the Norm and of the Bilingual subjects may be stated briefly. In the context of initial /w/ and final lateral, e.g. "well" the vocoid is articulated in a retracted mid-mid area.

In a CVC context, with initial /l/, e.g. "legs, left" the quality is that of more open R.P. /e/, or close C3 = [ɛ̝]. In the other contexts the quality is that of a close R.P. /e/ in a front high-mid area, i.e. open C2 = [e̞].

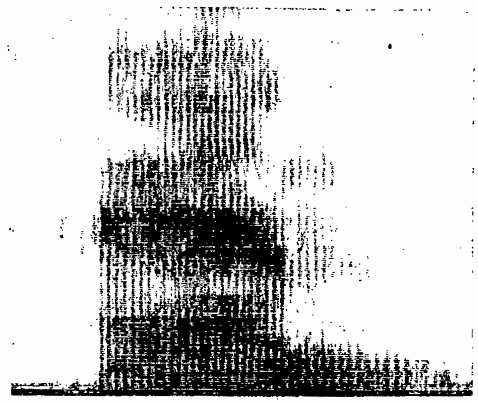
Vocoid /æ/.

Spectrograms D.1.2.(5: i - x) display analyses of the utterances "ham, racks, shall, shanks, trash", by the Norm and by five Bilingual subjects. The resonance bar tracings Figs. D.1.2.(5: xi - xv) have again been equated in time at the inception of phonation. The schematized assembly of resonance bands Figs. D.1.2.(5: xvi - xx) depict the frequencies in terms of figures of the distribution of the formants. In unsustained, short vocoids the figures can present no more



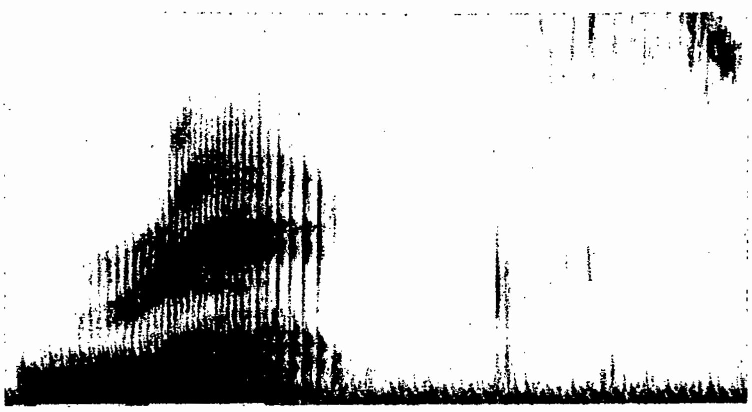
i.

Ham - N.



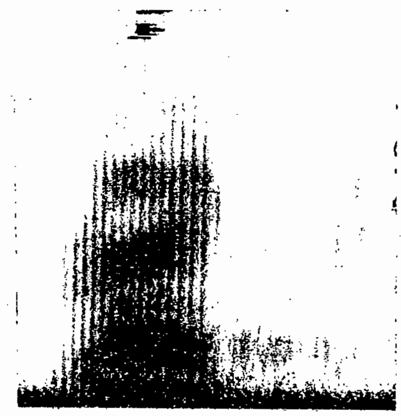
ii.

Ham - Bil.



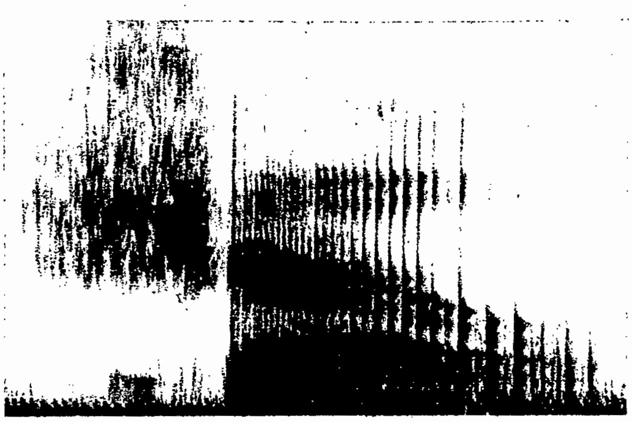
iii.

Racks - N.



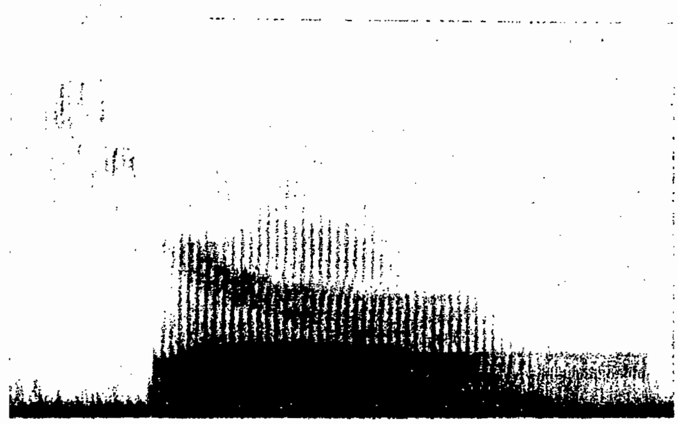
iv.

Racks - Bil.



v.

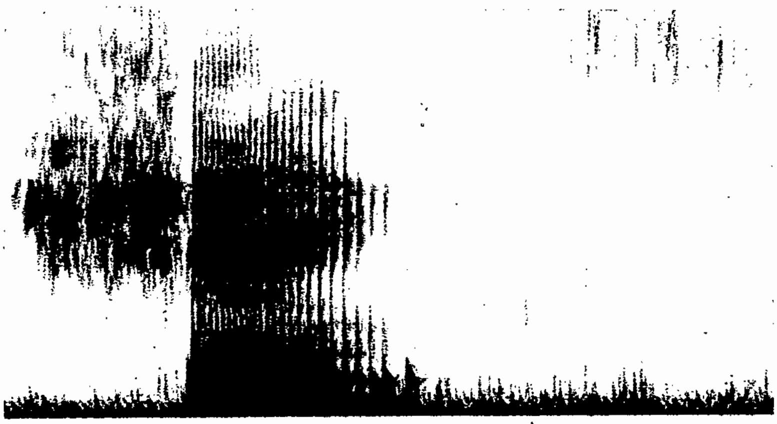
Shall - N.



vi.

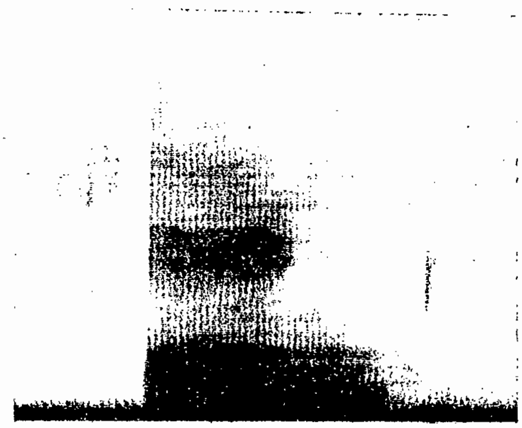
Shall - Bil.

Figs. D.1.2. (5: i - vi).



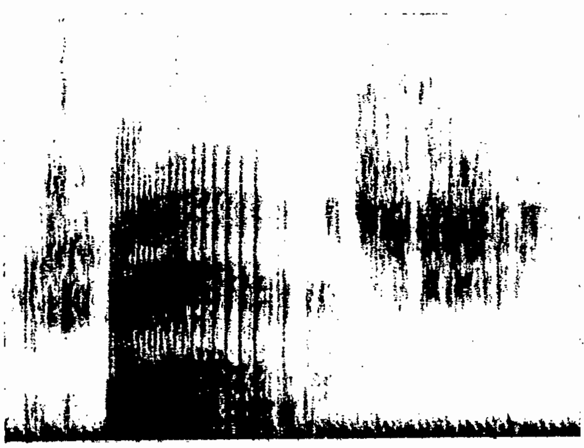
vii.

Shanks.- N.



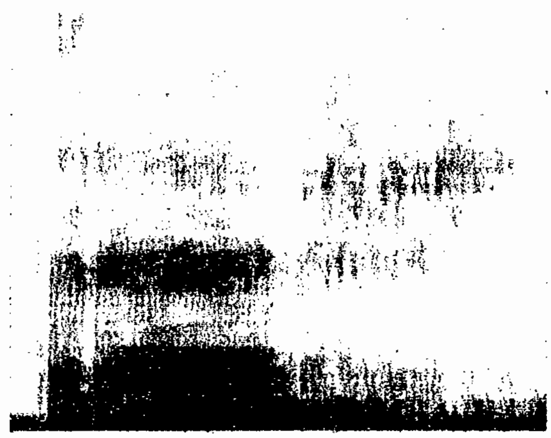
viii.

Shanks- Bil.



ix.

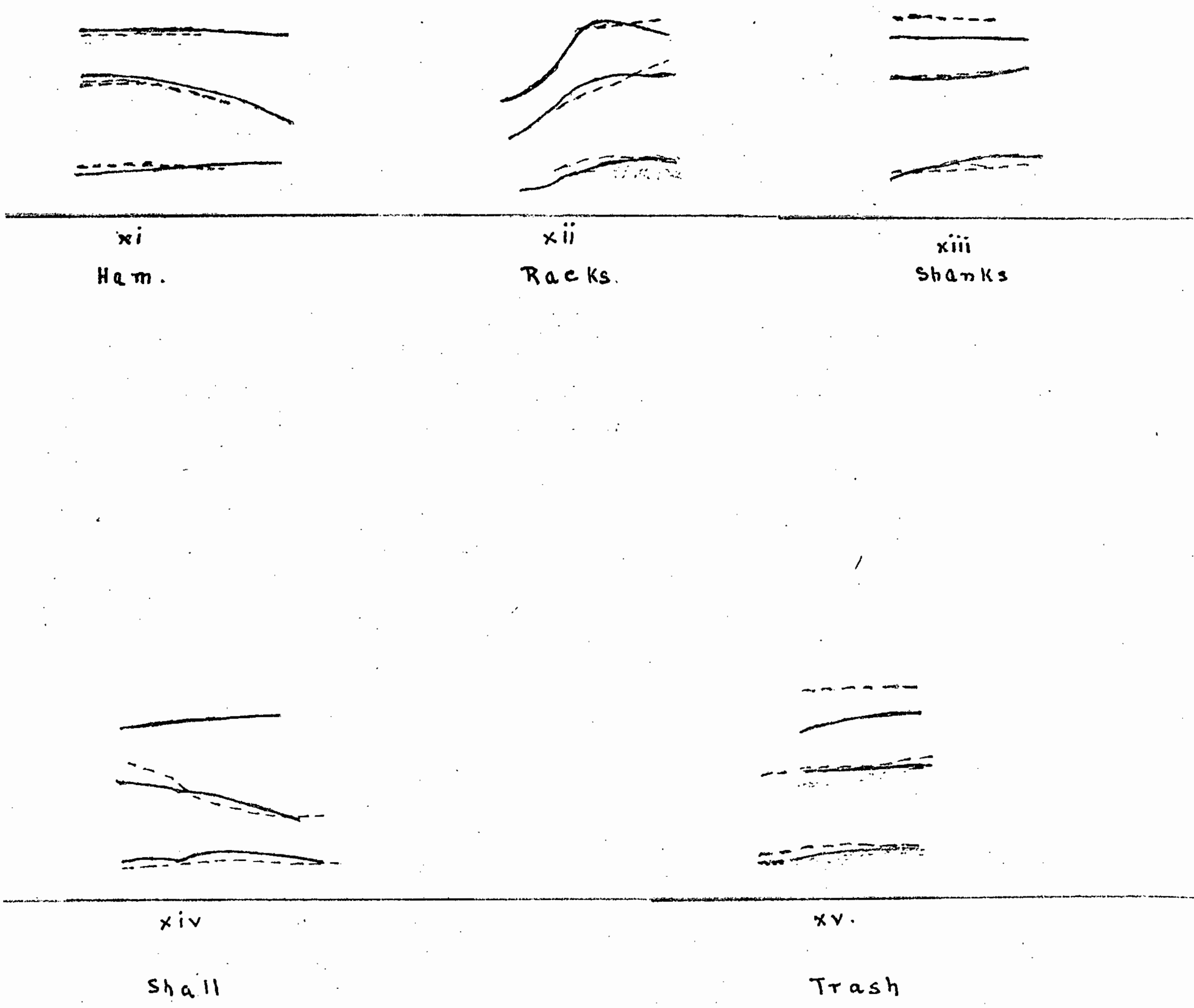
Trash- N.



x.

Trash- Bil.

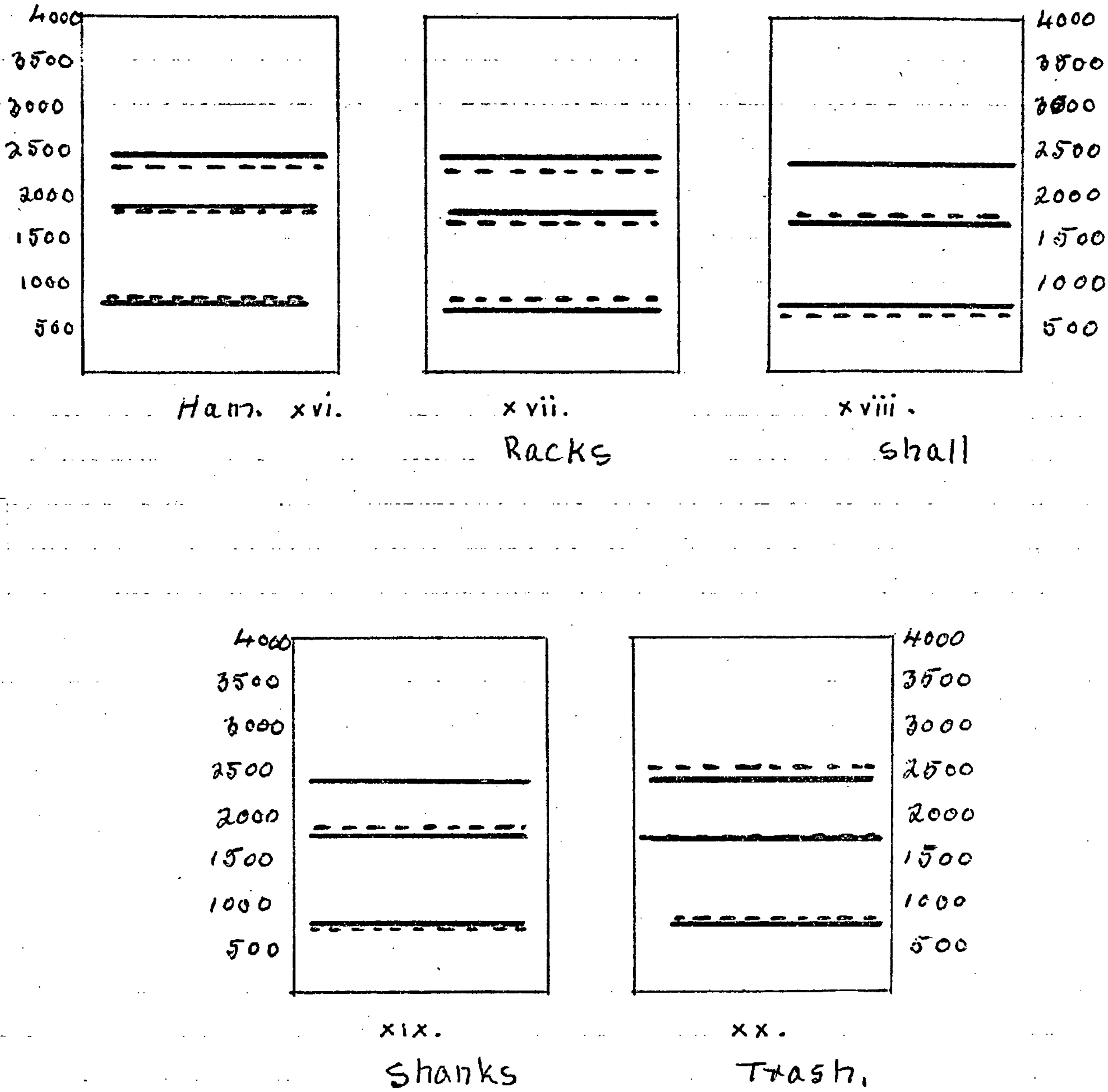
Figs: D.1.2. (5: vii- x).



Figs. D1.2. (5: xi - xv)

Norm : ————

Bil. : ------



Figs. D.1.2. (5: xvi – xx).

Norm: ————

Bil.: --------

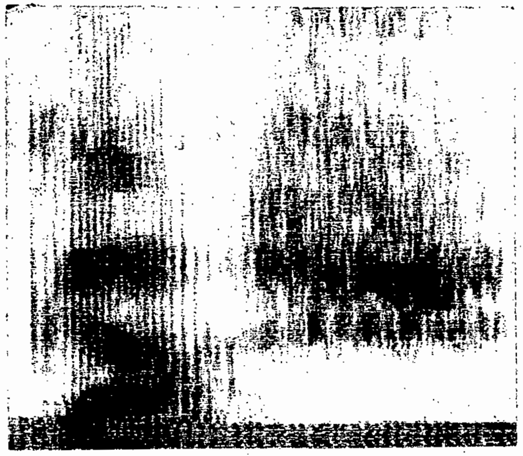
than approximate values as it is impossible to determine the position of a vocoid in formants that angle upwards or slope downwards for their entire duration. The point of no influence by prompting and succeeding contoids cannot be determined with any degree of accuracy. The relative value of the figures, does, however, give some idea of the comparative distribution of the resonance bars.

The assembly of formant values reflects the consistency in the quality of the vocoids of the Norm in the different contexts. It will be observed that, with the exception of the values of "shall", F1, F2 and F3 are at about the same frequencies, respectively. This is the acoustic correlate of the mid-open front area of articulation of the vocoid diagram. The falling intonation is a regular feature of the articulation of the Norm, in contrast to the sustained or rising pitch of the Bilingual subjects.

The respective F values of the Bilinguals are not as consistent as those of the Norm. It will be seen that the relative values of "ham" and "racks" Figs. D.1.2.(5: xvi and xvii) correspond: F1 of the Bilinguals at higher frequencies and F2 and F3 at lower frequencies. Raised F1 and closer F2 - F1 separation at these frequency levels represent a retracted half-open tongue position in comparison with that of the Norm. The bigger F3 - F2 separation of the Bilingual reflects a closer articulatory position than that of the Norm. In the vocoid diagram the Bilingual's articulation would be of a quality in the retracted high-open area i.e. an open and somewhat retracted C3 = [ɛ̠-] . Low F1 of "racks" Fig. D.1.2.(5: xvii) represents a closer articulation with the tongue in a more fronted position: a close C3 = [ɛ̝]. F3 in the spectra of "shall" and "shanks" Figs. D.1.2.(5: vi and viii) of the Bilingual subject are dominated by fricative modulations and cannot be positioned; but the large F2 - F1 separation represents a close articulation with the tongue raised above the mid-open position. The values of F1 and F2 of "trash" Fig. D.1.2.(5: xx) are virtually the same; but the higher F3 of the Bilingual identifies it as the acoustic correlate of a closer area of articulation than that of the Norm. The difference between the quality of vocoid /æ/ as articulated by the Norm and by the Bilingual subjects can be stated briefly: In all relevant contexts the quality of the Bilingual is that of a closer articulation, varying between front high-open and mid-mid on the vowel diagram i.e. between close and open C3 [ɛ̝] and [ɛ̞] . Low F1 of "shall", Fig. D.1.2.(5: xviii) does indicate a retracted tongue, producing a quality somewhat akin to a fronted low schwa.

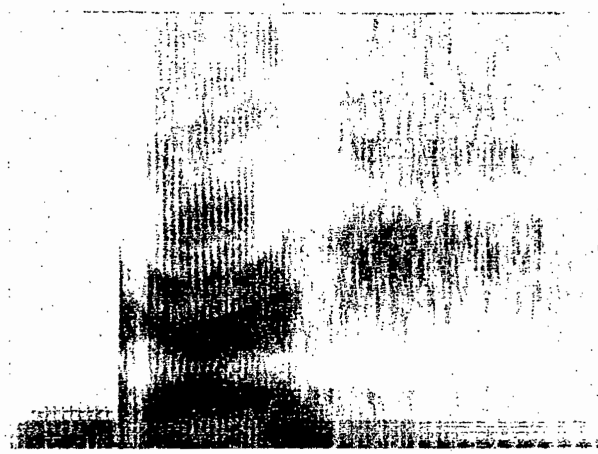
Vocoid /ʌ/

The spectrograms of Figs. D.1.2.(6: i - x) depict the articulations of "gush" and "fudge" by the Norm and two Bilingual subjects each and of "jump" and "hum" by the Norm and one Bilingual each. The resonance bar tracings of "gush" and "fudge" Figs. D.1.2.(6: xi and xii) have the bars of two subjects superimposed. The schematized assembly of formant distributions, Figs. D.1.2.(6: xv and xvi) reflect the F values of the vocoids in "gush" and "fudge". In each case two Bilinguals are superimposed to facilitate comparison of relative distribution of formant values. In slanting formants, such as the Norm's F2 of "gush", Fig. D.1.2.(6: i) the area of greatest intensity



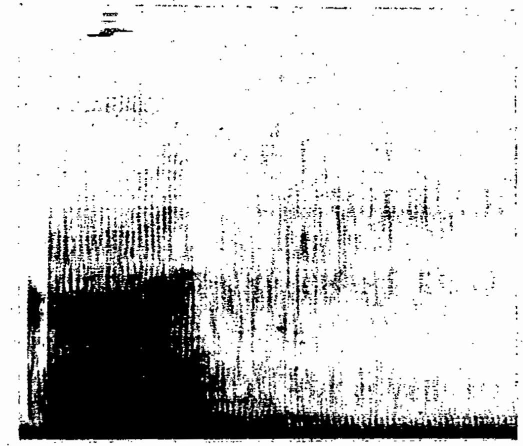
i.

Gush — N.



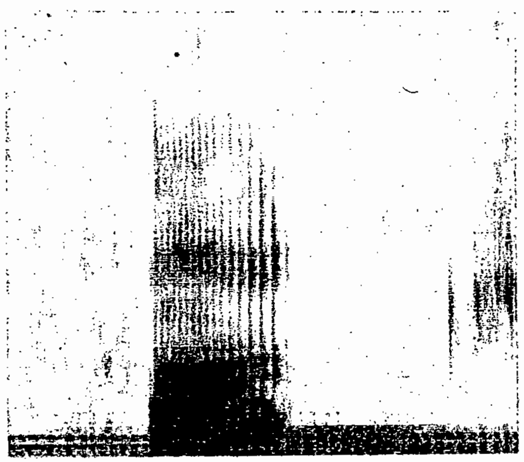
ii.

Gush — Bil.



iii.

Gush — Bil.



iv.

Fudge — N.

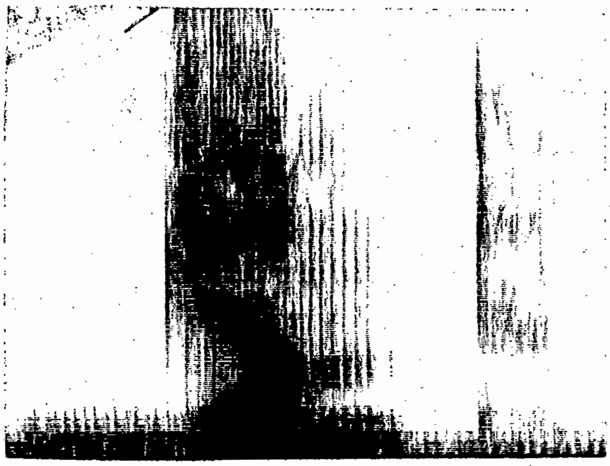
v.

Fudge — Bil.

vi.

Fudge — Bil.

Figs. D.1.2. (6: i–vi).

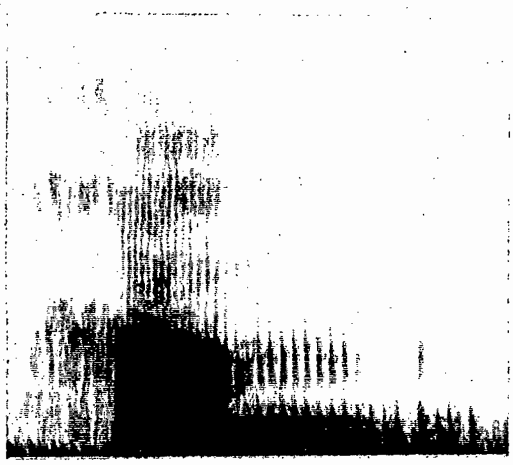


vii.

Jump – N.

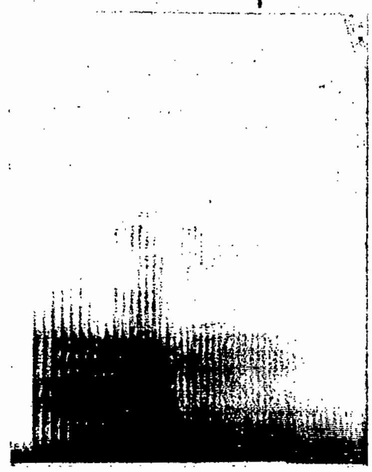
viii.

Jump – Bil.



ix.

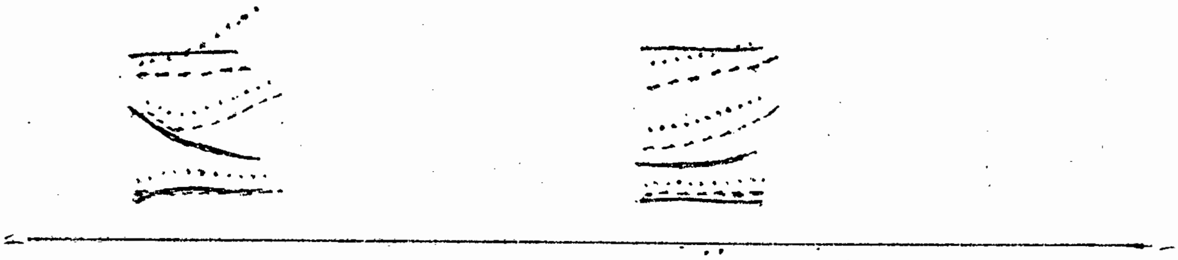
Hum – N.



x.

Hum – Bil.

Figs. D1.2. (6: vii – x).

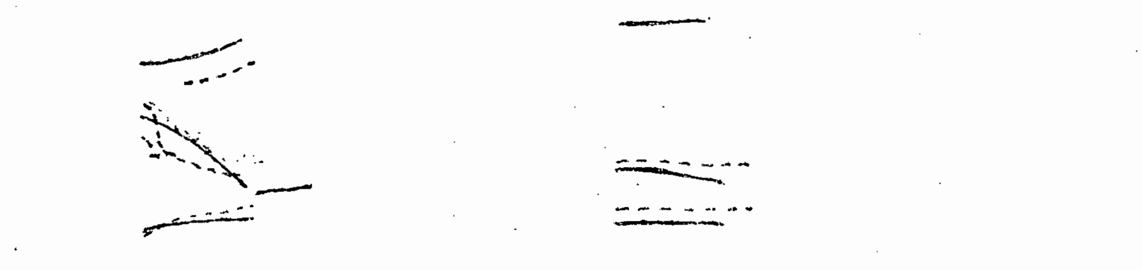


xi.

Gush

xii

Fudge



xiii

Jump.

xiv.

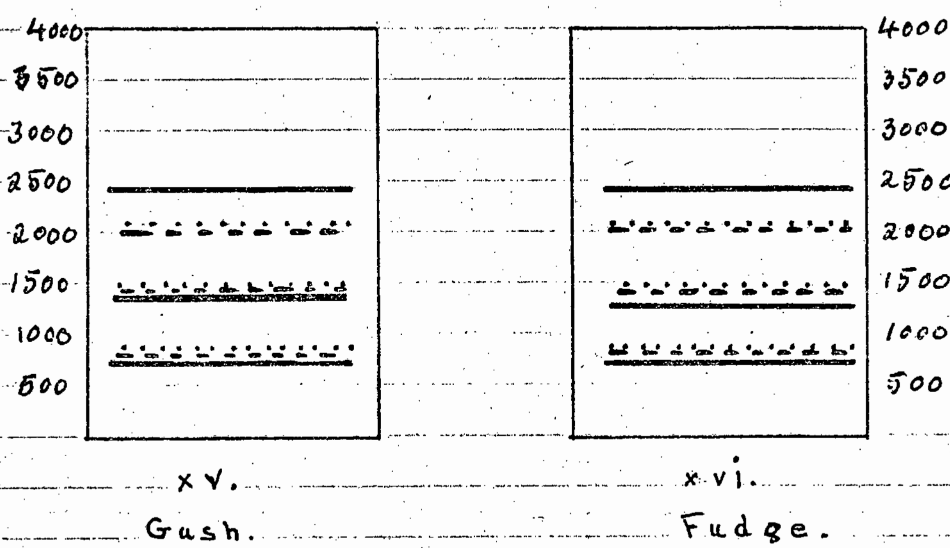
Hum

Figs. D1.2. (6 : xi – xiv)

Norm : ————

Bil. : - - - - -

Afr. : • • • • •



Figs. D. 1-2. (6: xv, xvi).

Norm: ————

Bi I(i): - - - - - - - -

Bi I(ii): . . . .

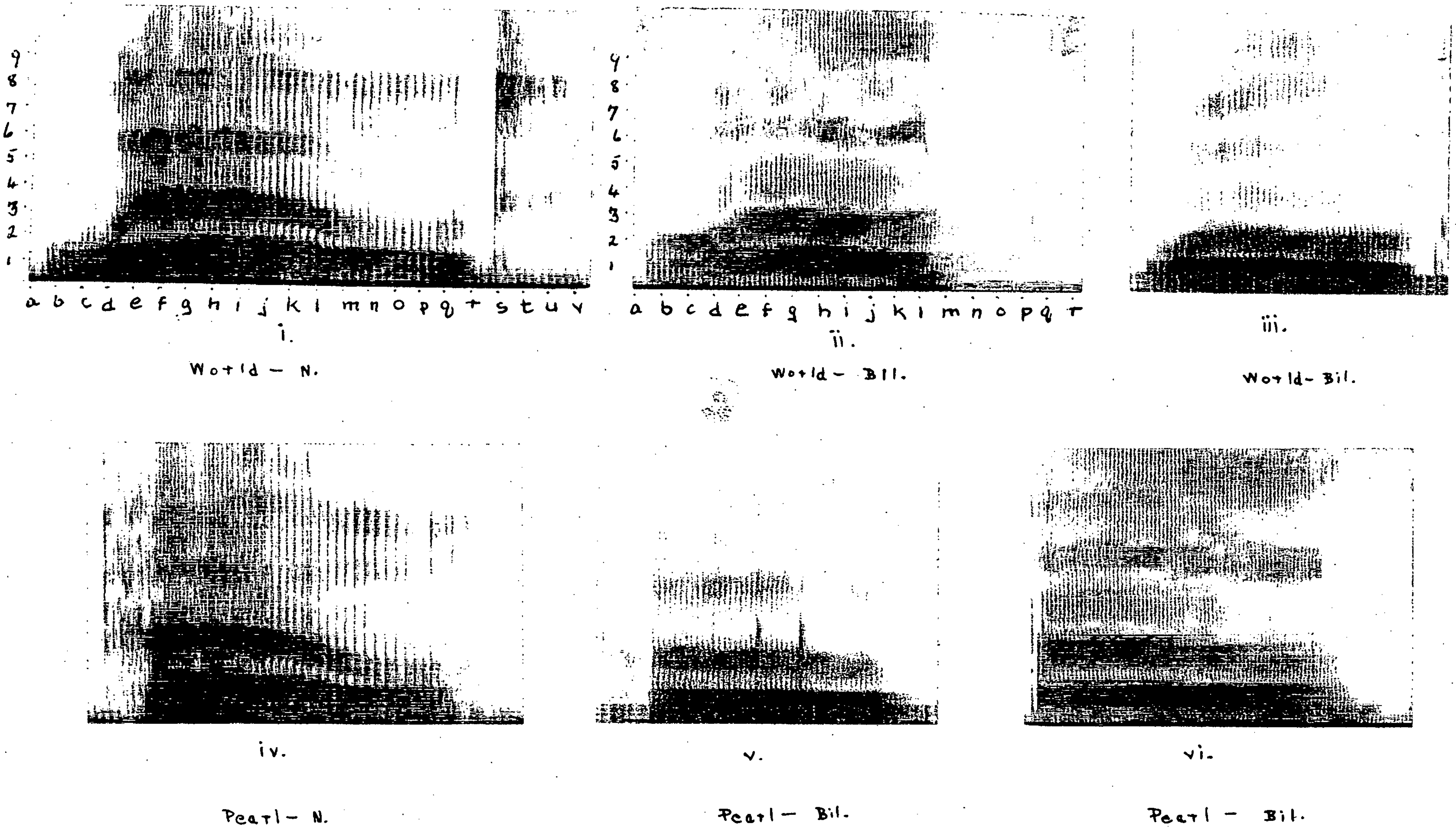
represented by the most intense blackening was taken as the hub of the vocoid resonance. In "jump", Figs. D.1.2.(6: vii-viii) the steep angling of the formants and the even distribution of blackening precluded any possibility of identifying the location of the hub of the vocoid resonances with any degree of dependability. The tracings of "gush" and "fudge", Figs. D.1.2. (6: xi, xii) reveal a close affinity between F1 of the Norm and one of the subjects, and consistency in the relative distribution of F2 and F3 viz. F2 at higher frequencies and F3 at lower frequencies. The broken lines in "gush", with a closer F3 - F2 separation represent a centralized articulation. The dotted lines represent the bars of a second subject. The relative distribution of the formants likewise identifies the area of articulation as central with the blade of the tongue forming a relaxed hump between low-mid and high-open areas. The F pattern of "fudge", Fig. D.1.2.(6: xvi) of the Bilingual indicated by the broken lines is similar to the pattern of Bilingual (1) of "gush". But the greater regularity in the F2 - F1 and F3 - F2 separation represents the pattern of a centralized vocoid. The same applies to Bilingual (2) whose formant pattern is depicted by the dotted lines.

In the context of an initial velar plosive or labio-dental fricative and a final palato-alveolar fricative or palato-alveolar affricate, such as "gush" and "fudge", spectrographic evidence points to an advanced /ʌ+ / by the A.-E. Bilingual, i.e. a low-mid to high-open central area. The F pattern of "jump", Fig. D.1.2.(6: viii) represents a different arrangement of resonance cavities. The relative close F2 - F1 affinity and large F3 - F2 separation is the acoustic correlate of a more open articulation than that of the Norm: in articulatory terms, a mid-open advanced back articulation; a close, advanced C5= [ɑ̟] .

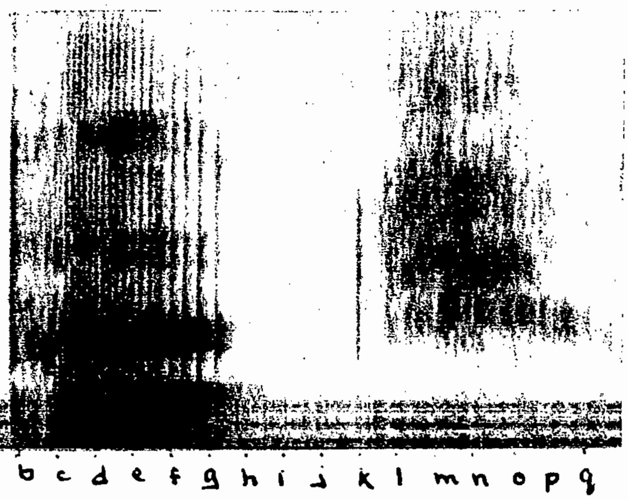
Spectrographic evidence of the utterances analysed displays two main variants of vocoid /ʌ/ as articulated by A.-E. Bilinguals: an advanced centralized allophone between low-mid and high-open areas, and a more open retracted one in the fronted back mid-open to low-open area.

Vocoid /ɜ:/

Spectrograms D.1.2.(7: i - x) display acoustic analysis of the words "world, pearl, perch and surge". Resonance bar tracings are shown in Figs. D.1.2.(7: xi-xiv). The tracings of two Bilingual subjects are superimposed on each of the patterns of "world" and "pearl", Figs. D.1.2.(7: xi and xii) respectively. The deviations from the formant values of the Norm, it will be observed, are consistent: all the formants of the words "world, pearl" and "surge" are at lower frequencies. An articulatory opposition of rounded versus unrounded lips is revealed by a lowering of all formants for the more rounded member, (Fant, op.cit., p.19). This pattern reflects the articulation of virtually all A.-E. Bilinguals: there is no evidence of lip-spreading. The quality of their /ɜ:/ vocoids reflects different degrees of lip-rounding accompanied by retraction of the hump of the tongue. The schematized assembly Figs. D.1.2.(7: xv, xvi and xvii) displays the relative formant values in terms of figures. F3 of the Bilingual subject in "surge" is not clearly defined, but the first two formants provide adequate evidence for the quality of the vocoid.

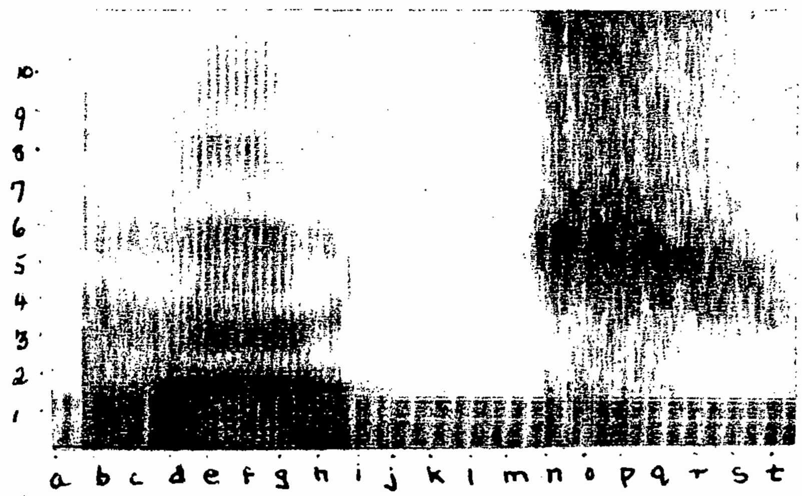


Figs. D.1.2. (7: i–vi).



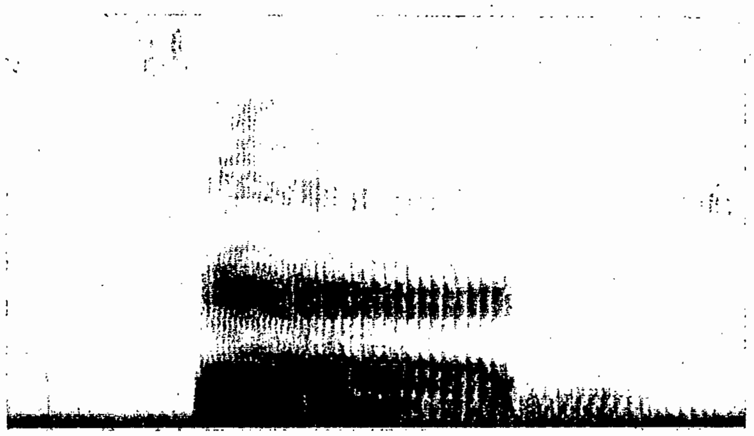
vii.

Petch – N.



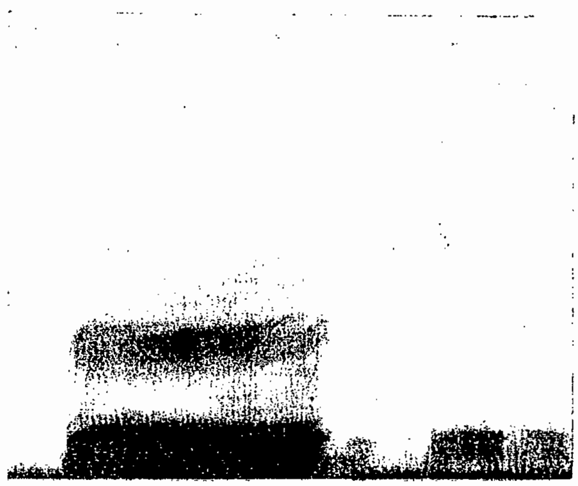
viii.

Petch – Bil.



ix.

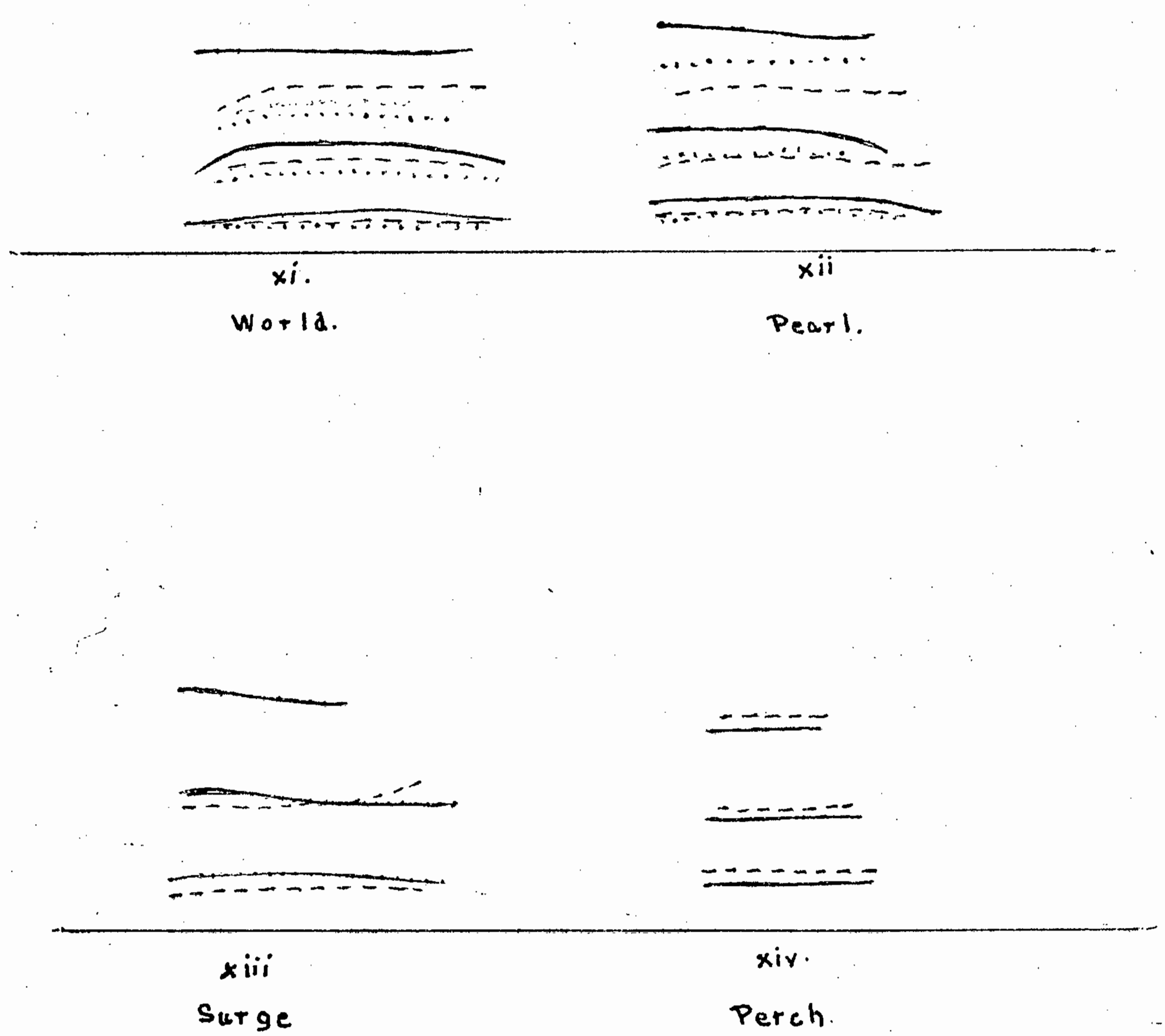
Surge — N.



x.

Surge – Bil.

Figs. D. 1. 2. (J : vii – x).

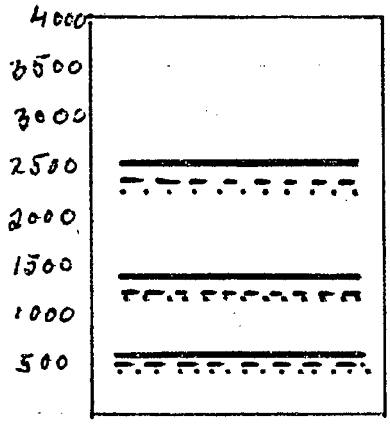


Figs. D1.2. (7: xi – xiv)

Norm. :

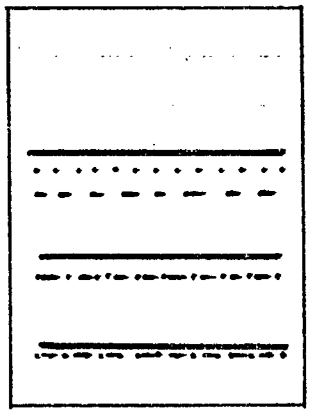
Bil :

Bil.(2):



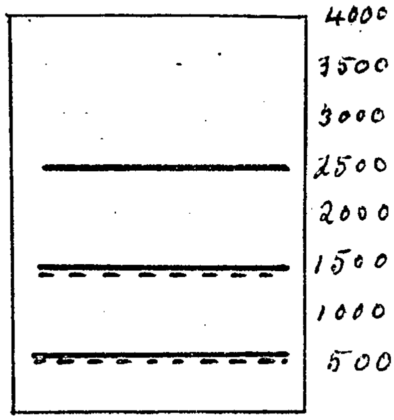
xv.

World



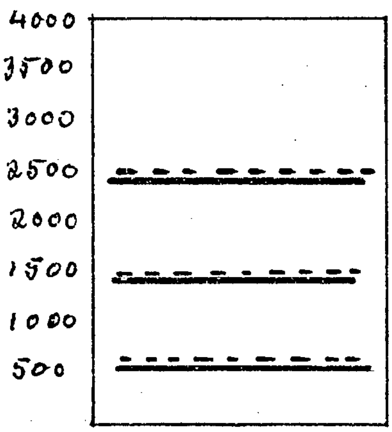
xvi.

Pearl



x vii .

Surge



xviii .

Perch.

Figs. D1. 2. (G: xv – xviii).

Norm: ————

Bil: - - - - - -

Bil.(2) • • • • • • • •

The relative distribution of the formants as displayed in the resonance bar tracings and in the schematized assembly of "perch", Figs. D.1.2.(7: xiv and xviii) respectively, is interesting. All three bars are at higher frequencies than those of the Norm. This pattern reflects a closer articulation with more pronounced lip-spreading. The auditory impression was that the subjects spoke an affected "advanced" R.P.. This impression is confirmed by the spectrographic evidence. The transient just before (b), Fig. D.1.2.(7: viii) marking the explosion of /p/ is followed by deliberate, prolonged aspiration extending to (d). The resonance bars are not clearly resolved but diffused by dominant frictional modulations, reflecting breathiness, a continuation of the exaggerated /p^h/ aspiration. The terminating affricate is particularly emphasized. However, the unchanged fundamental pitch, is reminiscent of the articulation of practically all A.-E. Bilingual subjects. Clearly, idiolectal qualities that may escape the ear, are reflected in the spectrogram. It should be observed that this type of articulation is uncommon, but does indicate an "over-correct" rendition given by an Afrikaans native.

However, the main variant reflected by spectrographic analysis is characterized by lip-rounding and retracted, somewhat fronted hump of the tongue.

Brief reference to ancillary features of pitch, duration, intonation and the conditioning impact of context, all of which combine to reflect the non-native timbre of the Bilingual's rendition, may be pertinent at this stage. The spectra of "world", Figs. D.1.2.(7: i and ii) will be referred to. The phonetic components of (i) are clearly resolved: viz. the voice bar of

/w/, the gradual rise at (d) of F1 and sharp upturn of F2 at (d) marking a well-defined transition from /w/ to /ɜ:/; the virtual steady state of the articulators for the vocoid from (e) to (i); the gradual slope of F1 and F2 denoting the transition to the lateral which has a close F2 - F1 affinity characteristic of Dark /l/; the upturn of F2 of the lateral to the hub of final /d/ and the open gap from (m) marking the closure for /d/; the transient at (s) denoting the explosion of /d/ with final random striations displaying brief, final aspirated release of /d/. In addition the duration of the phonetic segments may be determined approximately. The varying degree of separation between the vertical striations denote a falling pitch. Spectrum (ii) of the A.-E. Bilingual displays the following features by comparison: the inception of /w/ glide marks a lower tongue position as indicated by the higher F2 of /w/; the duration of /w/ is prolonged; the transition to vocoid /ɜ:/ is gradual and less steep; F1 and F2 run parallel for their entire duration, displaying steady static vocal resonance arrangement; transition to /l/ is not clear. The F1 and F2 distribution indicate the same resonance cavity modulation for the vocoid and for the resonances of /l/. This probably reflects co-articulations producing the same resonance modulations. The vocoid apparently terminates at (i), and at (p) there is vague evidence of a transient indicating the burst of /d/, but there is no voice bar. /d/ has thus been devoiced and so weakly articulated - or not exploded at all - that it is below the reproduction threshold of the spectrograph and consequently beyond auditory comprehension. The vertical striations reflect sustained intonation with no change in pitch.

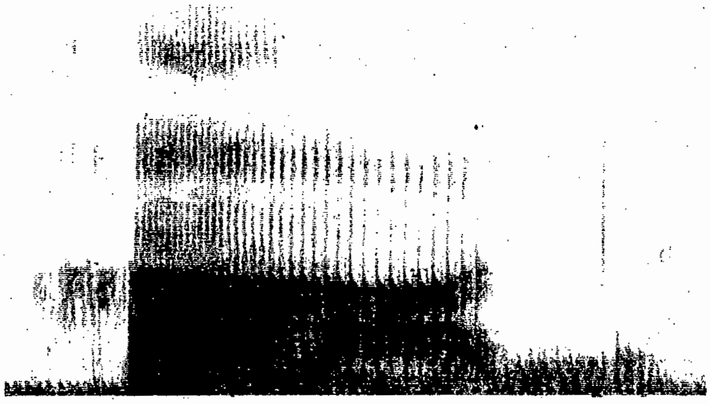
In broad outline, spectrogram Fig. D.1.2.(7: iii), protraying the analysis of "world" by a second Bilingual subject, reflects an articulation of similar features.

Vocoid /ɑ/.

The spectrograms in Figs. D.1.2.(8: i-x) reveal the analysis of the words "hard, heart, march, staff", and "starve" uttered by the Norm and five A.-E. Bilingual subjects. The resonance bar tracings have again been equated in time at the inception of the vocoid phonation. The schematized assembly displays the location of the formants in figures.

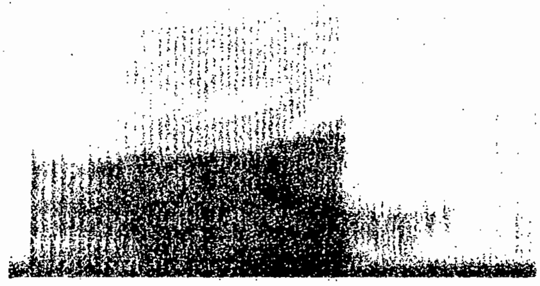
Back vocoids are notorious for the problems they present in acoustical analysis, unless they are clearly articulated by a voice of a particular timbre. This is confirmed by the fact that F3 of the Bilingual subjects could not be located with any degree of certainty whereas those of the Norm and the Afrikaans informant, Fig. D.1.2.(8: xi), are clearly defined. In some spectra the position of the first two formants was not very clearly defined.

The spectra and resonance bar tracings reveal that the locations of the first two formants of the Norm and the Bilingual subjects are at the same frequencies respectively. In back vocoids, especially, distribution of F1 and F2 is sufficient specification to identify the vocoids. Similar values of F1 and F2 reflect similar arrangement of vocal resonance cavities and hence similar quality of the vocoids. The formant pattern of the Afrikaans vocoid "gaan", articulated by the Afrikaans informant, has been superimposed on the tracings of "hard", Fig. D.1.2.(8: xii). The dotted lines represent the Afrikaans



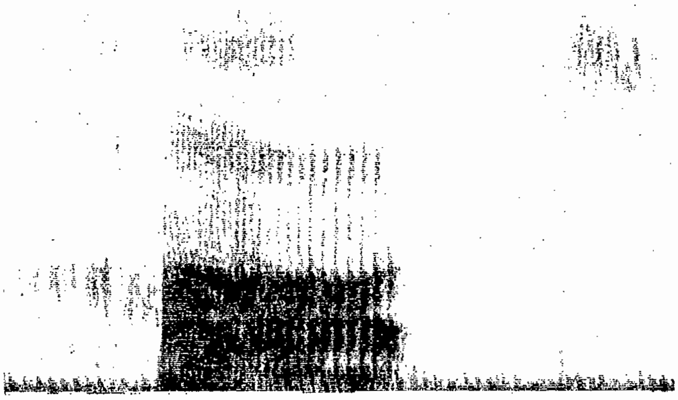
i.

Hard — N.



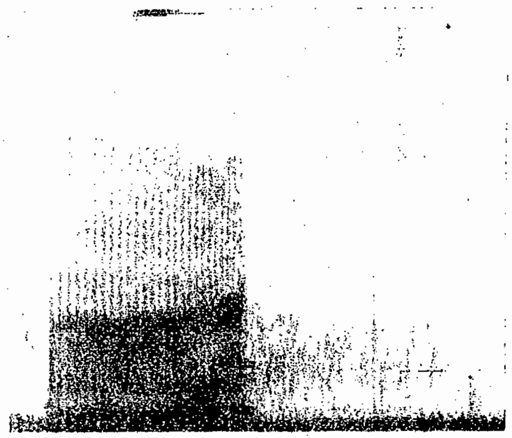
ii.

Hard — Bil.



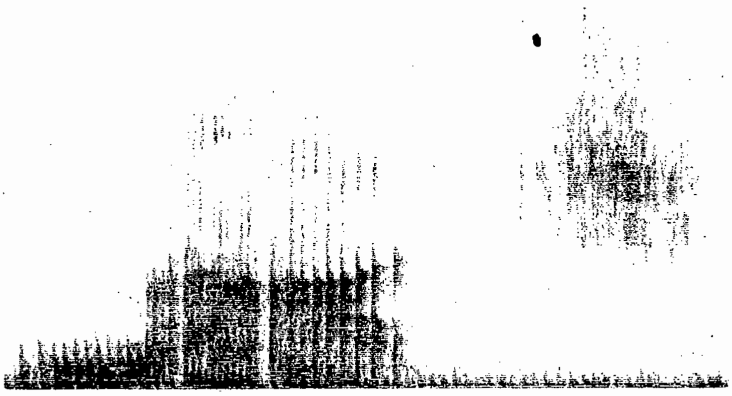
iii.

Heart — N.



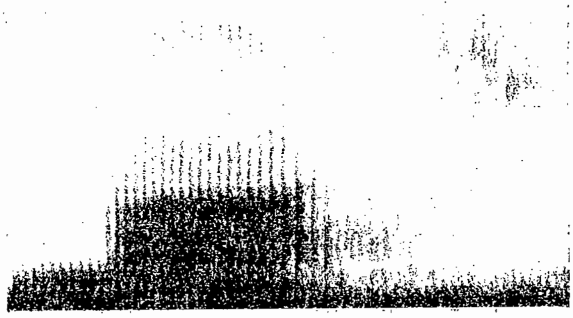
iv.

Heart — Bil.



v.

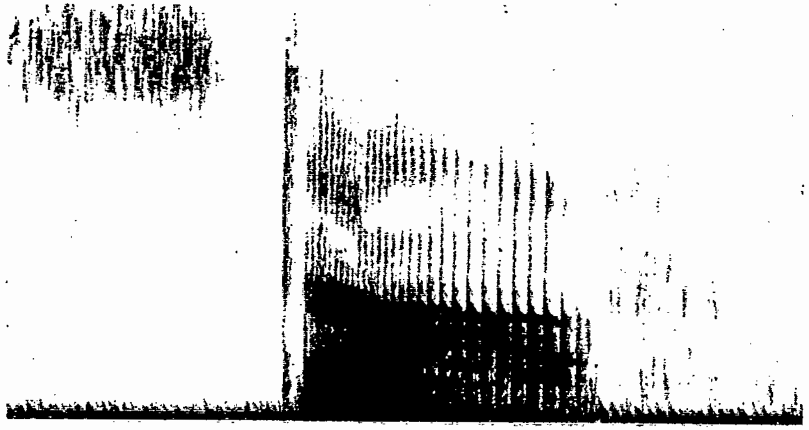
March — N.



vi.

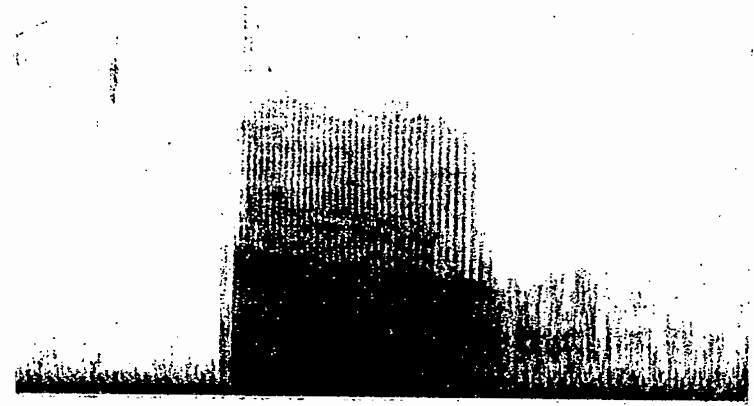
March — Bil.

Figs. D.1.2. (8 : i–vi).



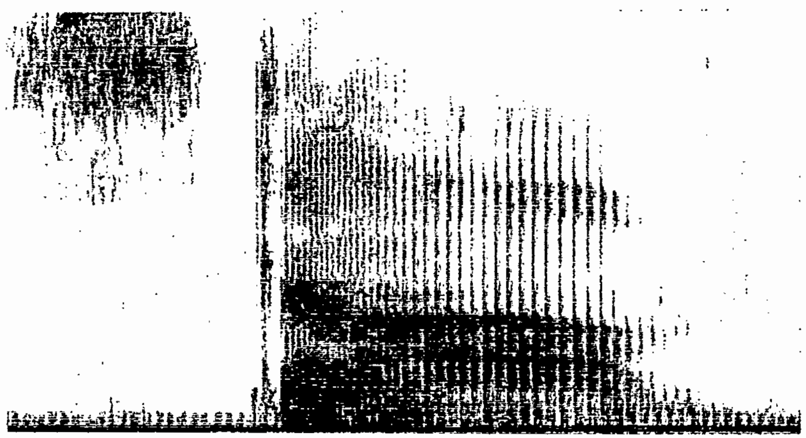
vii.

Staff – N.



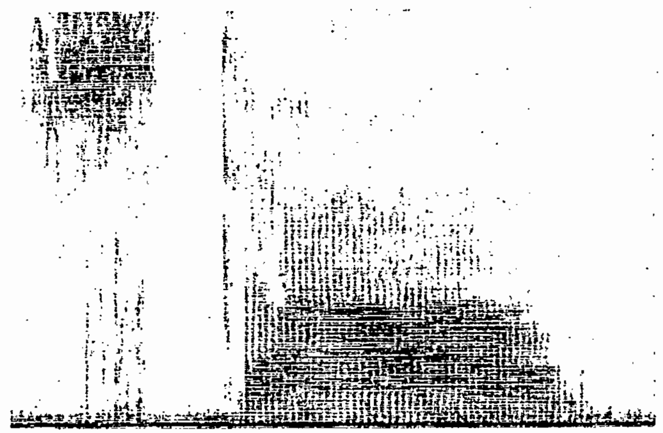
viii.

Staff – Bil.



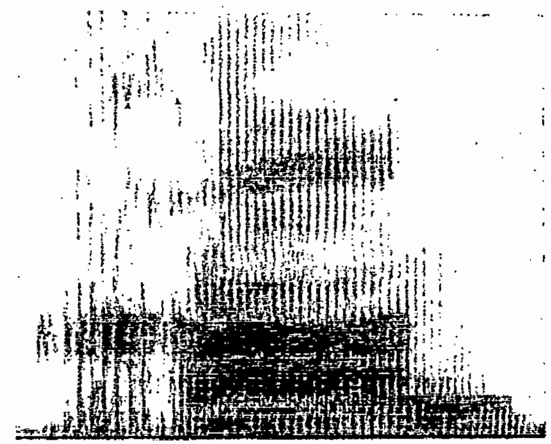
ix.

Starve – N.



x.

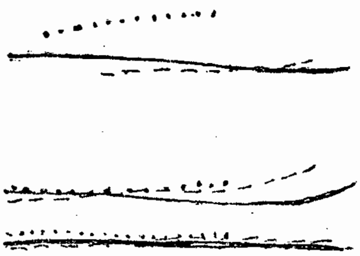
Starve – Bil.



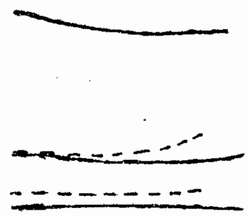
xi.

Gaan – Afr.

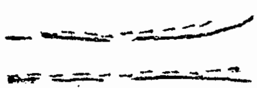
Figs. D.1.2. (8: vii – xi).



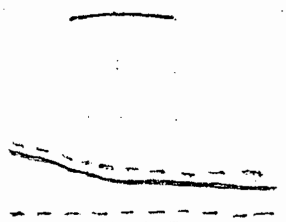
xii
Hard.
Gaan (Afr)



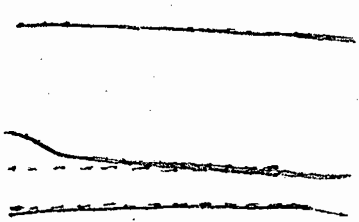
xiii
Heart.



xiv.
March



xv
Staff.



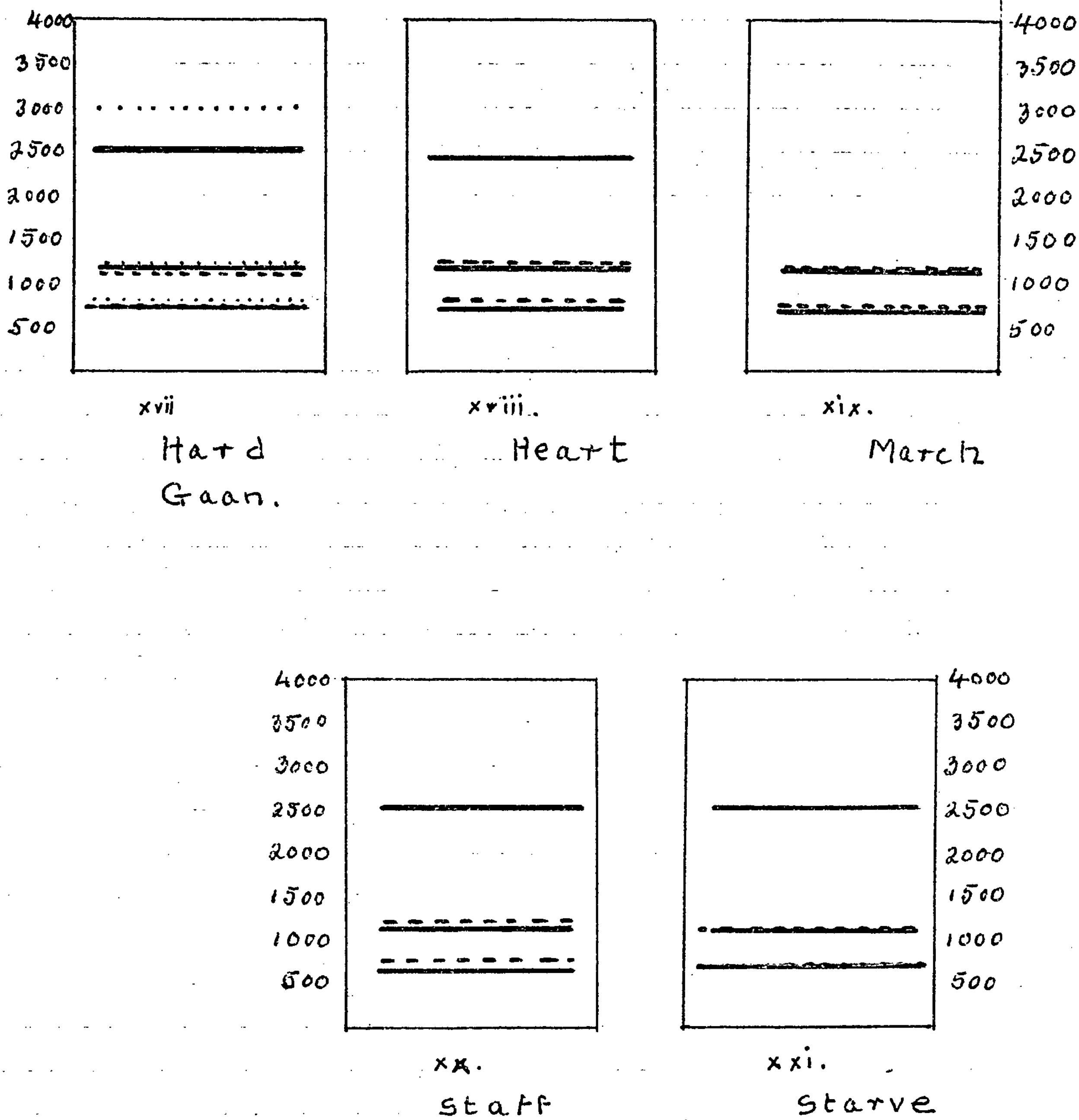
xvi.
Starve.

Figs. D1.2. 8: xii – xvi

Norm : ————

Bil. : - - - - - - -

Afr. : • • • • • •



Figs. D.1.2.(8: xvii – xxi).

Norm: ————

Bil.: - - - - - -

Aft: · · · · · · · ·

word. The F1 and F2 locations are at the same frequencies, reflecting the same quality of the vocoids. As both "gaan" and "hard" are prolonged vocoids, the middle portion of the utterance would least suffer the conditioning influence of the context. The very high location of F3 of the Afrikaans word may have a non-linguistic significance.

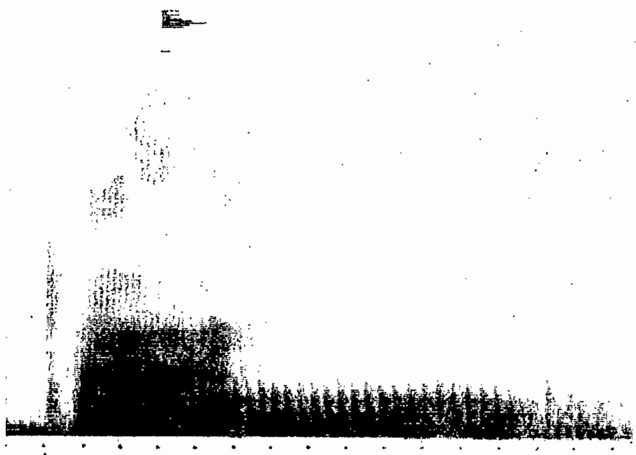
The greatest difference in the values is reflected in the formant assembly of the word "staff" Fig. D.1.2.(8: xx): 1150 Hz of the Norm's as against 1250 Hz of the Bilingual. Higher F1, F2 locations reflect a fronted articulation. A similar arrangement is evident in the formant values of "heart", Fig. D.1.2.(8: xviii). These two variations may not supply sufficient evidence for generalization, but "staff" and "heart" are the only short forms of /ɑ/ in the five test words, and, as such, indicate that the A.-E. Bilingual articulates short /ɑ/ vocoids with a fronted tongue in comparison with the Norm.

Spectrographic evidence thus reveals little difference in the quality of vocoid /ɑ/, except in shortened forms, when the Bilinguals have a fronted articulation i.e. an advanced C5 in the low-open area.

It is again evident in the spectra of "hard" and "heart" Figs. D.1.2.(8: ii and iv) that the Bilingual produces a voiced /ɦ/ which assumes the nature of the succeeding vocoid. There are no frictional modulations before the onset of the vocal cord-cavity modulations as seen in the corresponding spectra of the Norm, Figs. D.1.2.(8: i and iii).

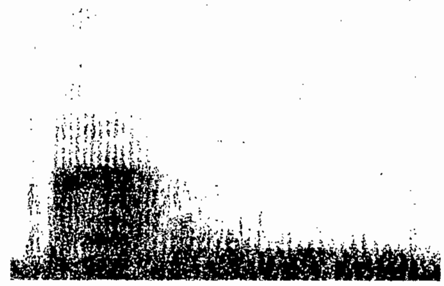
<u>Vocoid /ɒ/</u>

Spectrograms D.1.2.(9: i-x) display the analysis of



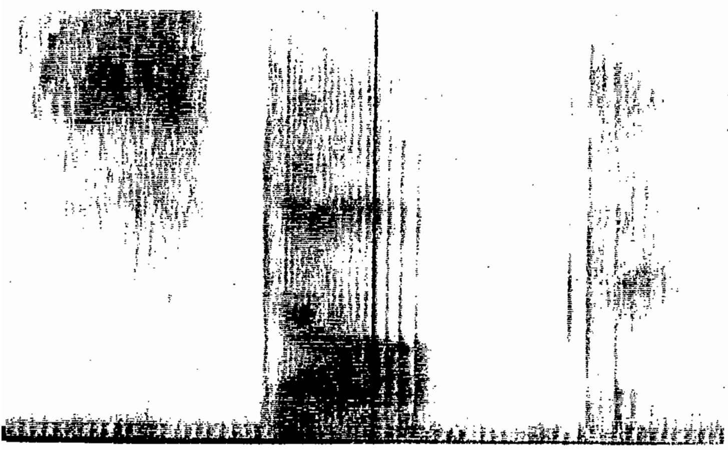
i.

Pond.— N.



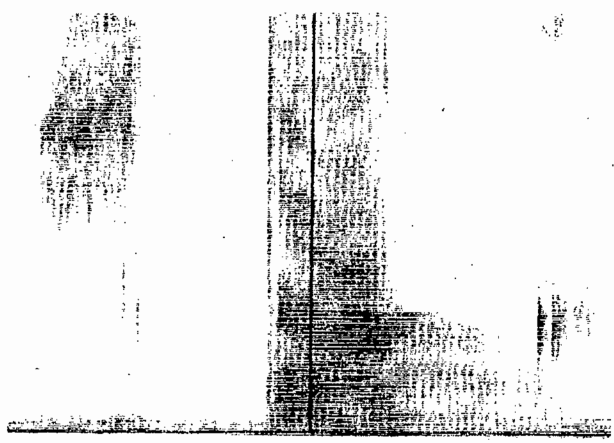
ii.

Pond — Bil.



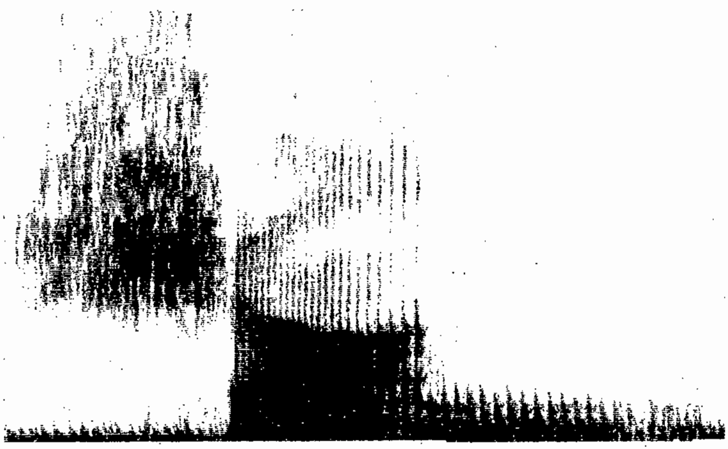
iii.

Stock — N.



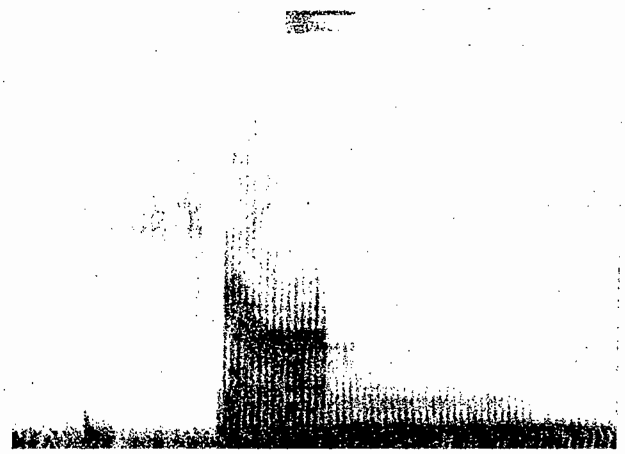
iv.

Stock — Bil.



v.

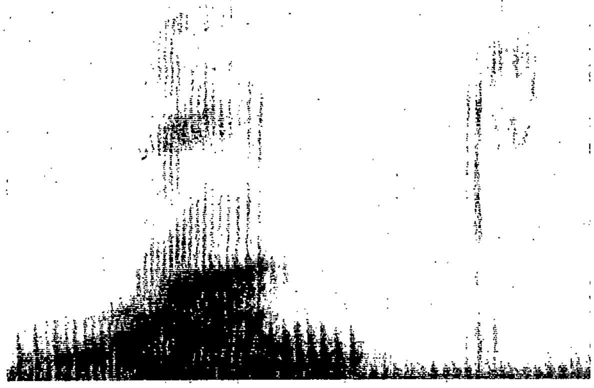
Shone — N.



vi.

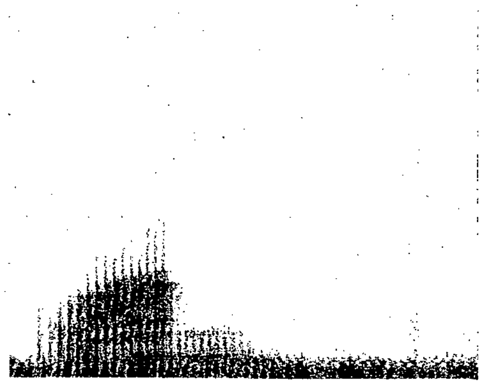
Shone — Bil.

Figs. D.1.2. (9: i – vi).



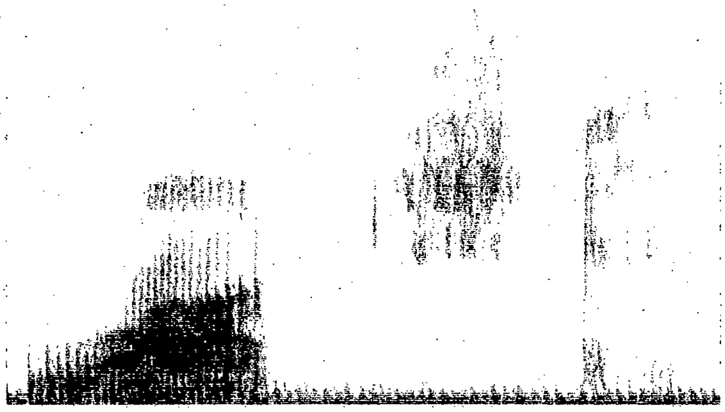
vii.

Want - N.



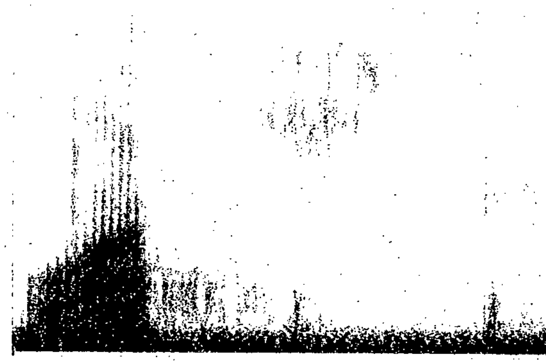
viii.

Want - Bil.



ix.

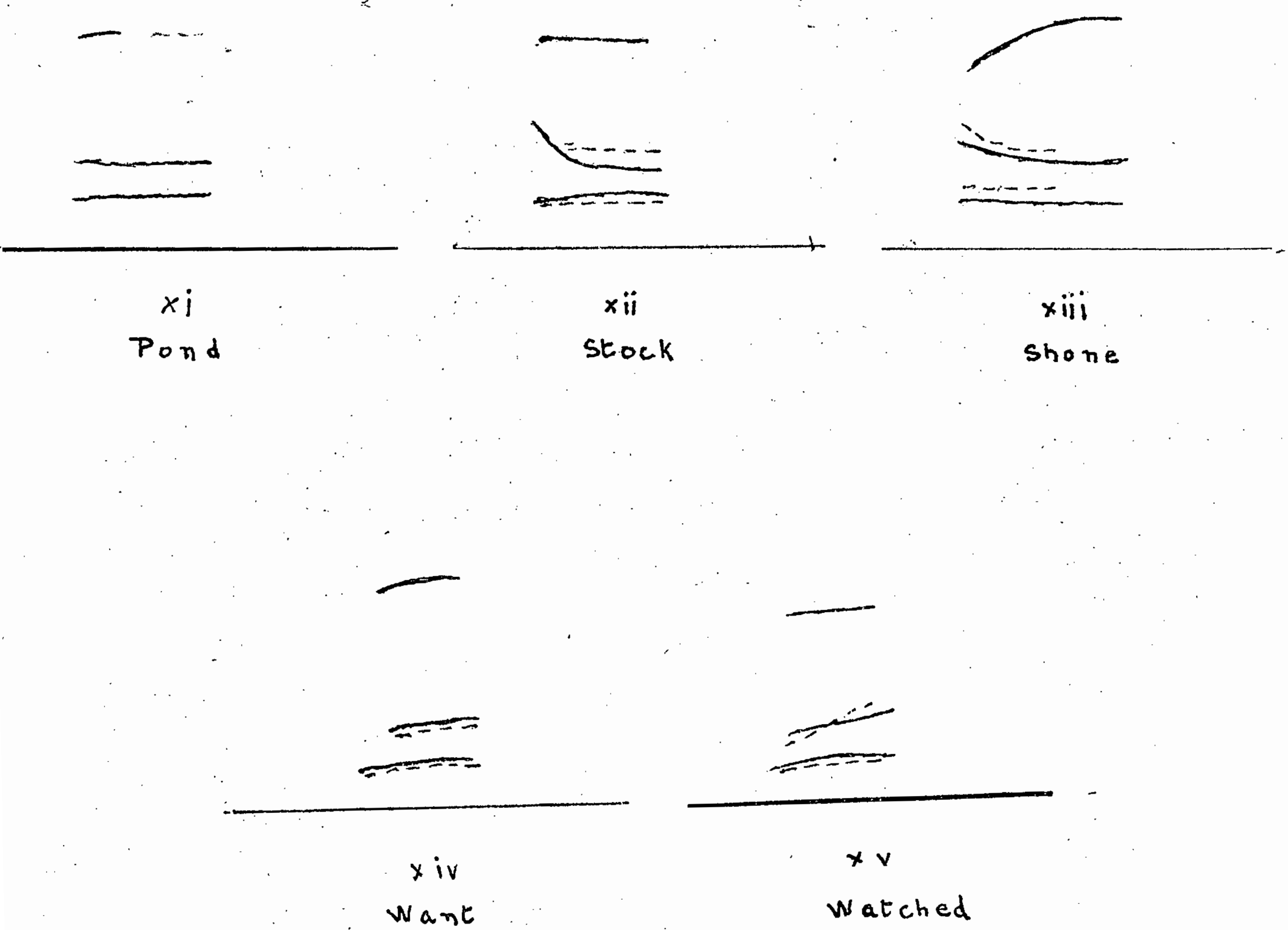
Watched - N.



x.

Watched - Bil.

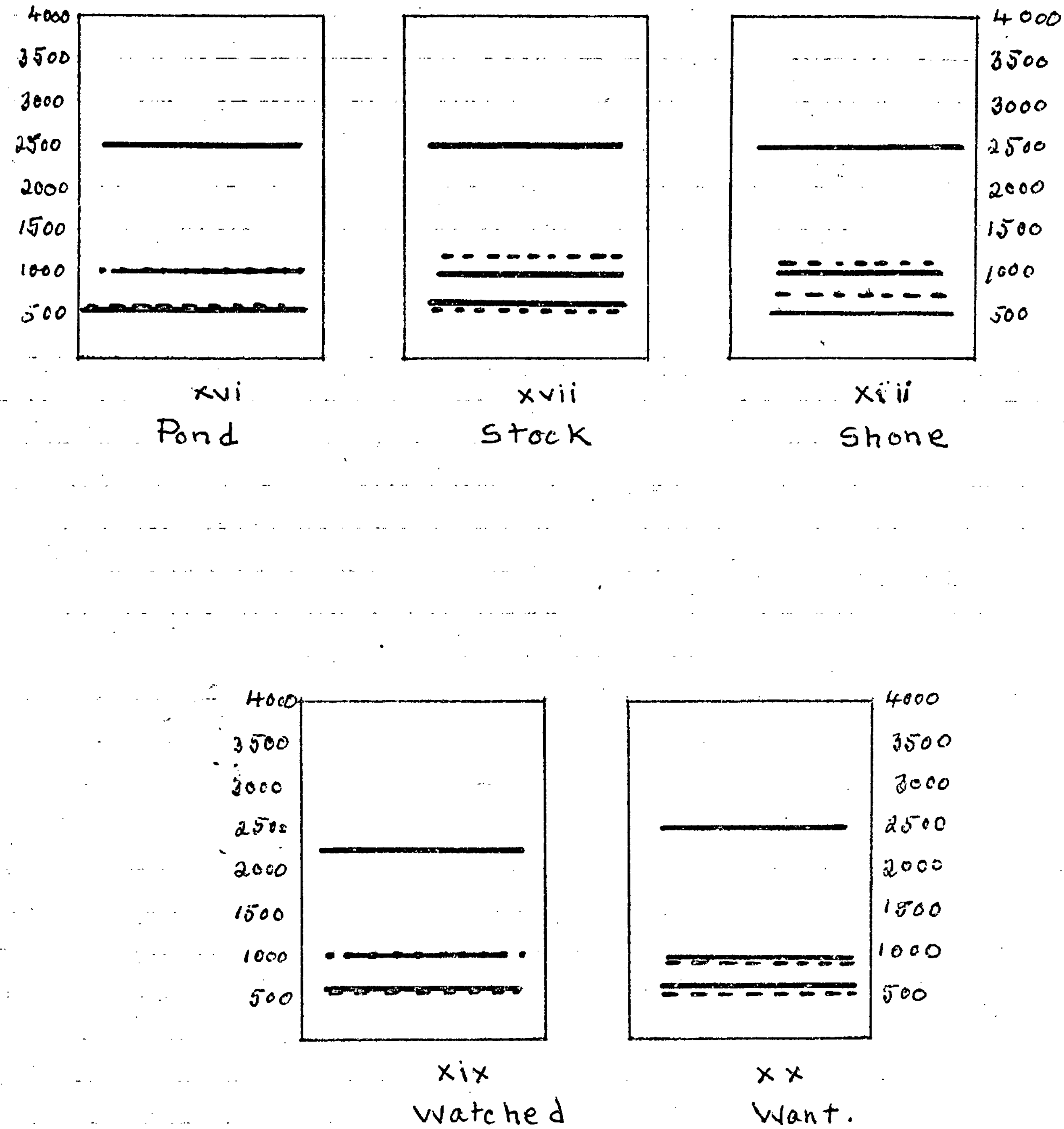
Figs. D.1.2. (9: vii - x).



Figs. D1.2. (9: xi – xv)

Norm : ————

Bil. : - - - - - -



Figs: D.1.2. (9: xvi – xx)

Norm: ————

Bii: - - - - - -

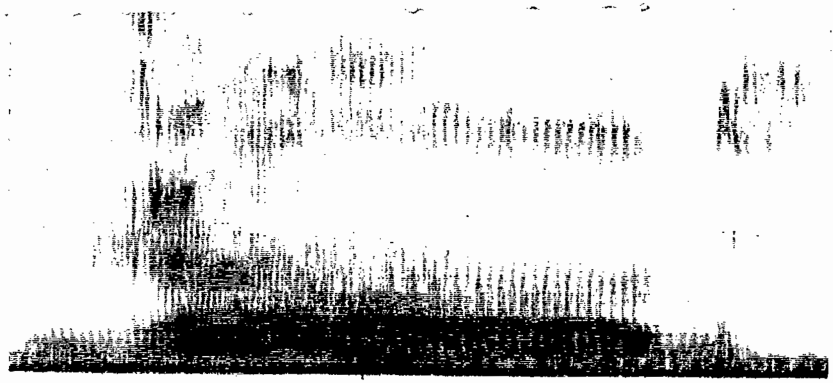
the words "pond, stock, shone, want" and "watched". The resonance bar tracings, Figs. D.1.2.(9: xi-xv), show the relative location of the resonance bars. F3 of the Bilingual subjects is not shown in the tracings as the upper frequencies are dominated by frictional modulations with no clear resolution of resonance bars.

The F1 - F2 distribution of the Norm and of the Bilingual subject for the word "pond" virtually coincide, a feature which points to a similar arrangement of resonance cavities and hence vocoids of the same timbre. The spectra, however, reveal an appreciable difference in duration: (c) to (g) in the case of the Norm as against (b) to short of (e) of the Bilingual. The resonance bars of "shone" reflect a different arrangement of resonances by the Bilingual: both F1 and F2 are at higher frequencies. In this pattern this arrangement reflects an advanced articulation in the direction of /a/. In "stock" the Bilingual has a lower F1 and a higher F2 with a greater degree of F2 - F1 separation than the Norm. The lower F1 indicates a closer articulation and the wider F2 - F1 separation an advanced, more centralized hump of the tongue. The relative arrangement of "watched" is similar to that of "stock", allowing for the transitions from the arrangement of the initial contoids to the vocoid resonances. One would expect a somewhat similar formant distribution for the vocoids in "watched" and "want" by virtue of the initial /w/ glide. But "want" of the Bilingual has a closer vocoid than that of the Norm. The conditioning factor may be the nasal /n/. These articulatory correlates represent allophones conditioned by the linguistic habits of the Bilingual and by the context.

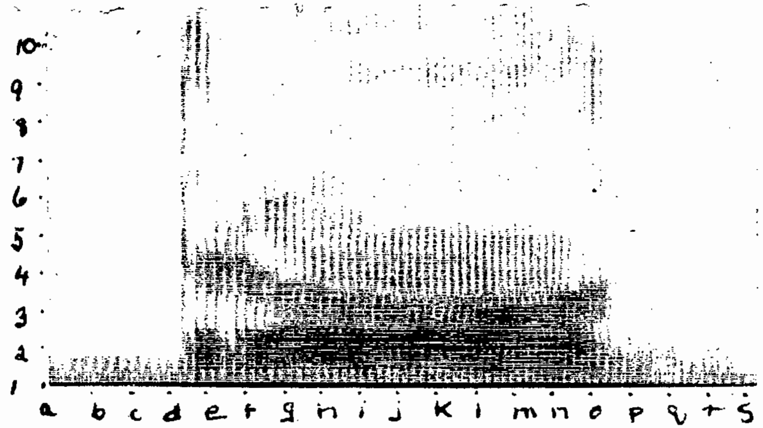
The deviations as evidenced by spectrographic analysis are of the following three types. In the context of an initial /w/ glide and a succeeding nasal, e.g. "want", the allophone is characterized by a greater degree of lip-rounding as indicated by the lower frequencies of the formants. The allophone would approximate to close C5 = [ɑ]. In the context of an initial /w/ glide and a succeeding palato-alveolar affricate, e.g. "watched", the allophone is more open with less neutral lip-rounding, viz. an advanced C5. The spectrum of "stock" reflects a different arrangement of resonance cavities. It represents an advanced articulation with slight lip-rounding, somewhat advanced in the low-open area of the vocoid diagram.

Vocoid / ɔ:/

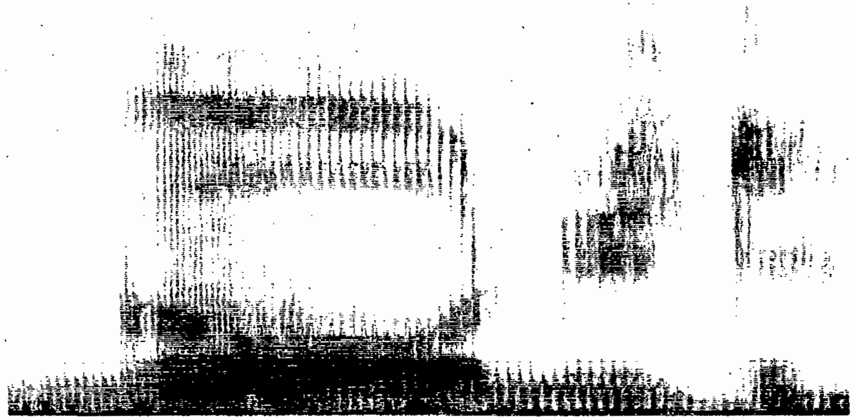
The words analysed by the spectrograph are "drawled, gorged" and "jaunt", Figs. D.1.2.(10: i-vi). The resonance bar tracings, Figs. D.1.2.(10: viii-x) reveal that there is very little difference in the location of F1. F2 of the Bilingual subjects is consistently higher than that of the Norm, though the difference is slight. The greatest degree of separation is evident in F2 of "gorged", Fig. D.1.2.(10: viii), viz. 790 Hz as against 950 Hz of the Norm, indicated by the broken lines in the tracing. The larger F2 - F1 separation at these frequencies reflects an advanced articulation, with the back of the tongue slightly in advance of the half-open half-close position. The lower F1 probably reflects the co-articulation of closer lip-rounding. The upper resonances in the spectra of the A.-E. Bilinguals are so weakly defined that they cannot be detected. However, as already stated, F1, F2 distribution is



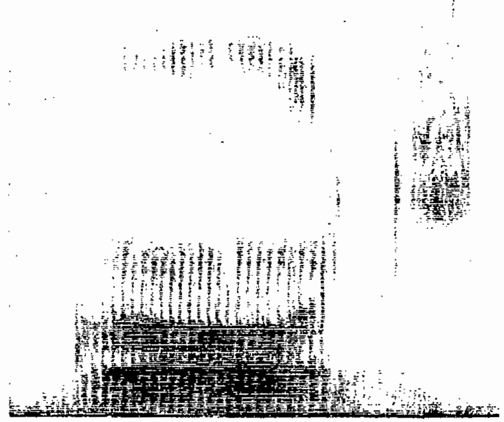
i. Drawled. – N.



ii. Drawled – Bil.

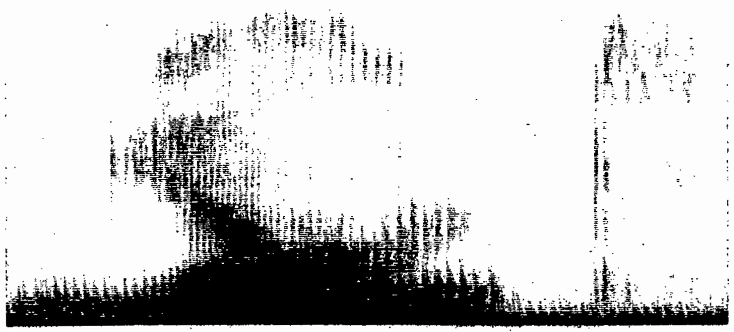


iii. Gorged – N.

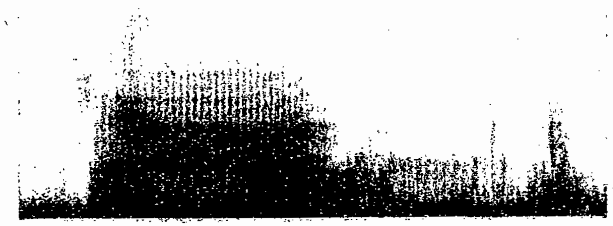


Gorged-R. iv.

vii. Môte.– Aft.

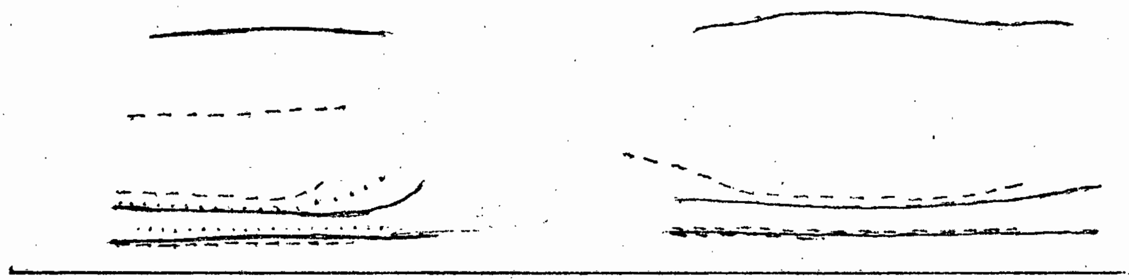


v. Jaunt – N.



vi. Jaunt – Bil.

Figs. D.1.2. (10: i–vii).



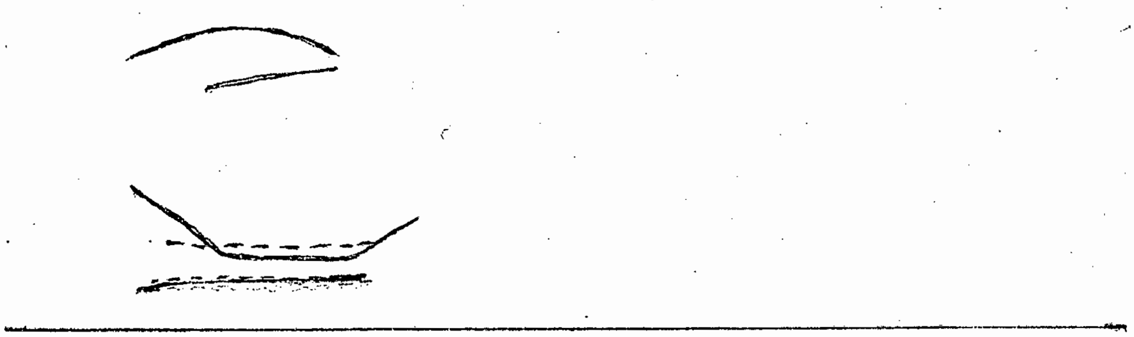
viii

Gorged

Mδre. (Afr.)

ix

Drawled



x

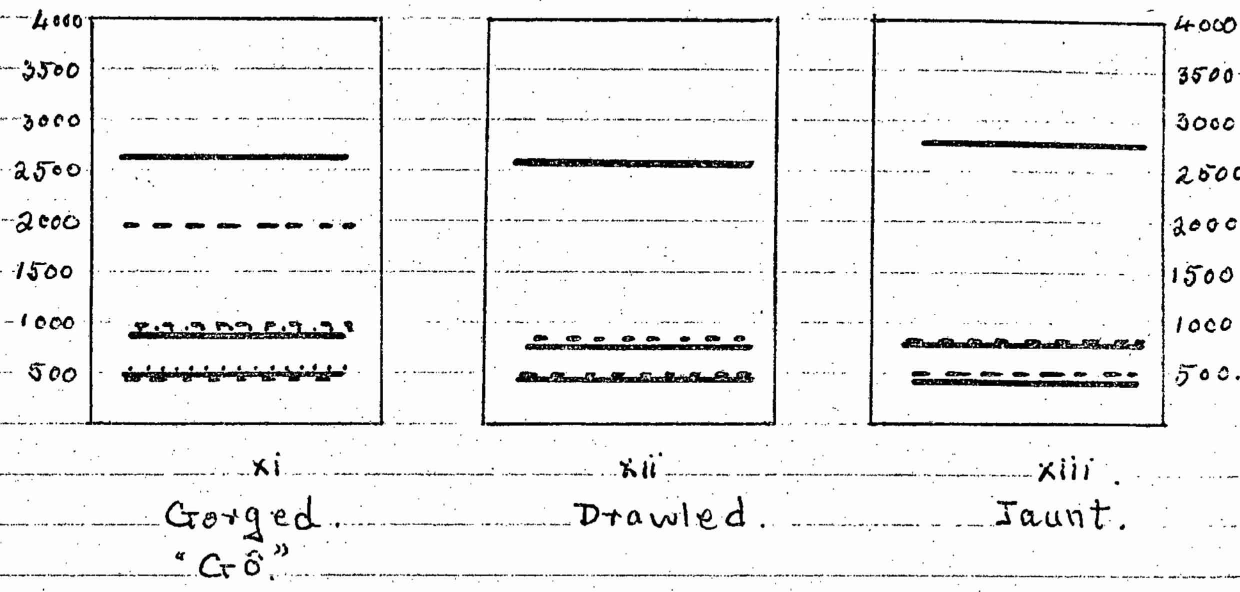
Jaunt.

Figs. D1.2. (10: viii – x)

Norm : ————

Bil. : - - - - - -

Afr. : . . . . . .



Figs: D. 1. 2. (10: xi – xiii)

Norm: ————

Bil: - - - - -

Aft: ....

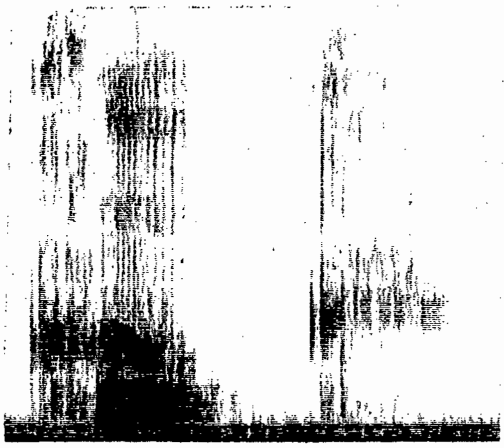
sufficient specification to identify back vocoids. Constant F1 with higher F2 represents a raised hump of the tongue and a closer articulation.

The resonance bar tracings of the Afrikaans word "môre", uttered by the Afrikaans native informant, spectrum D.1.2. (10: vii), have been superimposed on the tracings of "gorged" Fig. D.1.2.(10: viii).It is significant that there is little difference between the relative F1, F2 distribution. The higher F2 indicates closer lip-rounding. The spectrograms reveal longer duration for all the test words and more distinct division of the phonetic segments in the articulation of the Norm. An interesting feature in the spectrum of the Bilingual's "drawled" is the pronounced voicing of /r/, evident in the resonance modulations between (4) and (5) and in the voice bar (e). Both proceed from the clear spike marking the explosion of /d/.

Summarily: spectrographic evidence reveals slight differences in the quality of the vocoids as articulated by the Norm and A.-E. Bilinguals. The main allophone is a closer variant with closer lip-rounding: on the vocoid diagram in the back low-mid to high-open area.

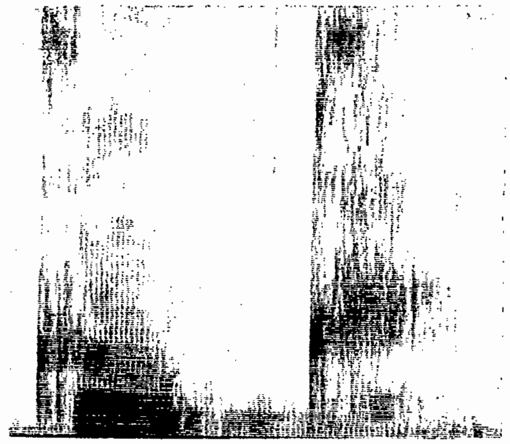
Vocoid /ω/

The articulatory correlates of the spectrographic analysis, Figs. D.1.2.(11: i-vi), may be stated briefly. The tracings, Figs. D.1.2.(11: viii-x) display the resonance bar distribution of the words "cook, couldn't" and "pull". The relative resonance cavity correlates are reflected by the patterns of "cook" and "pull". F1 and F2 are consistently at lower frequencies at similar relative locations. The evidence is



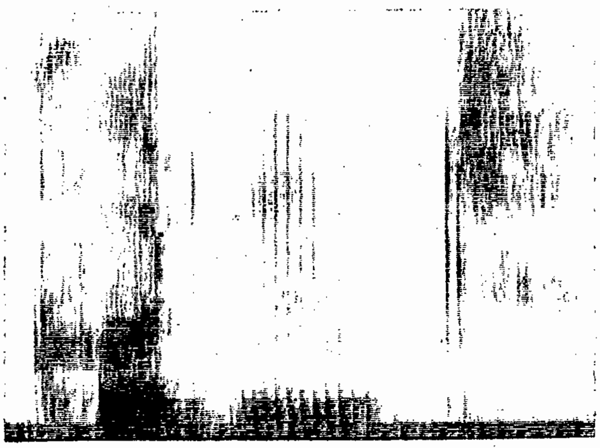
i.

Cook – N.



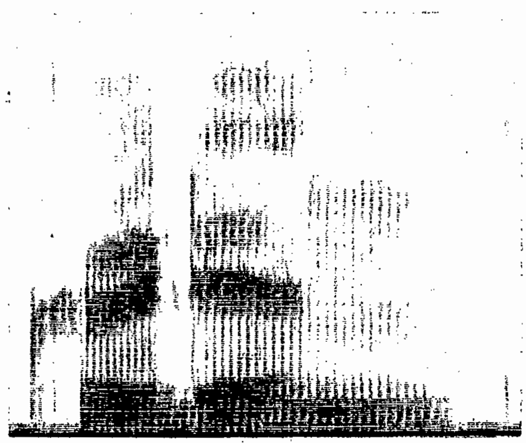
ii.

Cook – Bil.



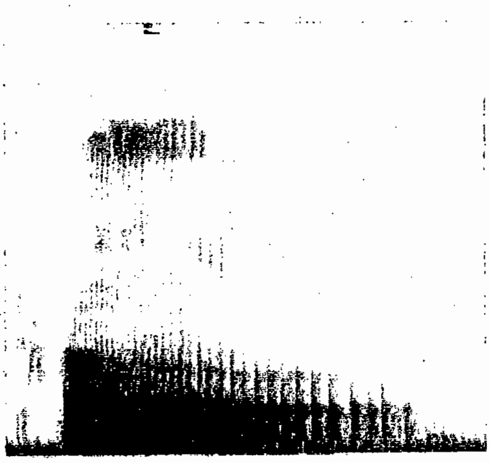
iii

Couldn't – N.



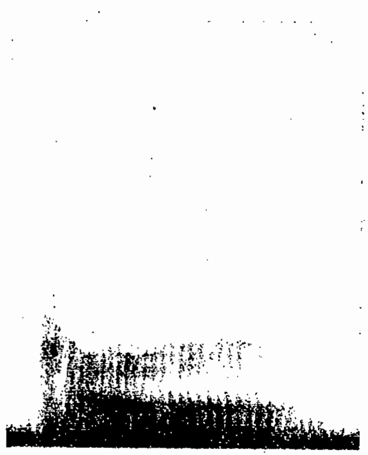
iv.

Couldn't – Bil.



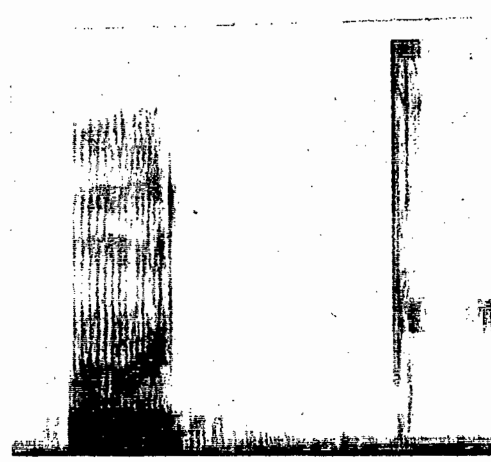
v.

Pull – N.



vi.

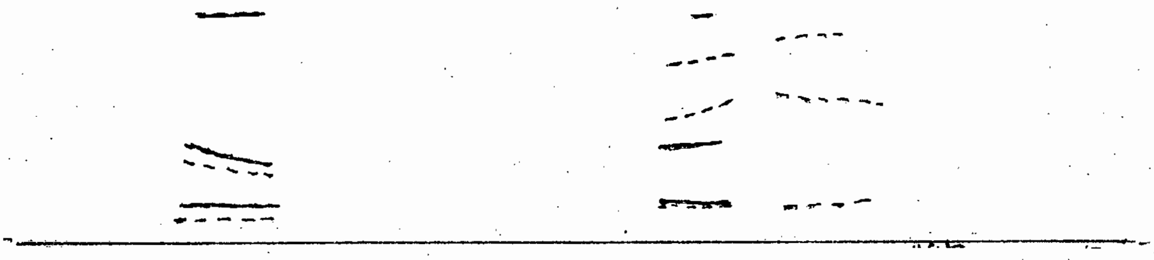
Pull – Bil.



vii.

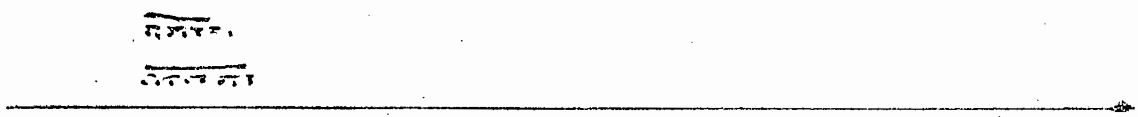
Hoed – Afr.

Figs. D.1.2. (11: i – vii).



viii
Cook

ix
Couldn't



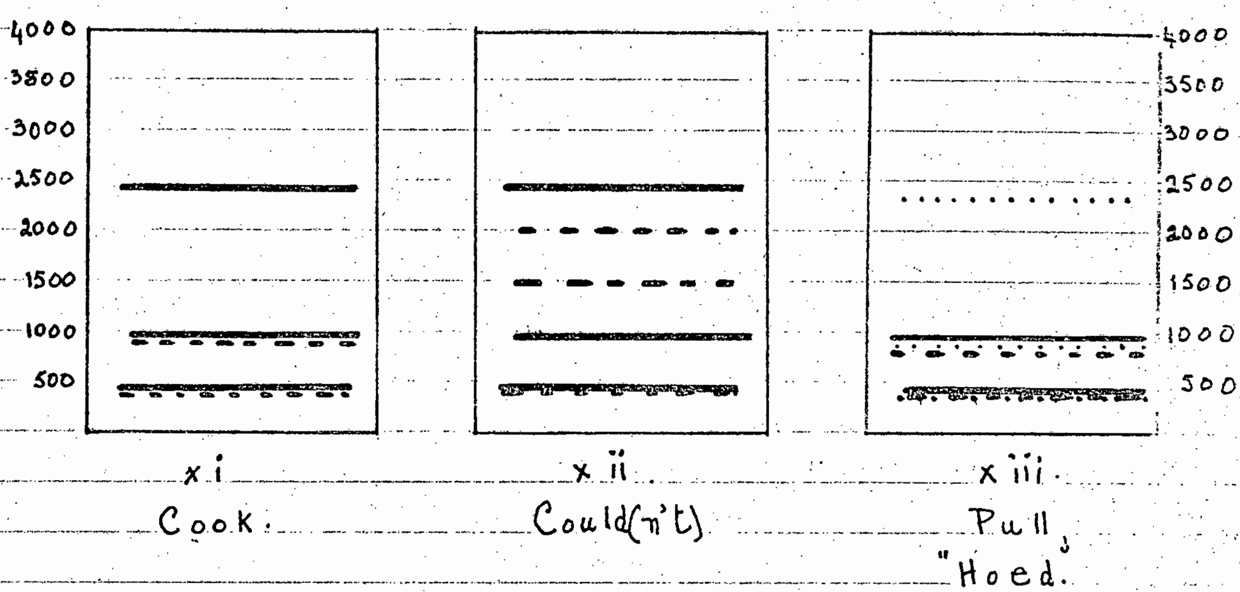
x
Pull
Hoed (Aft.)

Figs. D 1. 2. (II : viii – x)

Norm : ————

Bil. : - - - - - -

Aft. : · · · · · ·



Figs: D. 1.2. (II: xi – xiii)

Norm : ————

Bil : - - - - - -

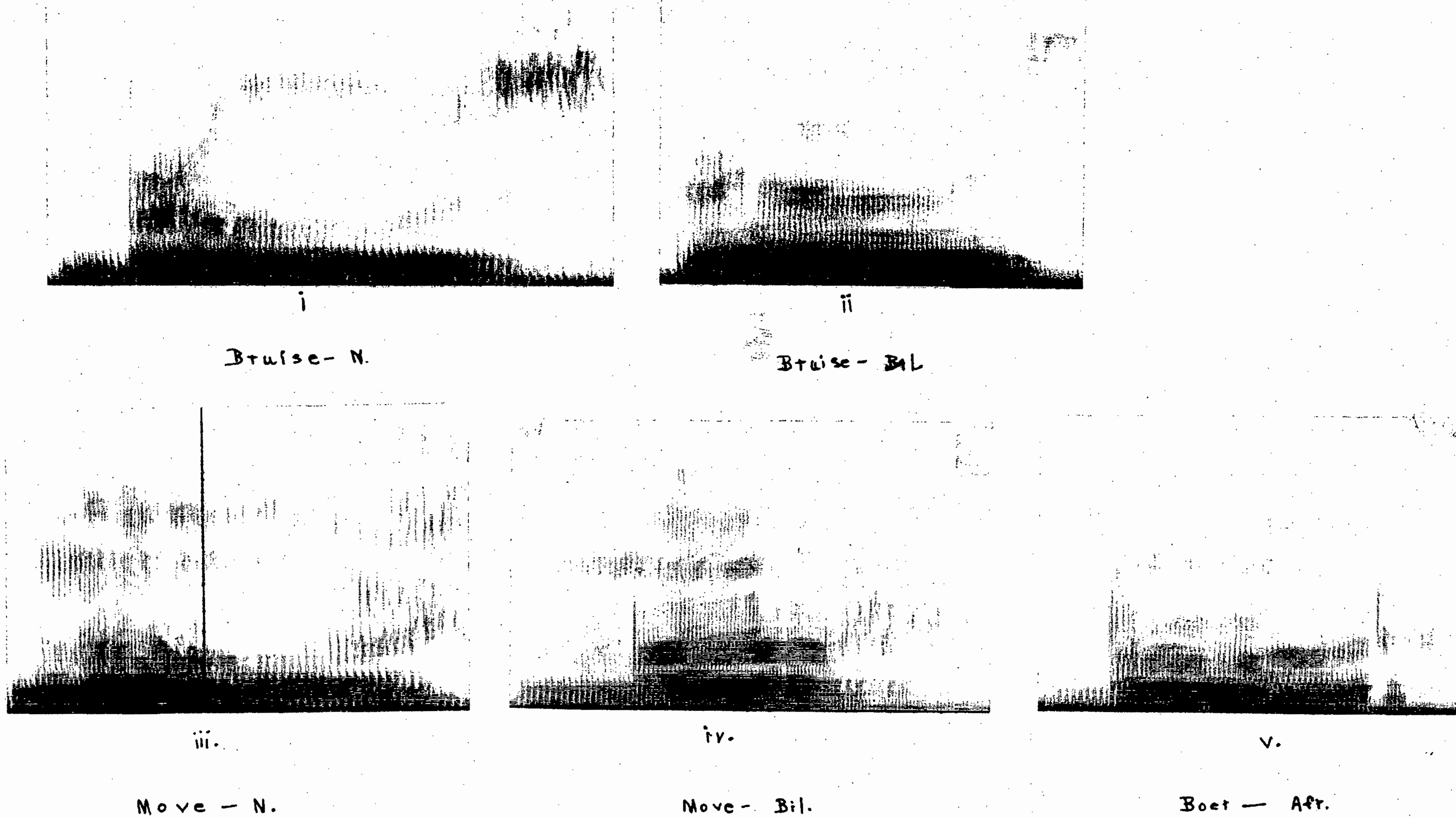
Afr : ··········

conclusive. The A.-E Bilingual's /ω/ is a retracted allophone characterized by closer lip-rounding, reflecting an articulation in the back advanced mid-close area of the vocoid diagram. The dotted line tracings superimposed on those of "pull", Fig. D.1.2. (11: x) display the location of F1 and F2 of the Afrikaans word "hoed", articulated by the Afrikaans native informant. Both F1 and F2 are at lower frequencies than those of the Norm, substantiating the influence of the native linguistic habits of the A.-E. Bilingual upon his rendition of English /w/. The quality is neither that of the Norm, nor that of a similar Afrikaans phoneme.

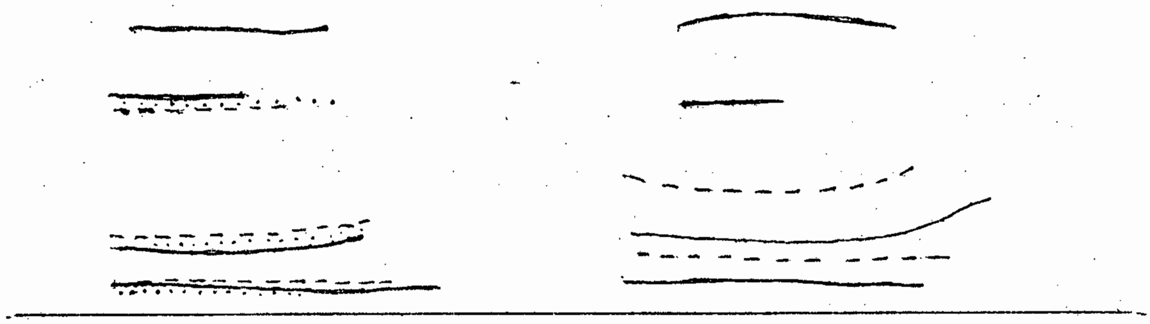
Reference should be made to the spectrogram and resonance bar tracings of "couldn't", by a Bilingual subject, Figs: D.1.2.(11: iv and ix) respectively. The spectrogram reveals that the second syllable is pronounced with greater prominence than the first. The extraordinary feature, however, is that the formants of the two syllables are distributed at almost similar frequencies: the large F2 - F1 separation and F3 - F2 affinity, is the pattern of a fronted vocoid. Phonemically the articulation may be transcribed /kəd'ənt/. This articulation obviously represents either an idiolectal variant or an affected fronted articulation of /ω/ with neutral or spread lips.

Vocoid /u:/

Vocoid /u:/ is represented by the spectrograms of the words "move" and "bruise", Figs. D.1.2.(12: i-iv). The F1, F2 pattern of the resonance bar tracings, Figs. D.1.2.(12: vi, vii) displays a consistent relative distribution: both F1 and F2 of the A.-E. Bilinguals are at higher frequencies than those of



Figs. D.1.2. (12: i- v).



vi
Move
Boer (Afr.)

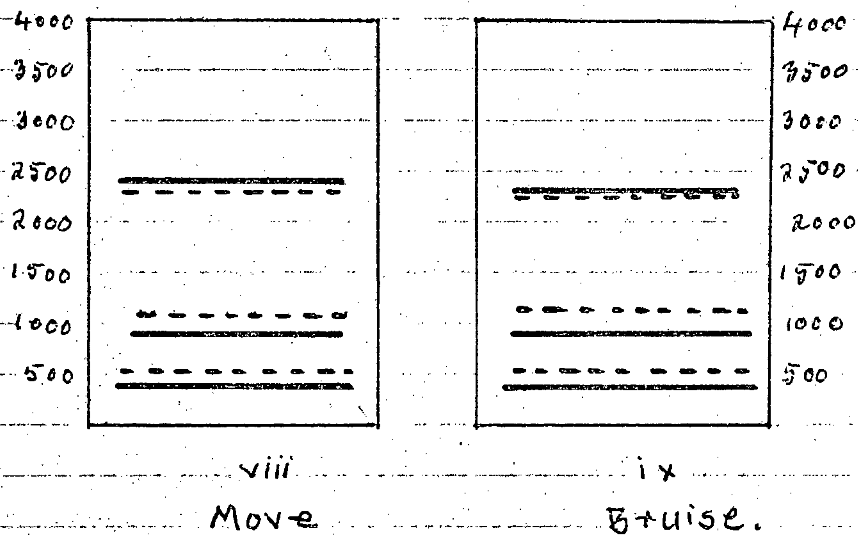
vii
Bruise

Figs. D1.2. (12: vi - vii)

Norm : ———————

Bil. : - - - - -

Afr. : . . . . . .



Figs: D. 1. 2. (12: viii, ix).

Norm: ————

Bil: - - - - - - -

the Norm. In an articulation of a front back opposition, the more retracted member has the lower F1, F2 location. Thus the A.-E. Bilingual has an advanced articulation in contrast with that of the Norm. Lip-rounding, in like manner, lowers formants whereas lip-spreading raises both F1 and F2 of back vocoids . The Bilingual's vocoid has the quality of a somewhat fronted articulation with less closely rounded lips; i.e. in the advanced back high-close area of the vocoid diagram.

The resonance bar tracings of the Afrikaans word "boer", spectrum D.1.2.(12: v), are superimposed in dotted lines on the pattern of "move", Fig. D.1.2.(12: vi). F1 is almost at the same frequency as that of the Norm, but F2 is higher than that of the Norm. The pattern of the difference between the formant distribution of the same utterance by the Norm and an A.-E. Bilingual on the one hand and an utterance of a similar Afrikaans vocoid on the other, has been repeated so consistently, that it may be stated that the quality of the vocoid of A.-E. Bilinguals is neither that of the Norm nor that of a similar Afrikaans Vocoid, in structures that are comparable.

Diphthongal Glides.

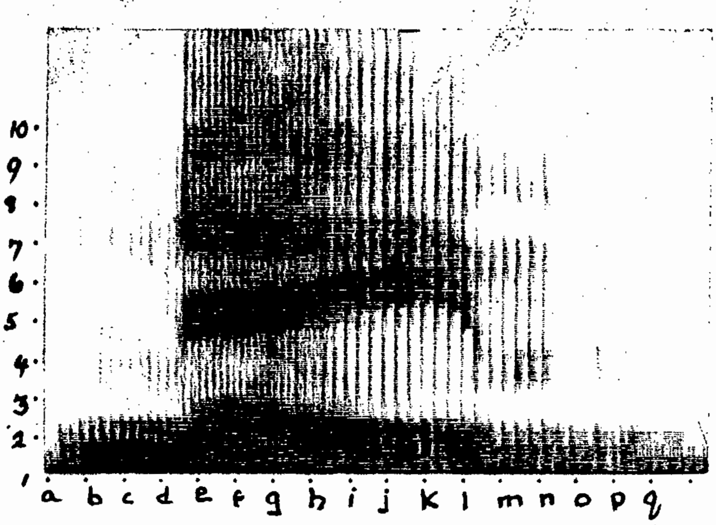
As already indicated in Section B, diphthongs have been variously described. The object of the acoustical analysis is to compare, on the basis of the evidence of the spectra, the quality of the articulation of diphthongs of A.-E. Bilinguals with that of the Norm. In effect this implies establishing the relative points at, or preferably areas, in which the vocoid element of the glide begins and the areas in which the glide terminates or the point towards which the glide extends.

Investigators have not yet located the exact points of inception and termination of diphthongal glides. The polar points are referred to in terms of approximations, but are sufficiently exact to reflect utterances of differing quality.

The diphthongal glides will be referred to as "vocoids".

Vocoid /eɩ/

The spectrograms of "name" and "raised", Figs. D.1.2. (13: i-iv) and the tracings of the resonance bars, Figs. D.1.2. (vi and vii), display the analysis of the articulation of the Norm and two A.-E. Bilingual subjects. The spectrograms of the Bilinguals reveal pronounced breathiness in the articulation; frictional modulations are superimposed on the entire duration of the articulation. The upper resonances are diffuse, but the formants can be distinguished and traced. The resonance bars of the Norm are clearly defined. The formant patterns are reflected in the tracings. There is little difference in the F1 location; but the transitions reflecting arrangement of the vocal resonances and marking the phonetic segments of the utterance, are indicative of the variations in the glides. The vocoid element of the diphthong begins at the hump of F1, (e) to (g), in the spectrum of the Norm and (d) to (f) in the spectrum of the Bilingual, Figs. D.1.2.(13: i and ii). For both "name" and "raised" F2 at the inception of the vocoid element is at a lower frequency than that of the Norm, as indicated by the resonance bar tracings; but, in the course of the utterance, it rises to terminate at a higher frequency than that of the Norm, between (6) and (7) as against (5) - (6) of the Norm. F3 of the vocoid element of "raised", Fig. D.1.2.

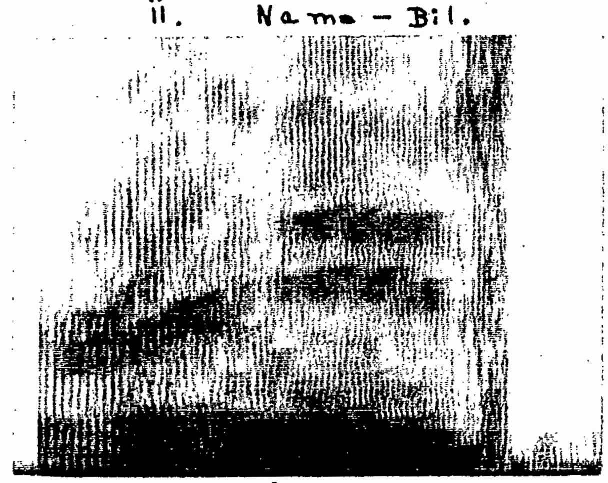


i. Name – N.

ii. Name – Bil.

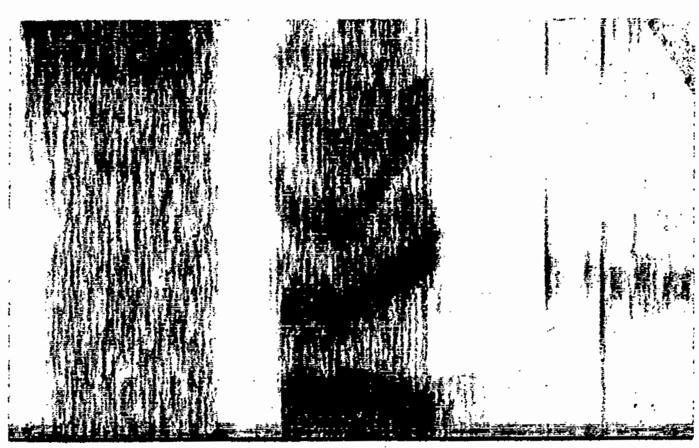
iii.

Raised-N.



iv.

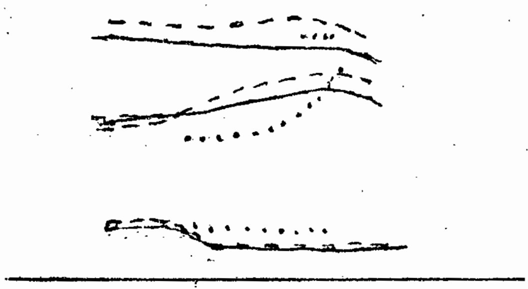
Raised – Bil.



v.

St+yK – Aft.

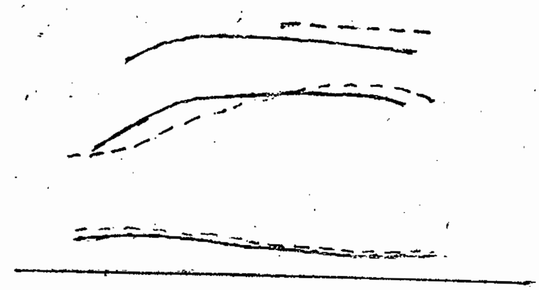
Figs. D.1.2. (13: i – v).



vi

Name

stryk (Aft.)



vii

Raised.

Figs. D1.2. (13: vi – vii)

Norm. : ————

Bil. : - - - - - -

Aft. : . . . .

(13: iv), cannot be located with certainty, but the resonances of the glide element are higher, in both utterances, than those of the Norm.

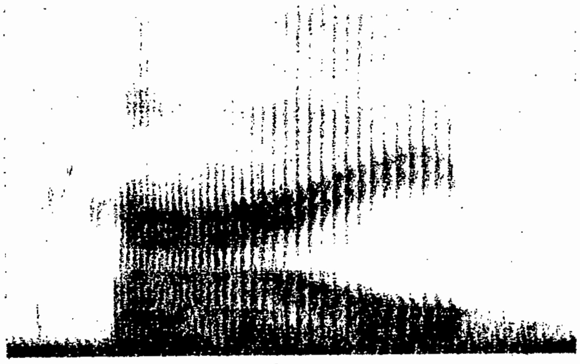
The dotted line tracings superimposed on the tracings of "name", Fig. D.1.2.(13: vi), display the pattern of the Afrikaans word "stryk" by the Afrikaans native informant. Although the word "stryk" is a short form, the spectrum clearly depicts the phonetic segments which, again, reflect the re-arrangement of the vocal resonance cavities. F1 and F2 of the vocoid element of the diphthong of the Bilingual subjects and of the informant are in closer affinity than those of the Norm. The regular F pattern of the Bilinguals reflects a lax, centralized articulation and the low F1, together with a large F2 - F1 separation and close F3 - F2 affinity, is the typical spectral correlate of a close front articulation. In contrast, the Norm's spectrum displays less symmetry at the beginning of the vocoid bars with a closer F3 - F2 location than the Bilingual's. This arrangement is the acoustic correlate of a fronted beginning of the vocoid. The glide of the Norm stops at a lower frequency than that of the Bilinguals and at a comparative retracted area of articulation as reflected by the relative F2, F3 distribution.

Summarily, then, the articulatory correlates of the spectrographic evidence are: the diphthong of the Norm begins in a mid-mid front area and glides towards a retracted high-mid front area. That of the A.-E. Bilinguals begins at a mid or high central area and terminates at a mid- or high-close front area of diagram Fig. D.1.2.(1).

Vocoid /aɩ/

Spectrograms D.1.2.(14: i-vi) and the resonance bar tracings, Figs. D.1.2.(14: viii-x), display the analysis of the words "tied, wives" and the triphthong "tired". As with all resonance bar tracings, an attempt has been made to equate them in time as near as possible at the inception of the vocoid phonation. The tracings of the Afrikaans word "saai", articulated by the Afrikaans native informant, spectrum D.1.2. (14: vii), have been superimposed on the tracings of "wives", Fig. D.1.2.(14: x). The symmetry in the relative distribution of the formants is remarkable. All utterances reveal a somewhat raised F1 (700 to 800 Hz), comparative close F2 - F1 affinity and a wider F3 - F2 separation. This configuration is that of a low central vocoid. In "tied" and "tired" the vocoid is closer; in "wives" lower F1 represents a retracted articulation. The transitions revealed by F2 are clearly observable. The relative arrangements of the acoustical resonances at the termination of the glide are unmistakable. The Bilinguals' F2 and F3 are at higher frequencies than those of the Norm, denoting a close front vocoid. F2 and F3 of the Norm are appreciably lower; the acoustic correlate of a retracted area of articulation. The pattern of the bars of the Afrikaans word "saai" serves more than a statistical significance. It accords with the F pattern of the Bilingual subjects with this difference that the terminal point of the glide is closer.

An interesting feature in the manner of articulation is displayed in the spectrograms of "tied", Figs. D.1.2. (14: i and ii). The /a - ɩ/ transition of F1 of the Norm is a



i.

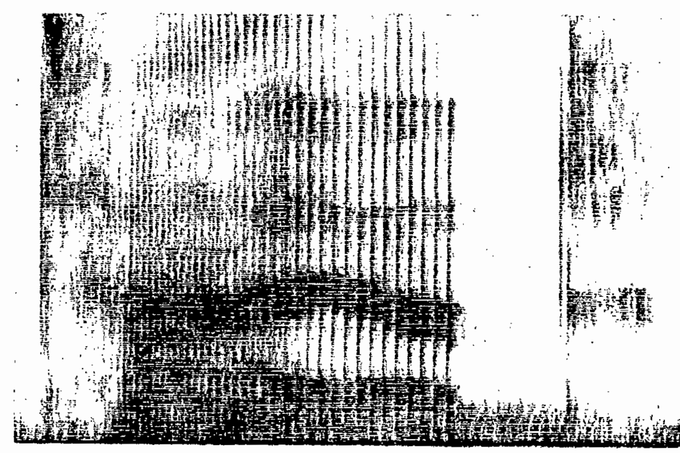
Tied - N.

ii.

Tied - Bil.

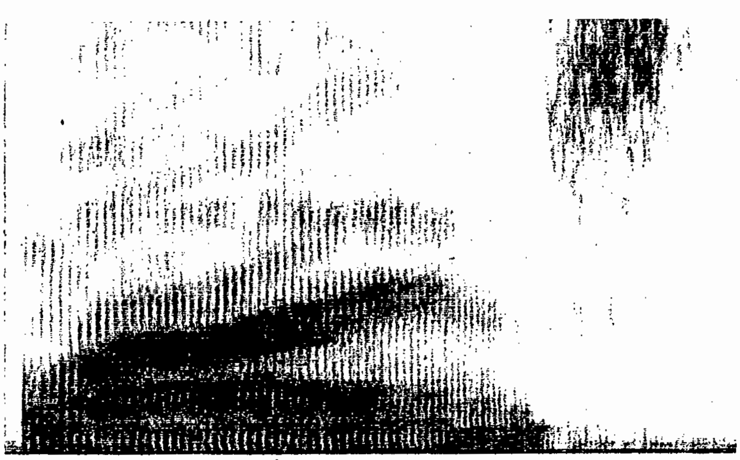
iii.

Wives—N.



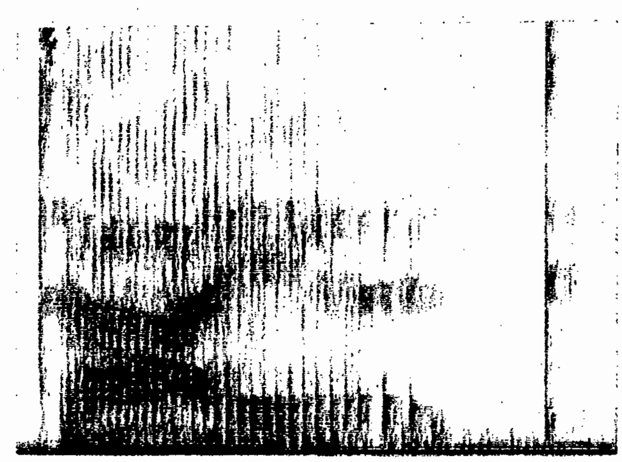
v.

Tired — N.



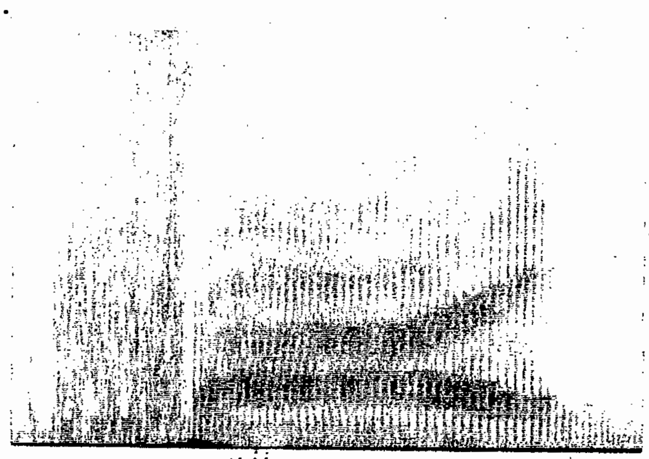
iv.

Wives- Bil.



vi.

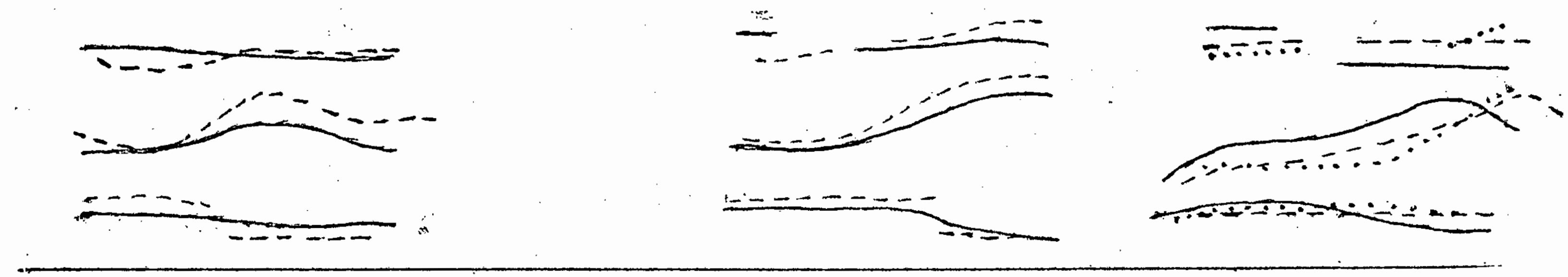
Tired - Bil.



vii.

Saai - Afr.

Figs. D1.2.(J4: I-VII)



Figs. Dl. 2. (14: viii – x)

Norm : ————

Bil. : - - - - - -

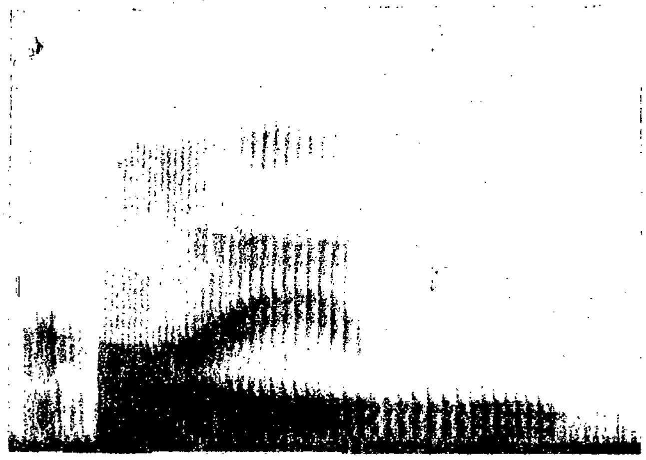
Afr. : ··········

gradual down-turn reflecting a smooth change in the rearrangement of the vocal resonance cavities, F1, and, indeed, F2 and F3 of the Bilingual are characterized by an abrupt break at the rearrangement of the articulatory organs for the /a - ɩ/ transition.

The difference in the quality of the /aɩ/ diphthong between the articulation of the Norm and that of A.-E. Bilinguals can be summarized as follows: The vocoid of the Norm begins in a fronted /a/ area, that of the Bilinguals somewhat closer. An initial /w/ glide conditions lip-rounding and a retracted hump of the tongue. The glide of the Bilinguals terminates in a mid- or high-close front area and that of the Norm in a high-mid retracted area.

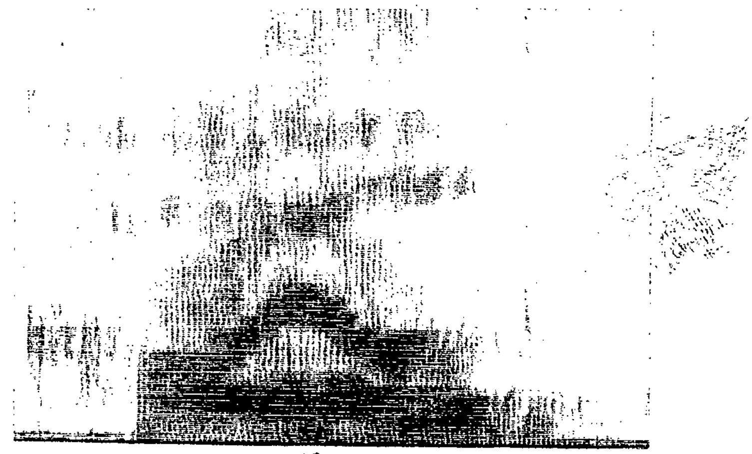
Vocoid /ɔɩ/

Test words for comparing the quality of diphthong /ɔɩ/, are "coiled, poison" and "voice", Figs. D.1.2.(15: i-vi). The resonance bar tracings, Figs. D.1.2.(15: viii-x), reveal regularity in the relative F patterns. The difference in the frequency location of F1 is negligible. The relative location of the vocoid element of the diphthong is consistent. The low F1 position, close F2 - F1 separation and large F3 - F2, are the pattern of a back vocoid in the mid-open area. The termination of the glide element of the diphthong reflects similar relative vocal resonance cavities, as portrayed in the resonance bar tracings. The configuration is a low F1, (about 500 Hz), wide F2 - F1 separation and close F3 - F2 location. This is the typical arrangement of a close front articulation. The higher F2, F3 positioning in the Bilinguals'



i

Coiled.— N.



ii.

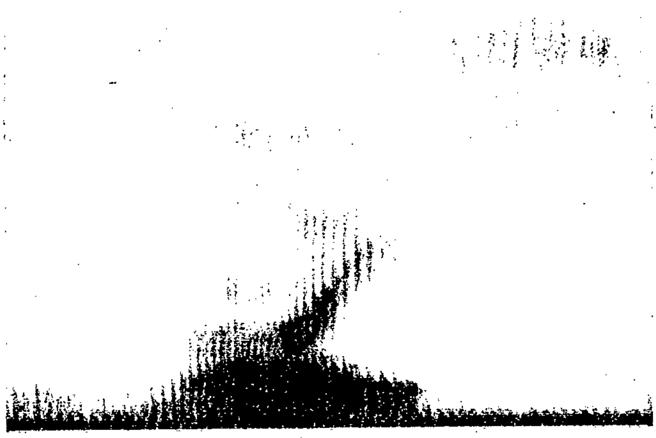
Coiled — Bil.

iii.

Poison—N.

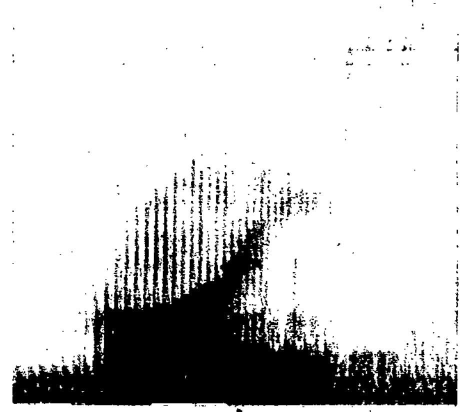
iv.

Poison— Bil.



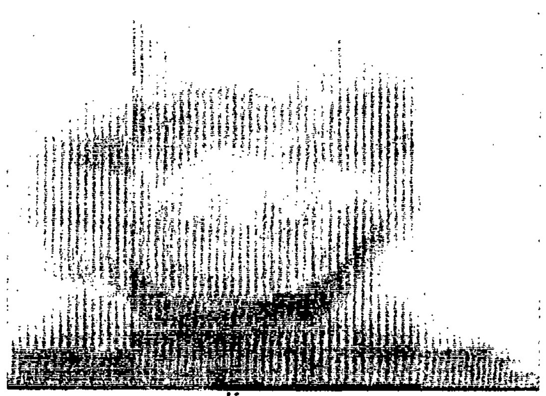
v.

Voice—N.



vi.

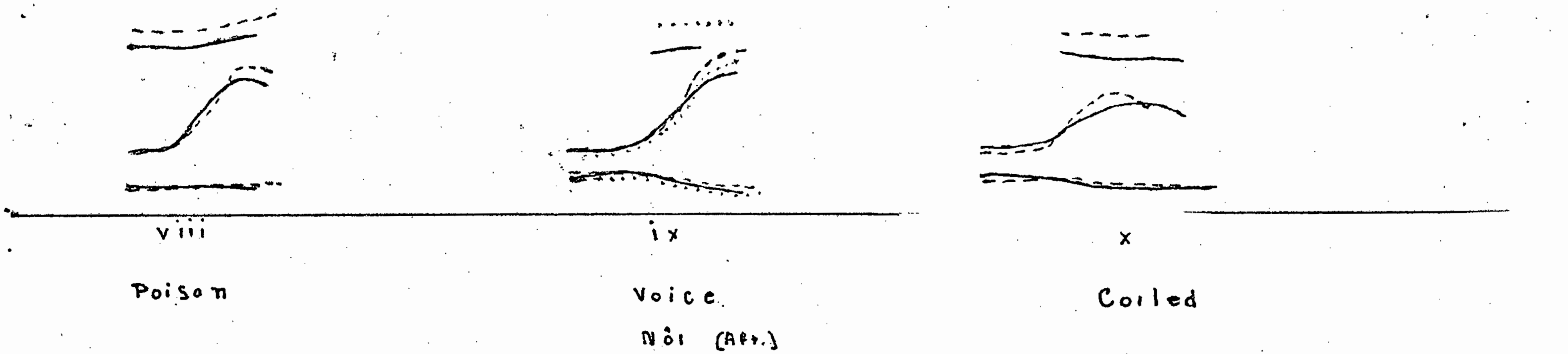
Voice-Bil.



vii.

Nôi — Afr.

Figs. D.1.2.(15: i-vii



Figs. Dl. 2. (15 : viii – x)

Norm. : ————

Bil. : - - - - -

Aft. : ·······

spectra likewise represents a close front articulation. That of the Norm at a lower frequency reflects a retracted terminal area by comparison.

It will be observed that the F2, F3 distribution of both spectra of "coiled", Fig. D.1.2.(15: i and ii), is appreciably lower than those of "poison" and "voice". This feature has been observed consistently in contexts in which /l/ succeeds a vocoid. Before post-vocalic /l/, /ɩ/ is absorbed into a retracted glide on to /l/. Retraction of the tongue causing a larger oral and somewhat diminishing pharyngeal resonance chamber has the acoustic effect of lowering F1 and F2.

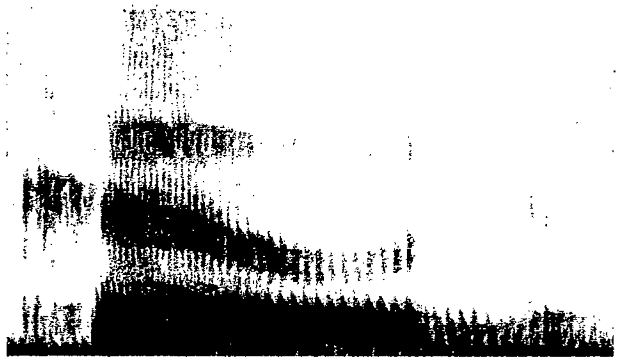
The pattern of the distribution of the three glides to the close front area, that have been discussed, is the same. The glide element of the A.-E. Bilinguals terminates in a mid-close front area and that of the Norm in a high-mid retracted area.

The resonance bar tracings of the spectrum, Fig. D.1.2. (15: vii), of the Afrikaans word "nôi", as said by the Afrikaans native informant, are superimposed on those of "voice", Fig. D.1.2.(.5: ix). The pattern is similar to those of the tracings of the other words: the vocoid element begins in a back low-mid area and the glide terminates in a mid-close front area.

<u>Vocoid /əω/</u>

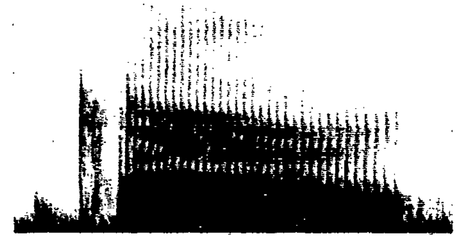
Spectrograms D.1.2.(16: i-vi) display the analysis of the words "code, loaves" and "robe" ("robes" by the Norm). Resonance bar tracings, Figs. D.1.2.(16: viii-x), present the patterns of formant distribution. The spectrograms reveal the rearrangement of resonance cavities and the shifts to the component segments of the diphthongs. The transitions in the spectra of the Norm are clearly defined, but less clearly resolved in the spectra of the Bilingual subjects, with the exception of "robe", Fig. D.1.2.(16: vi) in which the downward slope of F2 marks the transition to the glide of the diphthong. In the spectrum of "loaves", Fig. D.1.2.(16: iv), F1 and F2 have a very slight downward curve. The diphthong has virtually been monophthongized: compare the pronounced slope of F1 and F2 of the Norm's "loaves", Fig. D.1.2.(16: iii). The quality of the vocoid element of the diphthong is about the same as that of the Norm, which is that of a mid central area as revealed by the spectrogram. The Norm's tracings display the shift to the glide element of the diphthong towards an advanced low-close back area. The spectrum of "code" of the Bilingual, Fig. D.1.2.(16: ii), reveals the same tendency to monophthongize the diphthong. The parallel resonances may, however, also be the result of co-articulation of neutral or unrounded lips. The shift from a mid-central to a retracted area of articulation is slight.

The resonance bars of the Afrikaans word "kou", spectrum D.1.2.(16: vii), as uttered by an Afrikaans native informant, are different in that the shift to a retracted terminal point of the glide is distinctly indicated by the down slope of F2. The spectrum of "robe" Fig. D.1.2.(16: vi) reveals a distinct shift in the glide element of the diphthong to terminate in an area reflecting a more retracted and closer articulation than that of the Norm.



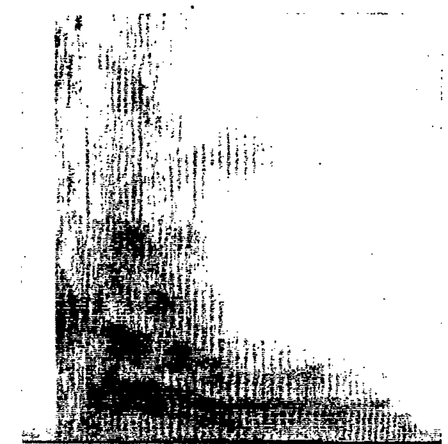
i

Code – N.



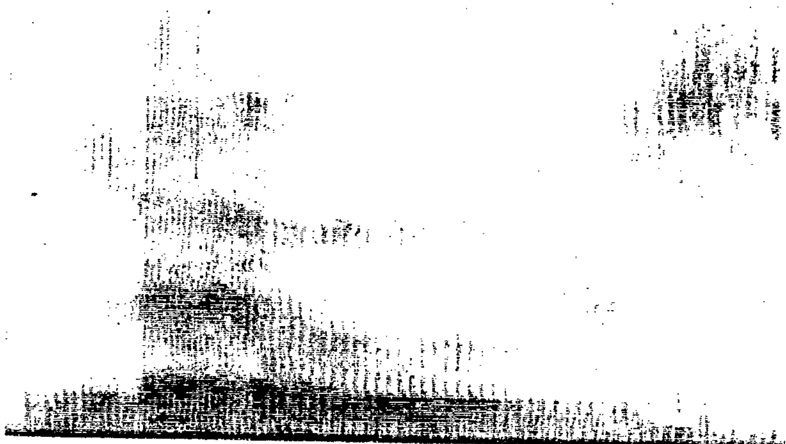
ii.

Code – Bil.



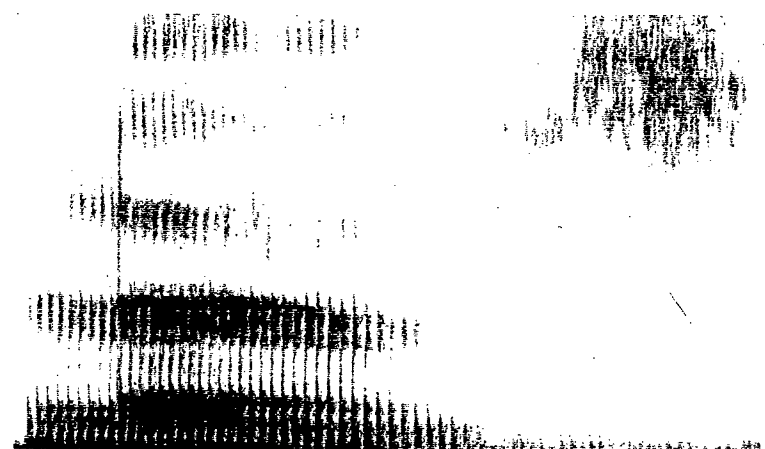
vii

Kou – Afr.



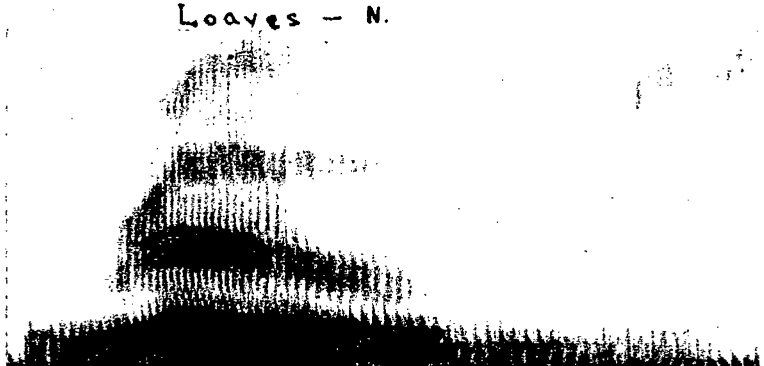
iii.

Loaves – N.



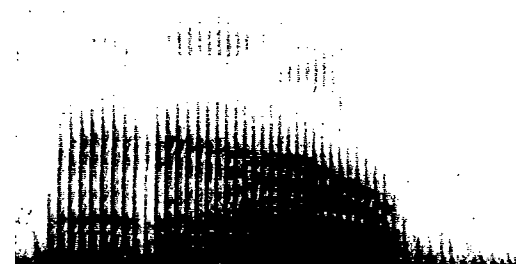
iv.

Loaves – Bil.



v.

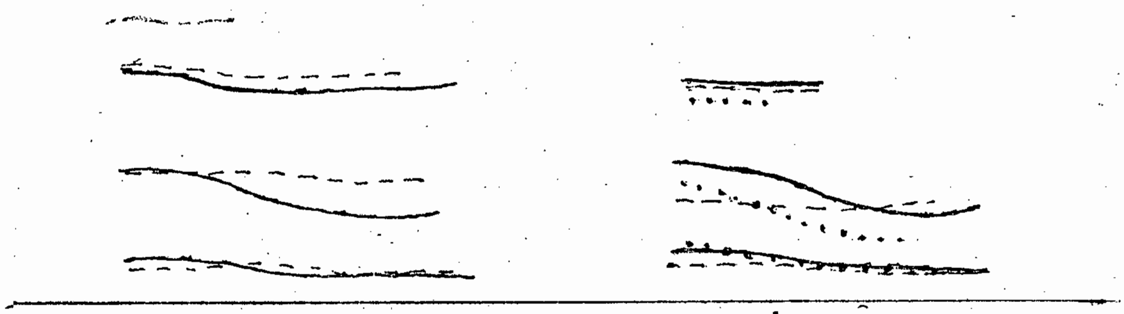
Robes – N.



vi.

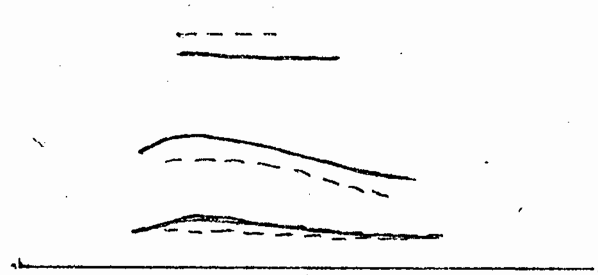
Robe – Bil.

Figs. D.1.2. (16: i–vii).



viii
Loaves

ix
Code
Kou (Apr.)



x
Robes

Figs. Dl. 2. (16: viii – x)

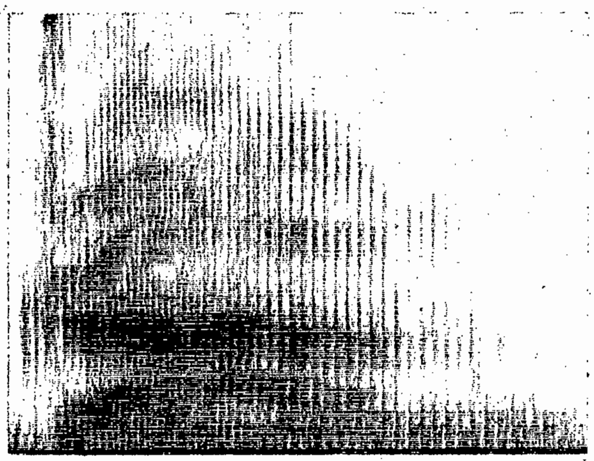
Norm :
Bil. :
Apr. :

The testimony of the spectrograms reveals, in effect, two extremes in the variant quality of the /əω/ diphthong by A.-E. Bilinguals: a tendency to monophthongize the diphthong, or to continue the glide element to an area of articulation retracted and closer, relevant to that of the Norm, with probably, a closer degree of lip-rounding. The glide of the Bilingual terminates in an open C8 area =[u̜], and that of the Norm in a centralized C7 area = [ö].

Vocoid /ɑω/

Spectrograms of the words "drown, drought" and "howl", Figs. D.1.2.(17: i-iv), depict the differences in the articulation of the /ɑω/ diphthong. Only the spectrum of the word "drown" displays a comparative analysis of the same word. "Drought" and "howl" were uttered severally by a Bilingual subject and by the Norm respectively. The features of the spectra of /ɑω/ in other contexts are not clear enough for comparative purposes, but the trend revealed by the above three articulations is clear.

The resonance bar tracings of "drown", Fig. D.1.2. (17: v), portray the difference between the acoustic correlates of the vocal resonance cavities. F1 of the vocoid element of the two articulations is located at a frequency of 600 to 700 Hz.F2 - F1 has a distinctly wider separation than that of the Norm. F3 - F2 separation of the Bilingual is slightly smaller than that of F2 - F1, as opposed to the bigger F3 - F2 separation of the Norm. The pattern of the Bilingual's spectrum represents a mid-open front area of articulation, viz. close C4 = [a̠]. That of the Norm represents a centralized low-open

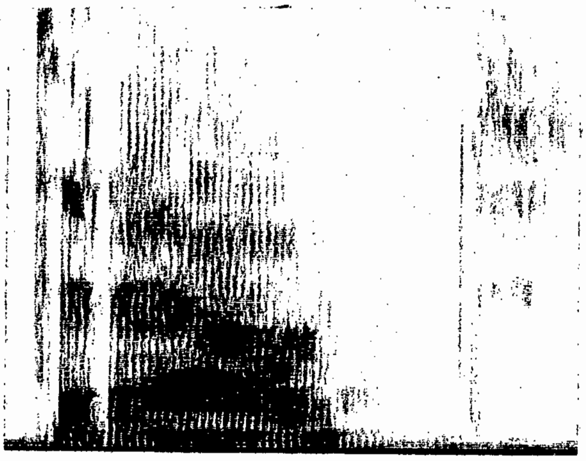


i.

Drown-N.

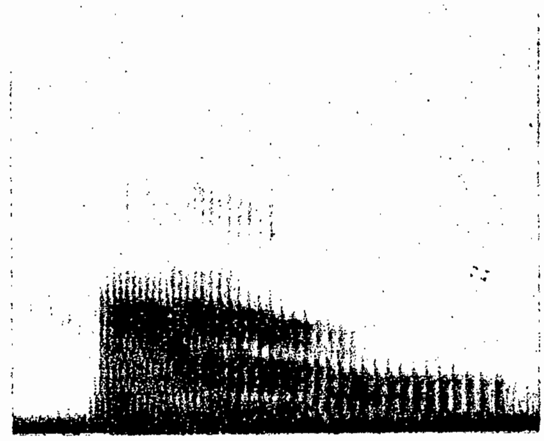
ii.

Drown-Bil.



iii.

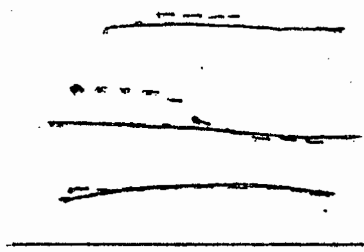
Drought-Bil.



iv.

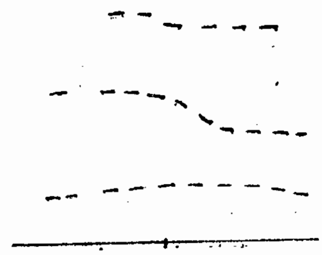
Howl-N.

Figs. D1.2. (17: i-iv).



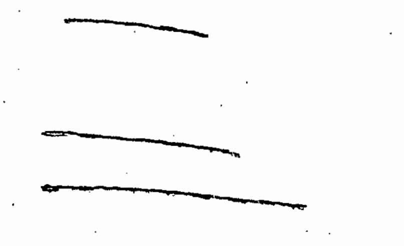
v

Drown



vi.

Drought



vii

Howl.

Figs. D1.2. (M: v–vii)

Norm : ————

Bil. : - - - - -

area for the beginning of the vocoid. F2 of the Bilingual has a distinct down shift indicating the configuration of a close back vocoid. The shift in the articulation of the Norm is slight, Fig. D.1.2.(17: i). A somewhat monophthongized version of the /ɑω/ diphthong is displayed: the transition from an open central to a closer and retracted area is brief.

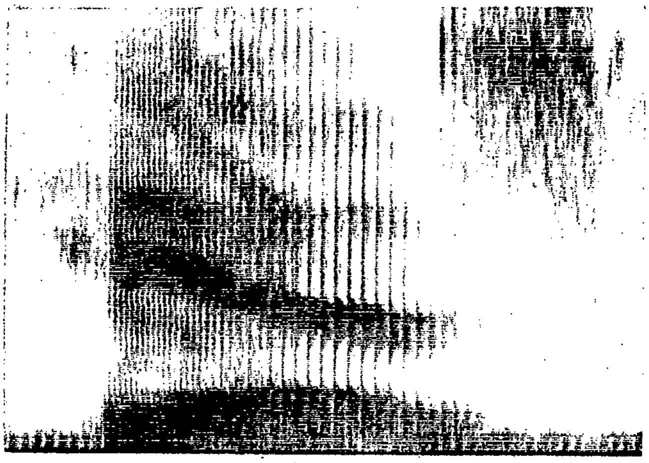
Identical patterns are displayed by the spectra and resonance bar tracings of the Norm's "drown" and "howl", Figs: D.1.2.(17: i, iv, v and vii), and by the Bilinguals' "drown" and "drought", Figs. D.1.2.(17: ii, iii, v and vi).

Spectrographic evidence reveals that the Bilingual begins the /ɑω/ diphthong in a mid-open front area and terminates the glide in a mid-close advanced back area. An auditive transcription of the Bilinguals' rendition, would be, phonemically, /æu/.

Vocoid /ɩə/

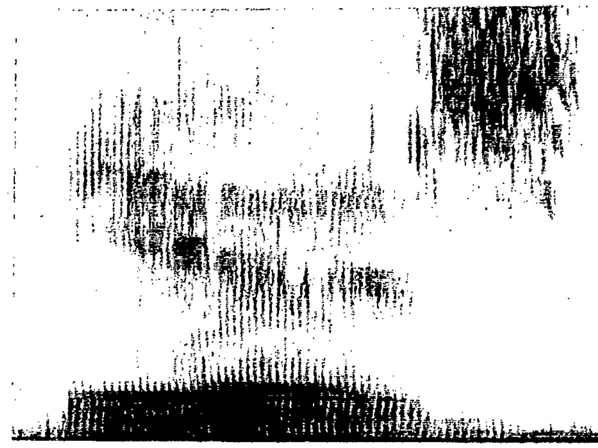
Spectrograms D.1.2.(18: i-vi) reveal the analysis of the words "hears, fears" and "fierce" articulated by the Norm and three Bilingual subjects. The resonance bar tracings, Figs. D.1.2.(18: vii-ix), depict the formant patterns. The relative distribution of the formants is consistent: F1 of the Bilinguals is at a lower frequency and F2 and F3 at higher frequencies than those of the Norm, with the exception of "fierce", Fig. D.1.2.(18: viii), in which F3 of both spectra appears to be located at the same frequency.

The spectra of "hears", Figs. D.1.2.(18: i and ii), reveal a common feature observed in the spectrographic analysis of utterances by Bilinguals: the initial glottal fricative /h/



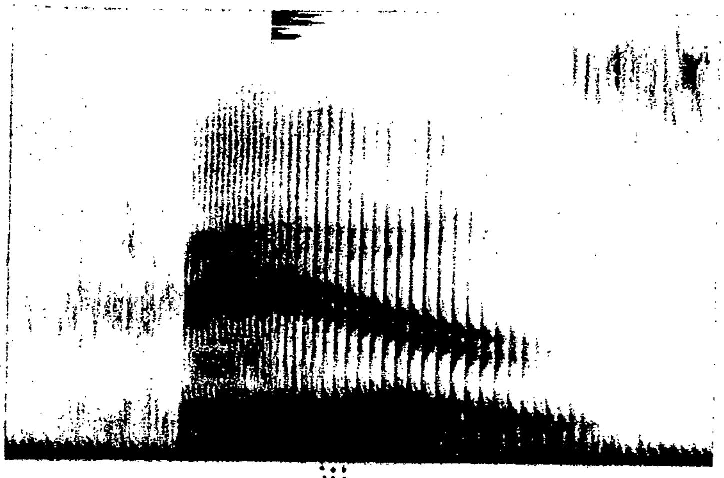
i.

Heats — N.



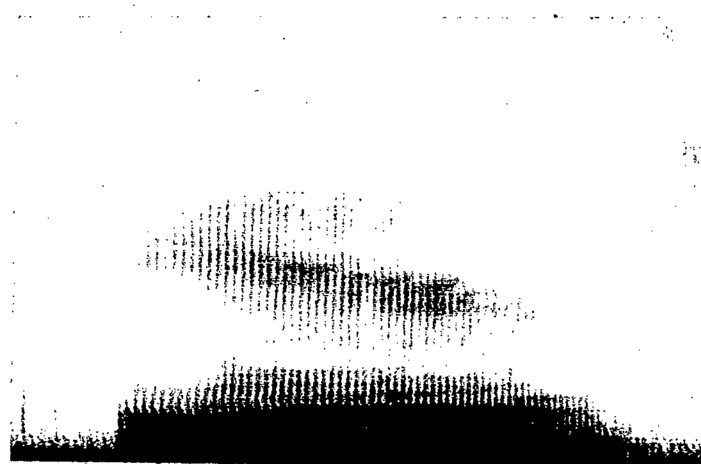
ii.

Heats — Bil.



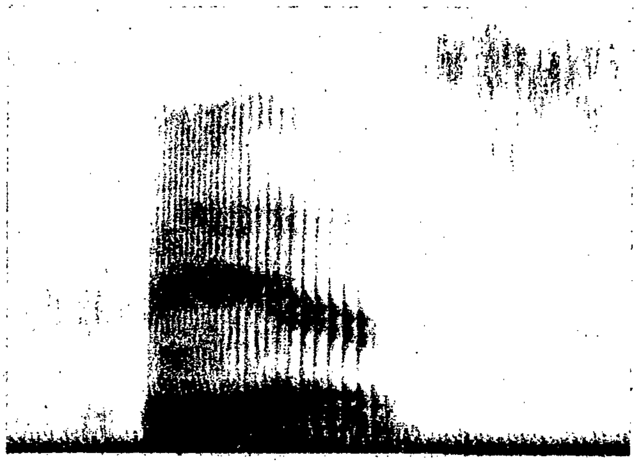
iii.

Feats — N.



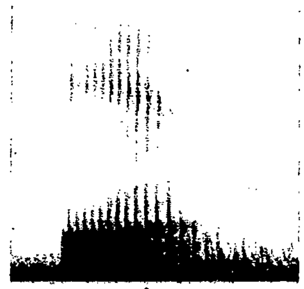
iv.

Feats — Bil.



v.

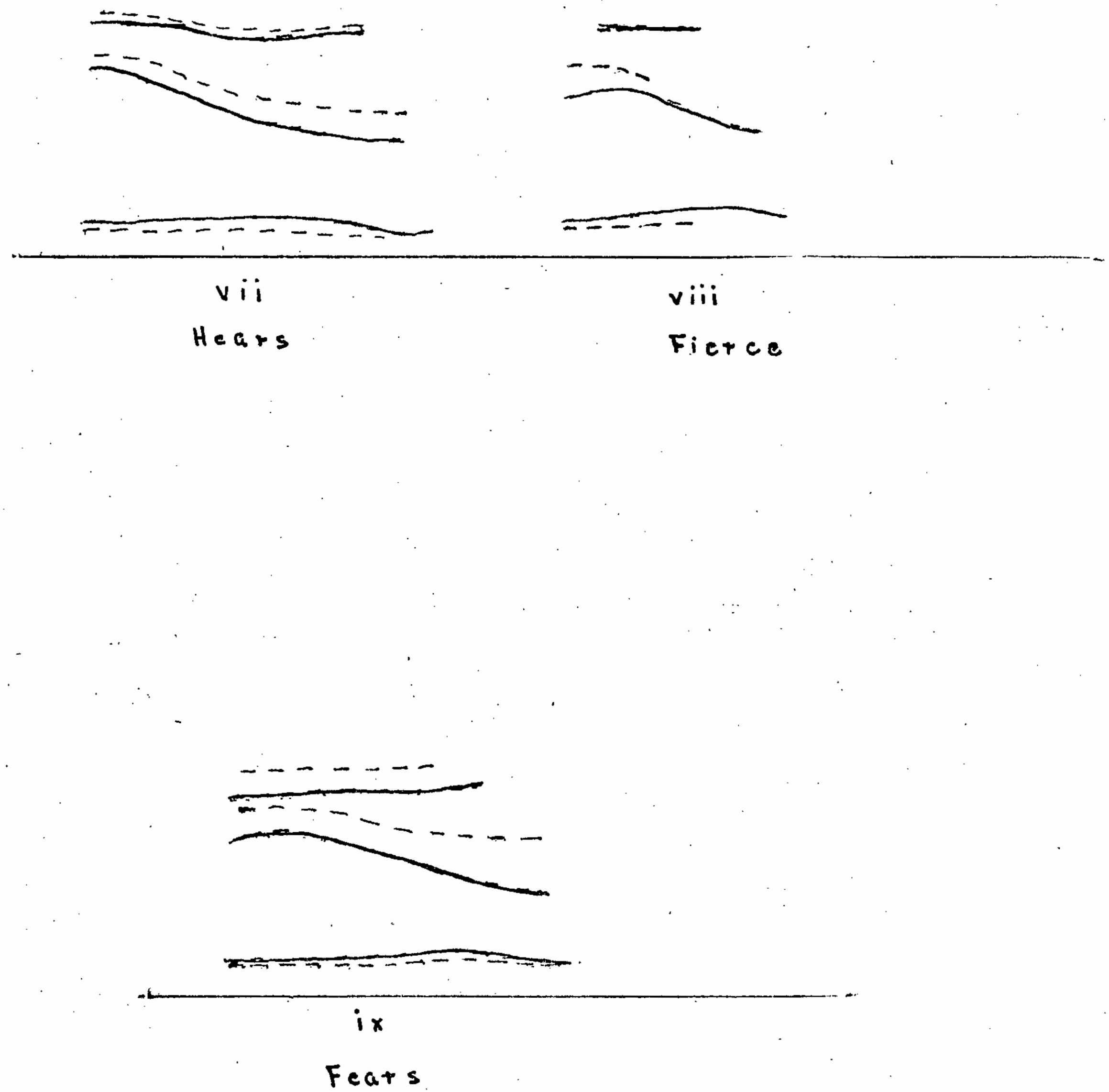
Fierce — N.



vi.

Fierce — Bil.

Figs. D.1.2. (18 : i- vi).



Figs. D1.2. (18: vii - ix)

Norm : ———

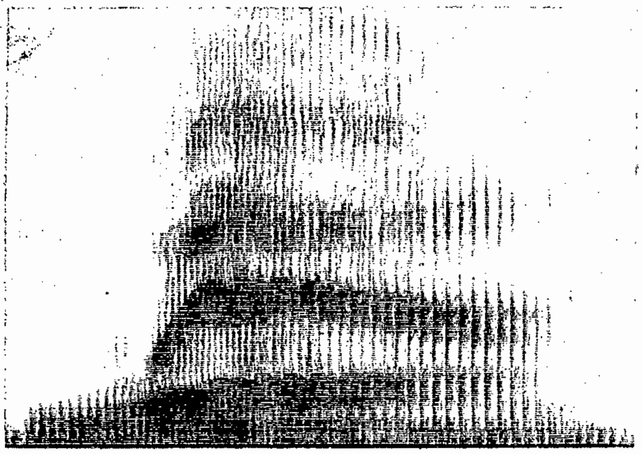
Bil. : - - - - -

is voiced and assumes the quality of the succeeding vocoid. The inception of the vocoid element of the diphthong is clearly indicated by the definition of the resonances. The two distinct phases of the diphthong with a long down-sloping curve denote the transition. The pattern of the resonances, viz. low F1, wide F2 - F1 separation and close F3 - F2 location, is characteristic of a close, front vocoid. The definition of formants and especially the F2 - F1 separation represent a vocoid in the front mid-close area, i.e. open C1 = [i̞]. The pattern of the Norm's formants reflects a more open and retracted area for the beginning of the vocoid element.

The regular spacing of the formants marking the termination of the glide is typical of a central vocoid. All three resonance bar patterns display a more pronounced transitional shift by the articulators of the Norm than by those of the Bilinguals. The closer F2 - F1 separation of the terminal points of the Norm's glides and larger F3 - F2 separation represent the articulatory correlates of a central vocoid lower than that indicated by the relative distribution of the bars of the Bilingual's spectra. In articulatory terms, the vocoid element of the diphthong /ɩə/ of the Bilingual begins in a closer front area than that of the Norm and the glide terminates in a closer central area than that of the Norm.

Vocoid /ɛə/

Spectrograms D.1.2.(19: i-vi) display analysis of the words "where, shares" and "stairway". Both the spectra and resonance bar tracings, Figs. D.1.2.(19: vii-ix), reveal such consistent relative distribution of formants that the comments

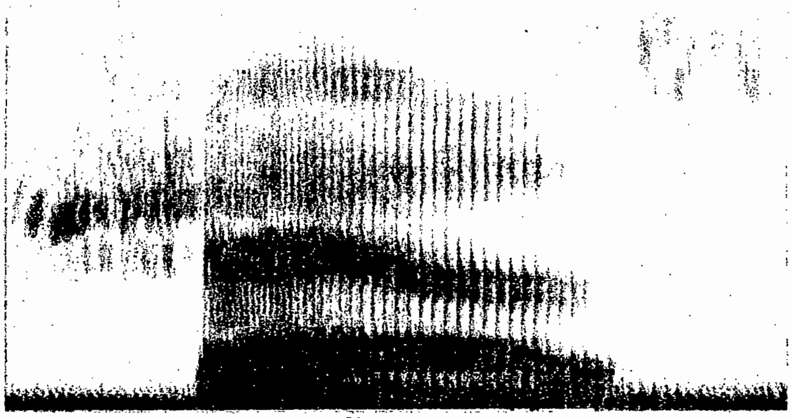


i

Where.— N.

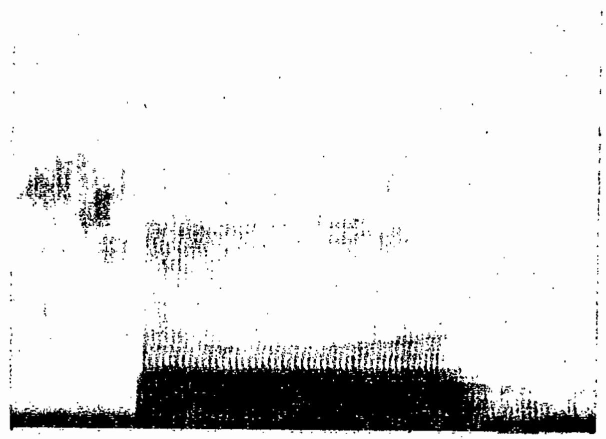
ii.

Where — Bil.



iii.

Shates — N.



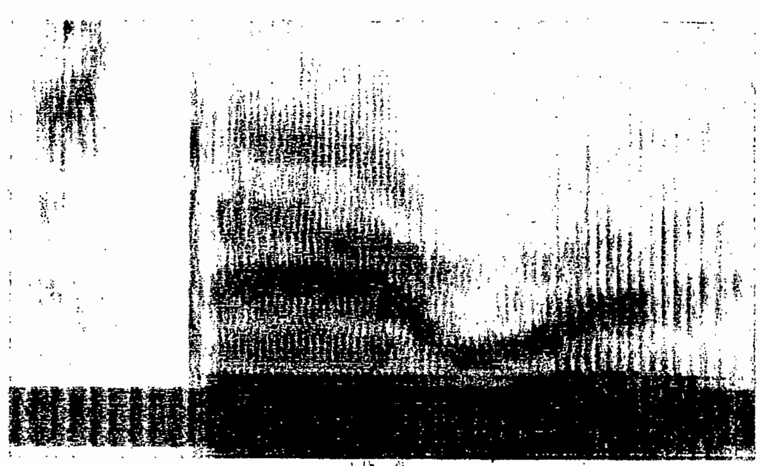
iv.

Shates — Bil.

v.

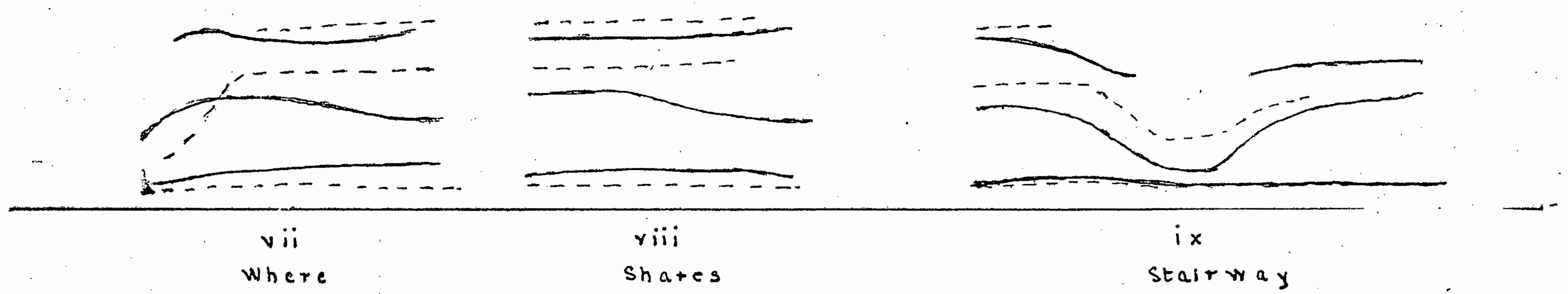
Stairway.— N.

Figs. D.1.2. (19: i–vi).



vi.

Stairway — Bil.



Figs. D1. 2. (19°vii – ix)

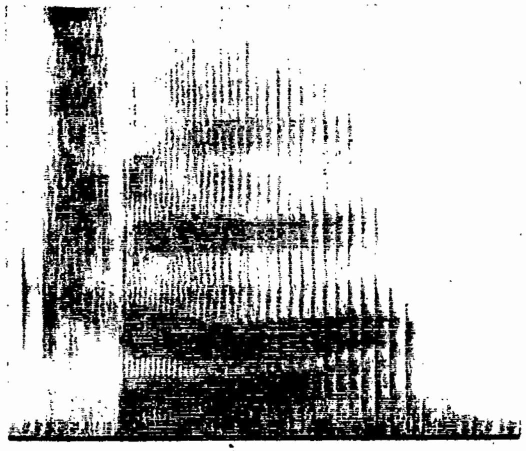
Norm : ——

Bil. : - - - - -

will be brief. There is no vestige of diphthongization in the resolution of the formants of the Bilingual subjects. Even in a disyllabic word such as "stairway", Figs. D.1.2.(19: v, vi, and ix), the vocoid of the first syllable reflects a steady static arrangement of vocal resonance cavities for the brief duration of the vocoid. The formant pattern of the Bilinguals represents a high-mid front area of articulation, in the vicinity of open C2 = [e̞]. As indicated by both the spectrum and the tracing, Figs. D.1.2.(19: v and ix) respectively, the articulation of the Norm distinctly reveals the two elements of the diphthong by the transitional shifts. The spectrograms reveal that the Norm's vocoid element begins in a low-mid to high-open front area and the glide terminates in a central mid-open area. The quality of the Bilingual's articulation is a monophthong in a high-mid front area; as already indicated [e̞].

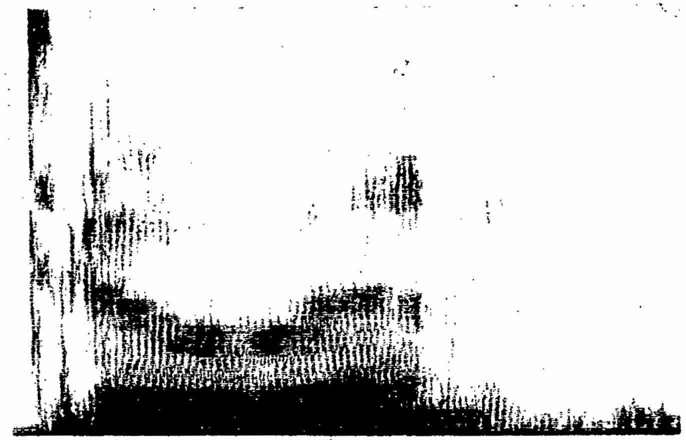
Vocoid /ωə/

Spectrograms of the words "truer, fluency" and "fewer", Figs. D.1.2.(20: i-vii), display the acoustic features of articulations by the Norm and by A.-E. Bilingual subjects. Resonance bar tracings are shown in Figs. D.1.2.(20: viii-x). The resonance bar tracings of "truer", Fig. D.1.2.(20: viii), depict the formants of the utterance by a second Bilingual subject with the dotted lines. In "truer" the relative formant distributions of the two Bilinguals and the Norm are identical. The spectrum of the Norm's articulation reveals a smooth transition in the rearrangement of the resonating cavities. The spectra of the Bilinguals, Figs. D.1.2.(20: ii and iii), reflect two syllables in close proximity. The transition from



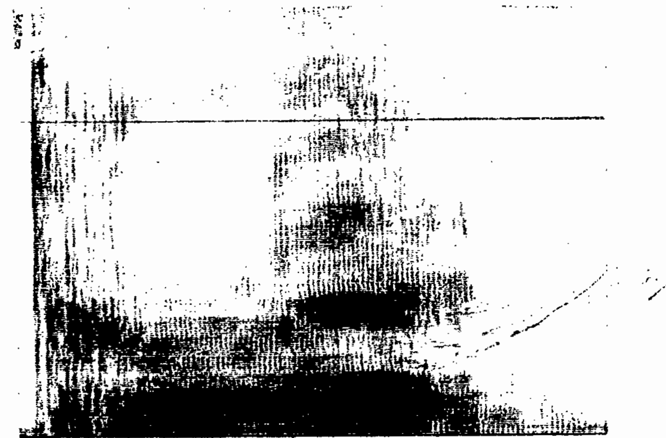
i.

Truer — N.



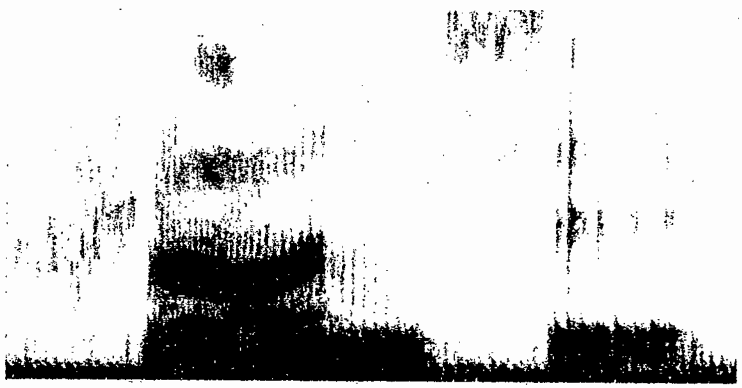
ii.

Truer — Bil.



iii.

Truer — Bil.



iv.

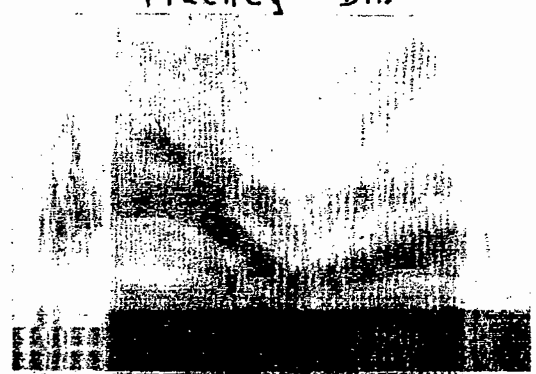
Fluency — N.

v.

Fluency — Bil.

vi.

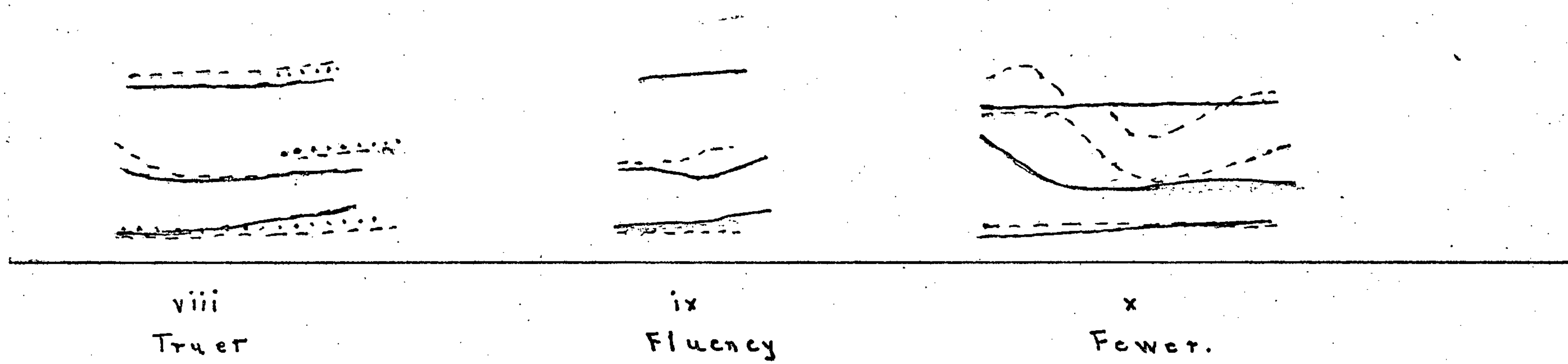
Fewer — N.



vii.

Fewer — Bil.

Figs. D.1.2.(20: i–vii).



Figs. D1. 2. (20; viii – x)

Norm : ———

Bil. : - - - - -

Bil. (2) : . . . . . .

the /ω/ element to the /ə/ element is revealed by a sudden readjustment of vocal resonances with some overlapping of the F2 bars of /ω/ and /ə/ - an interesting instance of the overlapping of phonemic and phonetic segments in an utterance. The spectrograms of "fluency" and "fewer", Figs. D.1.2. (20: v and viii), reveal similar transitions. In "fewer" the two syllables of the utterance are reflected conspicuously by the spectrogram.

As far as manner of utterance is concerned, the spectrograms testify that the Bilingual does not articulate a diphthongal glide but two phonetic elements in close proximity with virtually no evidence of a transitional glide or shift.

Although these features would inhibit the auditory perception of the differing qualities in the articulation, the resonance bars reveal little difference in the quality of the /ω/ elements of the words. There is, however, an appreciable difference in the quality of the second element. The small F2 - F1 and large F3 - F2 separation characterizing the Norm's articulation is the configuration of a retracted, open central vocoid; the same degree of F2 - F1 and F3 - F2 separation of the Bilingual subjects is typical of a fronted central vocoid. In articulatory terms the glide of the Norm is in the direction of an open schwa and that of the Bilinguals in the direction of a fronted high-mid schwa.

The spectra of "fewer" depict two widely divergent articulations. A schematized phonemic representation of the acoustical spectrum would be:

<u>Norm</u>:

begin in /ι/ area, down-slope representing fronted /ω/ area, gradual transition to low-mid schwa.

A.-E. Bilingual:

begin in close /i/ area, continue /i/ area, slope to /ω/ area, angle upwards to close fronted schwa.

Analysis of Connected Speech.

Connected Speech (1).

To my knowledge, no results of an investigation pertaining to spectrographic analysis of the continuum of speech have been published. All the data available are based on test words and sustained forms. One of the problems of interpreting acoustical analysis of speech is the difficulty of identifying acoustic correlates to phonetic and phonemic units. Furthermore, a citation form such as "than", for instance, phonemically /ðæn/, may be reduced to /ðən/ or /ðn/ or even /n/ in normal speech. There is no one-to-one correlation between the rendition and perception of phonetic and phonemic segments of speech. Reduced, weakened, shortened and badly rendered structures are automatically reconstructed and interpreted mentally. The machine does not reconstruct: it only analyses.

In the course of this investigation a number of phrases and sentences read from books and others prompted by wordless photographs and pictures were analysed by the spectrograph. Very brief reference will be made to three spectrograms of connected speech.

The first two, Figs. D.1.2.(21: i, ii), depict the utterance "What on earth is it?" said by the Norm and by an A.-E. Bilingual subject. It is a sentence appearing in a dialogue entitled "TELEVISION" which is part of the recording of

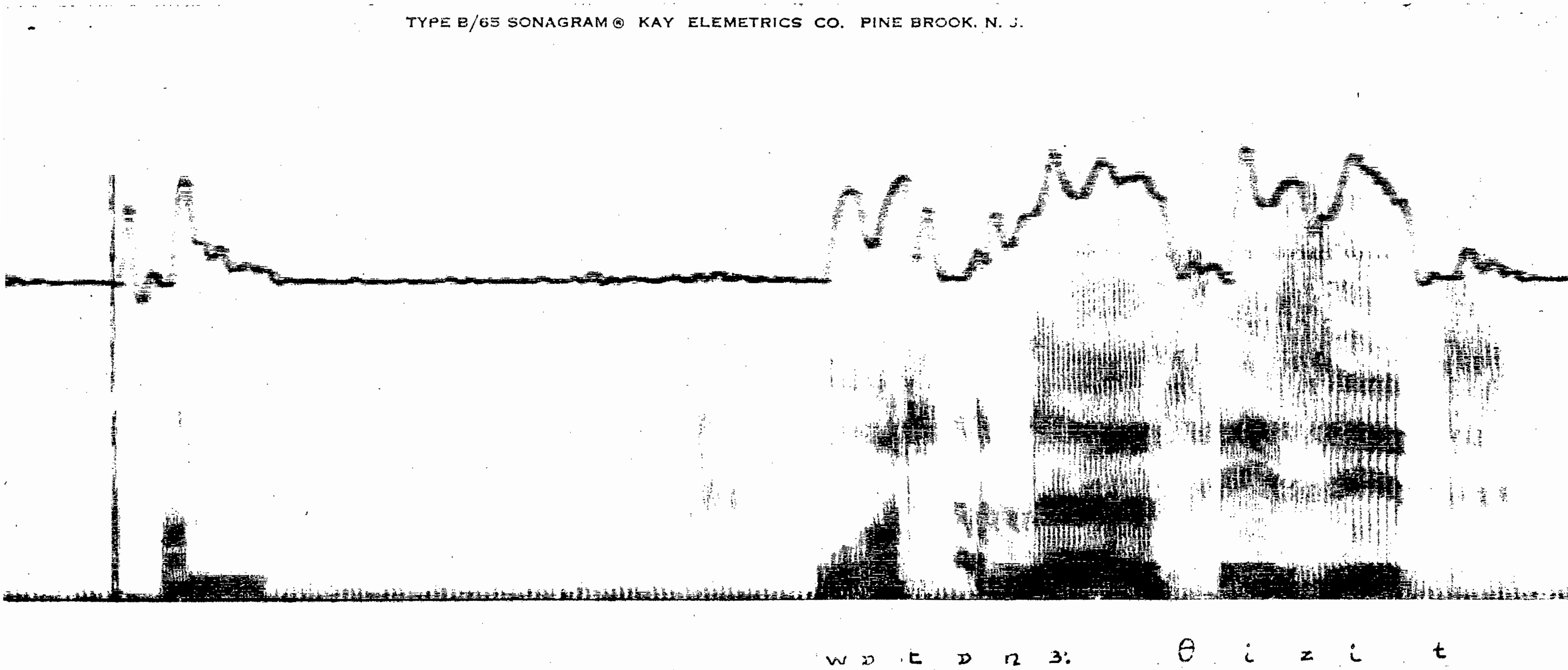


Fig. D.1.2. (21:i).

Norm: "What on earth is it?"

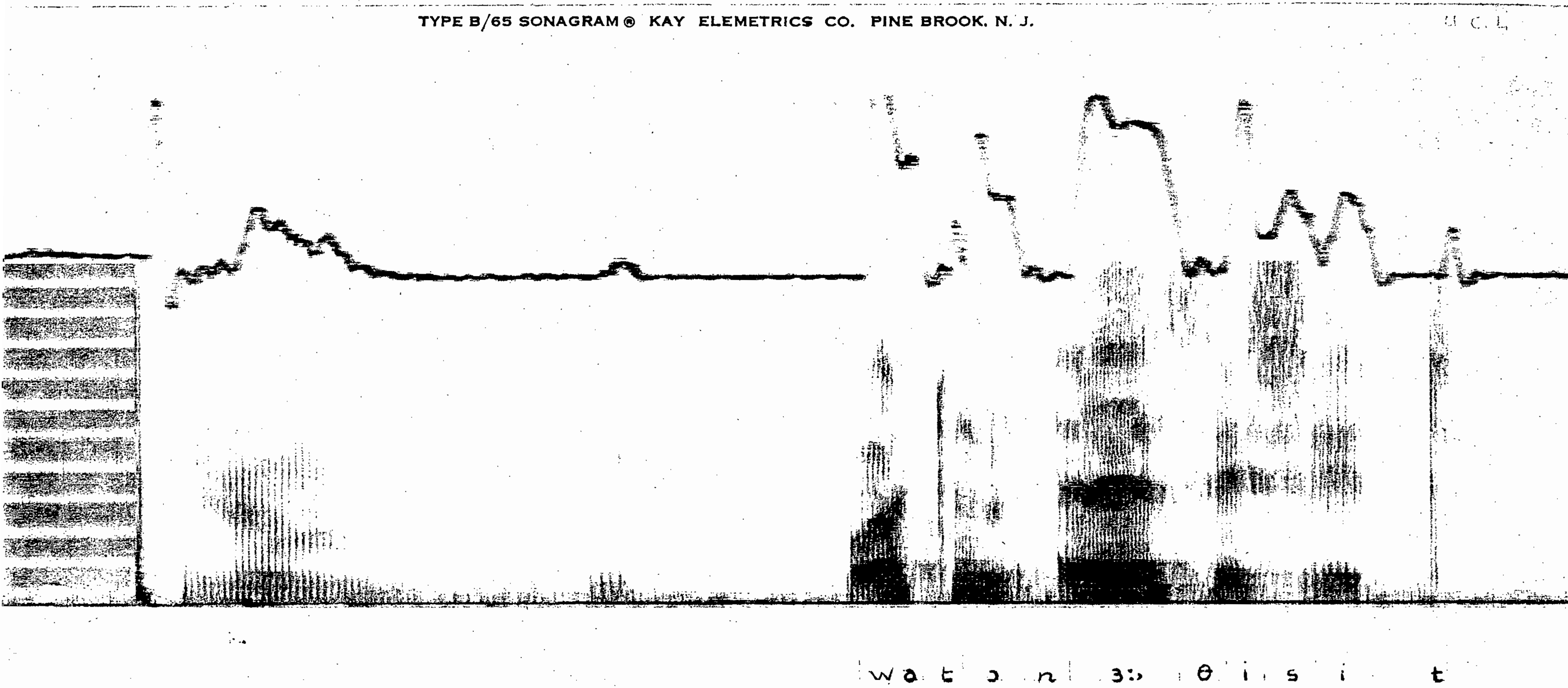


Fig. D.1.2 (21:ii).

A.-E. Bilingual: "What on earth is it?"

Arnold and Gimson's "English Pronunciation Practice". The fluctuating band at the top of the spectrogram displays the amplitude. The vertical lines below the spectrogram indicate the phonemic segments.

It will be seen that the formants of the Norm's articulation are more conspicuously resolved than those of the Bilingual subject. The continuum of the utterance of the Bilingual displays a more discrete segmentation into sound units than that of the Norm, whose utterance reveals continuous transitions between the sound segments, e.g. the first three words of the Bilingual may be symbolized as follows, the signs indicating the breaks:

"Wha+t+ on+glottal stop+earth".

This type of detached symbolization cannot be applied to the Norm's first three words.

It is difficult to determine the quality of the vocoids of the reduced forms as the definition of the formant distribution can hardly be established. In the stressed forms, such as "earth, is" and "it" the formant values can be determined. In terms of figures the formant frequencies of "earth" are as follows:

	Norm	Bilingual
F1	600 Hz	500 Hz
F2	1500	1850
F3	2580	2750

The configuration of the Bilingual represents a closer fronted allophone than that of the Norm in this context. There is not much difference in the quality of the vocoids of "it" and "is". There is, though, a marked difference in duration, as revealed by the vertical lines. The absence of a voice bar at the base denotes that the "s" of "is" is devoiced by the Bilingual. The Norm's formant patterns reveal a great difference in the values of the vocoids of "earth" and "it is". The fluctuations in the intonation are indicated by the variation in the distance between the vertical striations indicating pitch changes and by the shifts and transitions of the resonance bars. From "earth" to "it" the Bilingual's articulation maintains virtually the same monotone.

A significant feature in the two spectra is the distribution of stress as displayed by the amplitude band at the top of the spectrum. The valleys and peaks of the amplitude display of the Bilingual coincide with the segmented sounds and the intervocalic breaks. The staccato, halting rendition is evident. The first four words are isolated utterances each carrying about the same stress, but with the word "earth" dominant. The Bilingual's amplitude pattern reflects an utterance meaning:

"What on earth (as opposed to on something else) is it?"

The Norm's amplitude pattern does not reflect his concern about "on earth", but the fact of its being there: "What on earth is it?"

Connected Speech (2).

Both extracts (1) and (2) under "Connected Speech" represent readings from scripted versions. The first has the Norm's rendition as counterpart, while the second has not. The

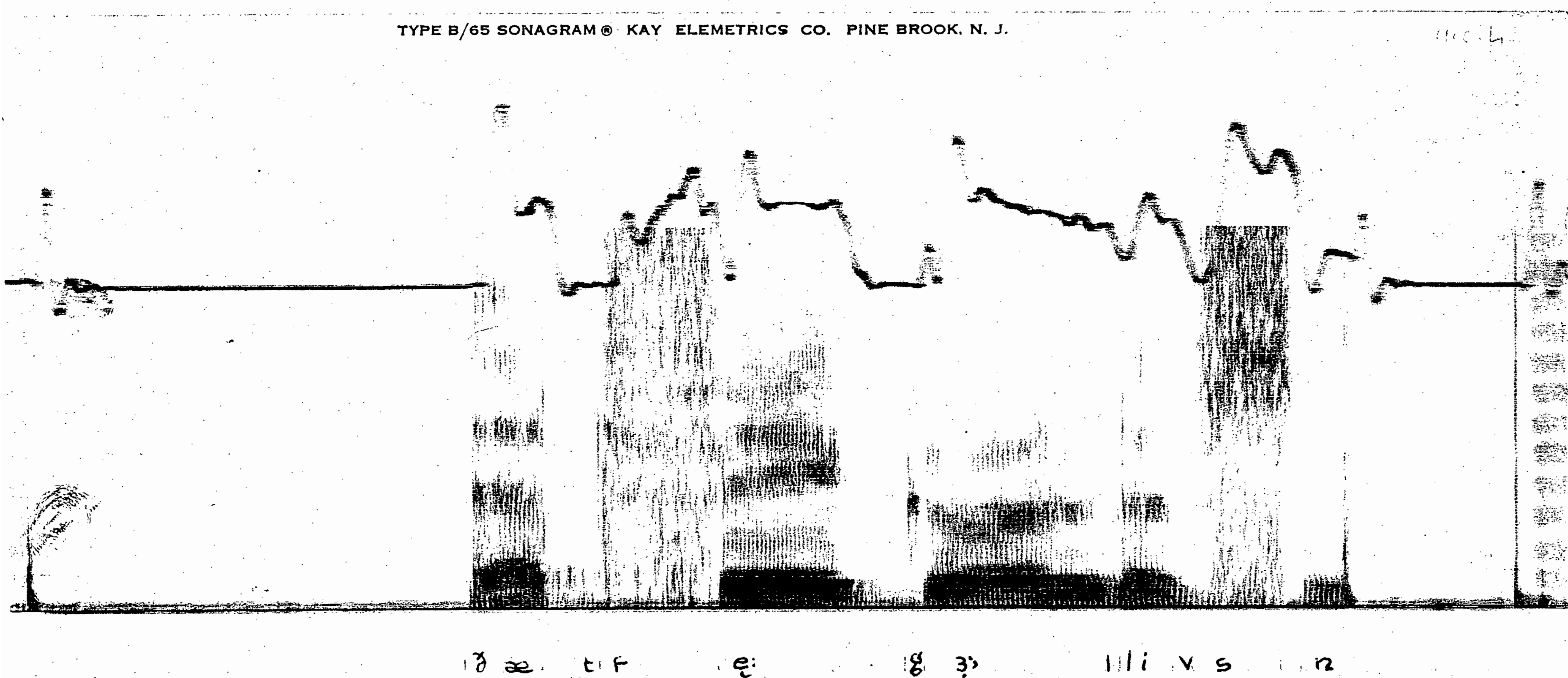


Fig. D.1.2. (22).

A.-E. Bilingual: "That fair girl lives n.----------"

second spectrogram, Fig. D.1.2. (22), depicts the sentence "That fair girl lives near to us", but only the portion "That fair girl lives n...." is analysed. It is taken from a short dialogue which was composed to record the Bilingual's rendition of the English diphthongal glide /εə/ in test words and in the continuum of speech.

The same discrete segmentation of phonemic elements is revealed in this spectrum as in spectrum D.1.2.(21: i). The tendency to detach and isolate the verbal units in versions that are read is revealed by virtually all the spectrograms of connected structures. Peaks in the amplitude band coincide with the individual words. This tendency is prevalent in spite of thorough "preparation" of the subjects, allowing them time to study the words and sentences, and advising them to read "as you normally speak".

Obviously the inhibitions ingrained in the lower classes at school, when passages were read for pronunciation and not for meaning, have not been overcome. The present series of tests has proved that for the average A.-E. Bilingual, ranging in age from 14 to 65, reading is a test in pronunciation. Pitch variations are minimal and the Afrikaans intonation contour is employed.

The resolution of the formants is sufficiently defined to make measurements possible and express their location in terms of Hz. The F distribution of "that" reflects a low-mid front articulation, viz. a close C3 = [ɛ̝]. The quality of the vocoid in "fair" conforms with the trend observed in rendering diphthongal /εə/ by all Bilingual subjects. The English diphthong is monophthongized. The F pattern is that of a high-mid front articulation, viz. open C2 = [e̞]. The first two formants of the spectrum of "girl" are located at the same frequencies as those of the test word "pearl", indicating similar quality. The lenis alveolar slit fricative "s", phonemically /z/, terminating "lives", is devoiced. Devoicing a final lenis contoid is a common feature in the English of A.-E. Bilinguals.

The evidence confirms what has been said earlier in this chapter: reading is an exercise in pronunciation for Bilingual subjects and the vocoids in a connected passage have virtually the same acoustic features as those of the same words in citation form.

Connected Speech (3).

The third spectrogram, Fig. D.1.2.(23), in the series "Connected Speech", displays the utterance "playing golf on a lovely green lawn". It is a recording from a description of a wordless picture cut from a magazine.

The blank separating "golf" and "on" marks a break in the articulation at a moment of hesitation. The vertical lines at the base divide the utterance into phonetic and phonemic segments.

It must be observed that this spectrum, when compared with Figs. D.1.2.(21, 22), is free from the inhibitions conditioned by the discrete units of orthography. The subject was not required to render detached words, hence the contracted combinations, especially, in the second part of the utterance from "on......". The spectrum displays unbroken transitions from "on" to the end of "lovely", where there is a brief break

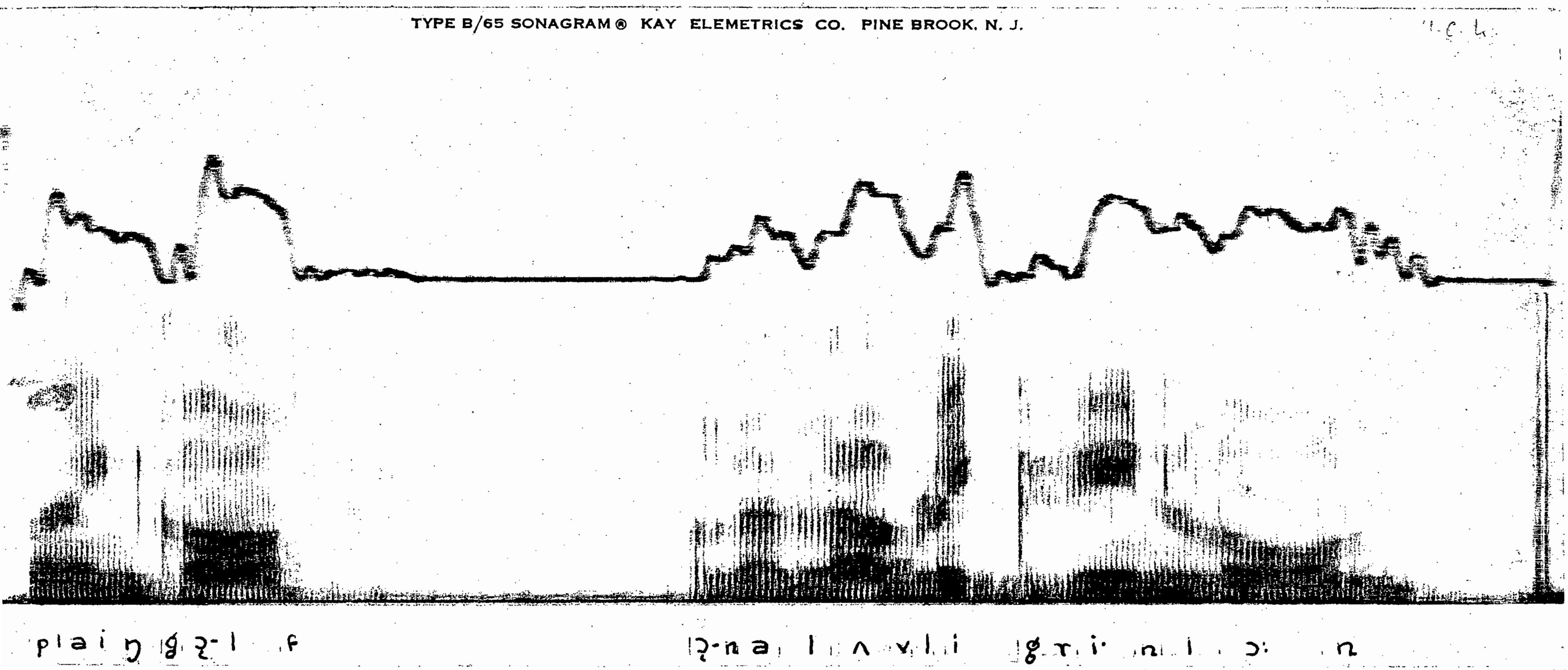


Fig. D.1.2. (23).

A.-E. Bilingual: "Playing golf on a lovely green lawn".

before the plosive velar /g/. The words "green lawn" are also connected by unbroken transitions. The Bilingual's rendition is, of course, interrupted by pauses and hesitations, in his search for words, or the appropriate word, to describe the scene. These pauses, however, are distinct from the staccato rendition of scripted versions. Another "un-English" feature in the manner of rendition is indicated by the amplitude peak above the "y" of "lovely". It is given the greatest prominence of all segments in the second part of the utterance. Stressing /ɩ/ in a final unaccented syllable in an English utterance and articulating it in a mid- or high-close front area, is a common deviation of an A.-E. Bilingual.

I tried to establish to what extent the contextualized vocoids would differ in quality from those of the Norm in the test words.

Translated into figures, the F pattern is as follows:

	Golf	Love	ly	Green	Lawn
F1	500 Hz	550	360	350	420
F2	1000	1300	2100	2100	850
F3	2400	2350	2400	2400	2450

This distribution reflects the following articulatory areas, each compared with the test words of the Norm:

Golf: neutral lips and advanced low-mid to high-open back area, i.e. advanced C5.

Lovely: more open i.e. high-open advanced back area.

Lovely: identical to "green": mid- to high-close front area, i.e. open C1 = [i̞]. Compare the low-close retracted /ɩ/

of R.P. in similar final, unstressed contexts.

Green: mid-close to high-close front area, i.e. open Cl = [i̞] .

Lawn: closer than Norm with closer lip-rounding, i.e. close C6 = [ɔ̝] .

On this evidence, the quality of stressed structures does not appear to be modified to any degree in the continuum of free speech of the A.-E. Bilingual.

D.1.3.

Correlates between Auditory Analysis and Acoustical Analysis.

Vocoid.	Auditory analysis: dominant allophones.	Acoustical analysis: dominant variants in articulatory terms. (Abbrev. "i.r.t." means "in relation to".)
/iː/	i. diphthongization of /iː/ with /ə/ glide on to post-vocalic /l/. ii. mid-close, retracted [i̠], or open R.P. /iː/.	i. /ə/ transition to post-vocalic /l/. ii. open i.r.t. Norm's, e.g. [i̞].
/ɪ/	i. raised and fronted. ii. word-final "y" raised to high-close front. iii. centralized.	i. close, fronted, i.r.t. Norm's, e.g. /ɪ̝̟/. ii. retracted and open, e.g. /ɪ̞̠/.
/e/	i. close R.P. /e/. ii. open R.P. e.g./ɛ̣/.	i. close i.r.t. Norm's. ii. open i.r.t. Norm's, e.g. /e̞/. iii. retracted before final /l/.
/æ/	i. close /æ̝/. ii. advanced, low schwa before final /l/.	i. close i.r.t. Norm's, e.g. C3 = [ɛ̝].
/ʌ/	i. low central, e.g. [ə̞-] ii. low, mid-open, e.g. [ʌ+]	i. advanced, centralized, e.g. [ʌ̞+]. ii. open and retracted i.r.t. Norm's, e.g. [ʌ̞-].
/ɑ/	i. centralized, about Afr. /a/. ii. fronted [ɑ+]. iii. raised, open-rounded, e.g. [ɒ].	i. approximately Norm's. ii. short form is fronted, e.g. [ɑ+].
/ɒ/	i. centralized, e.g. [ɒ̈]. ii. close allophone, e.g. [ ].	i. rounded, e.g. close C5 = [ɑ̹]. ii. advanced C5 [ɑ+].
/ɔː/	i. approximate R.P. ii. open, fronted R.P. /ɔ̞ː+/.	i. approximately Norm's. ii. close, rounded i.r.t. Norm's.

Vocoid.	Auditory analysis: dominant allophones.	Acoustical analysis: dominant variants in articulatory terms. (abbrev. "i.r.t." means "in relation to".)
/ω/	i. raised, i.e. about Afr. /u/. ii. raised and lengthened R.P. /ω/, e.g. [ʉ+] .	i. retracted, close rounded.
/u:/	i. advanced after palatal contoid. ii. open allophone.	ii. fronted, close i.r.t. Norm's.
/ɜ:/	i. rounded.	i. main variant is rounded.
/ə/	not analysed spectrographically, as resolution of formants of reduced forms not sufficiently clear.	
/eɩ/	i. vocoid centralized, and close, long glide.	i. vocoid in central area and high-close glide.
/aɩ/	i. vocoid open, fronted and glide close fronted. ii. vocoid open, retracted and glide close retracted. iii. back vocoid and close glide, e.g. [ɔi] .	i. vocoid close and glide close i.r.t. Norm's.
/ɔɩ/	i. vocoid at about C6 and close, front glide.	i. back, low-mid vocoid and high-close glide.
/ɩə/	i. monophthongized. ii. close, front vocoid and glide to mid-central.	i. vocoid close i.r.t. Norm's and glide to close, central.
/ɛə/	i. monophthongized close R.P. /ɛ̝/.	i. monophthongized open [e̞] .
/ωə/	i. monophthongized. ii. disyllable.	i. two phonetic elements.
/əω/	i. vocoid close, fronted [ɔ̝] and glide to about Afr. /u/. ii. vocoid retracted, open R.P. /ʌ-/ and glide to about Afr. /u/. iii. Monophthongized.	i. vocoid approximate Norm's and glide to close back. ii. monophthongized.
/ɑω/	i. vocoid close/centralized C4 and glide to Afr. /u/.	i. vocoid mid-open, fronted, and glide to close back.

D.1.3.1.

Comment upon Auditory and Acoustical Correlates.

It will be observed that, with the exception of partial discrepancies in the correlates of vocoids /ɔ:/, /aɩ/, /əω/ and /ɑω/, there is an almost one-to-one correlation between the variants as observed by auditory and by acoustical analysis.

The correlates tabulated above prove that the spectrographic analysis corroborates the testimony of the auditory analysis.

D.1.4.

Duration.

In the auditory analysis, frequent reference was made to the impact of lengthening or shortening of vocoids and glide elements upon the renderings of A.-E. Bilinguals. Comparative duration, as revealed in the spectra of the utterances of Bilingual subjects and those of the Norm, was explored. Measurements of duration were taken from the point of dominance of vocal cord-cavity modulations to the point where frictional modulations predominated.

The average duration of the vocoids in the test words is indicated in the following table. Specifications are in seconds.

Vocoid	Norm	A.-E. Bilinguals
/iː/	.28	.24
/ɩ/	.09	.06
/e/	.12	.11
/æ/	.19	.16
/ɜː/	.26	.21
/ʌ/	.13	.12
/ɑ/	.29	.25
/ɒ/	.12	.08
/ɔː/	.28	.25
/ω/	.10	.09
/uː/	.25	.25

Fig. D.1.4.1.(i).

Total average duration of long and short vocoids, regarding /æ/ as short, is the following:

	Norm	A.-E. Bilinguals
Long	1.36	1.20
Short	.75	.62

Fig. D.1.4.1. (ii).

Mean average duration of long and short vocoids is indicated in the following table:

	Norm	A.-E. Bilinguals
Long	.27	.24
Short	.12	.10

Fig. D.1.4.1. (iii).

The durations are diagrammatically illustrated in Fig. D.1.3.1. (iv).

Averages

Voc.	Norm.	Bil.
iː	.28	.24
ɩ	.09	.06
e	.12	.11
æ	.19	.16
ɜː	.26	.21
ʌ	.13	.12
ɑ	.29	.25
ɒ	.12	.08
ɔː	.28	.25
ω	.10	.09
uː	.25	.25

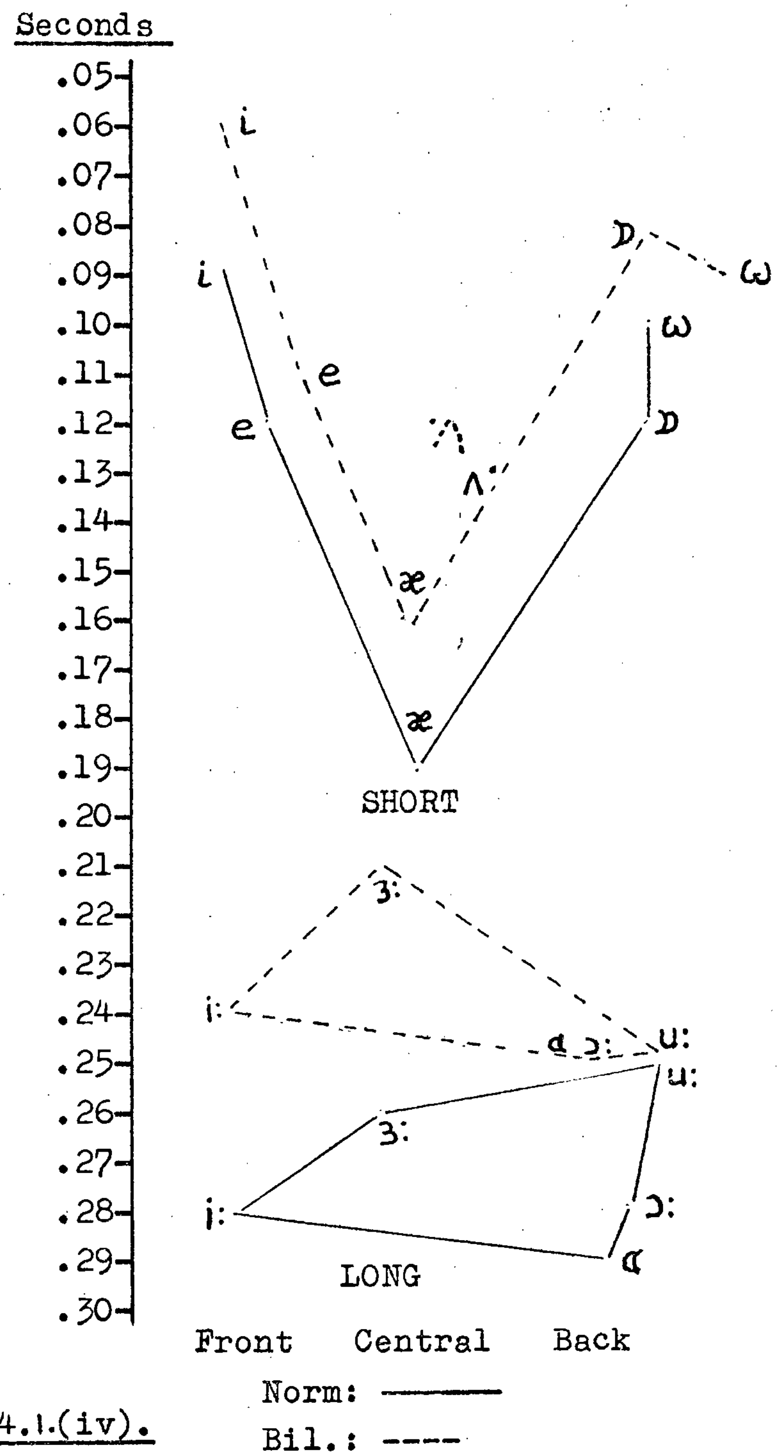


Fig. D.1.4.1.(iv).

Comparative durations diagrammatically illustrated.

D.1.4.1.

Oscilloscopic Analysis.

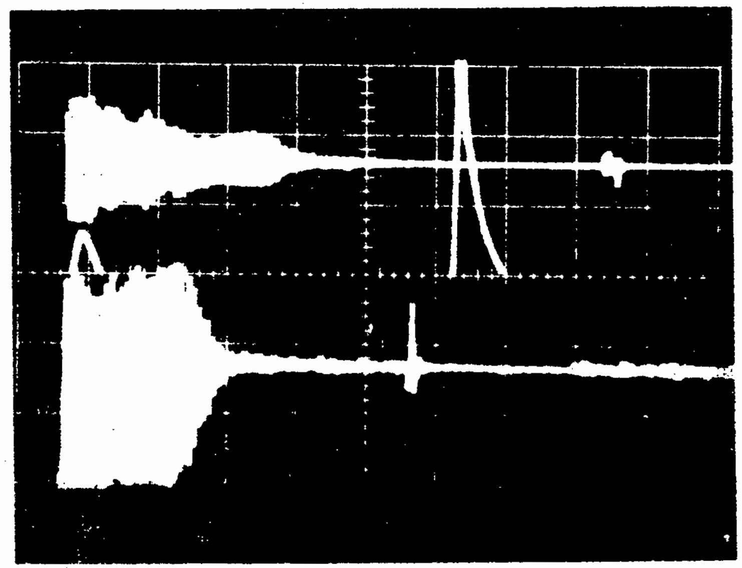
Two structures of each of the vocoids, uttered by the Norm and by A.-E. Bilingual subjects, were analysed by a storage oscilloscope. Fig. D.1.4.2. (i) displays photographs of the oscillograms of four structures: (a) "leave",
(b) "starve",
(c) "name", and
(d) "fierce".

On each of the photographs the upper oscillogram represents the utterance of the Norm and the lower the utterance of the Bilingual subject.

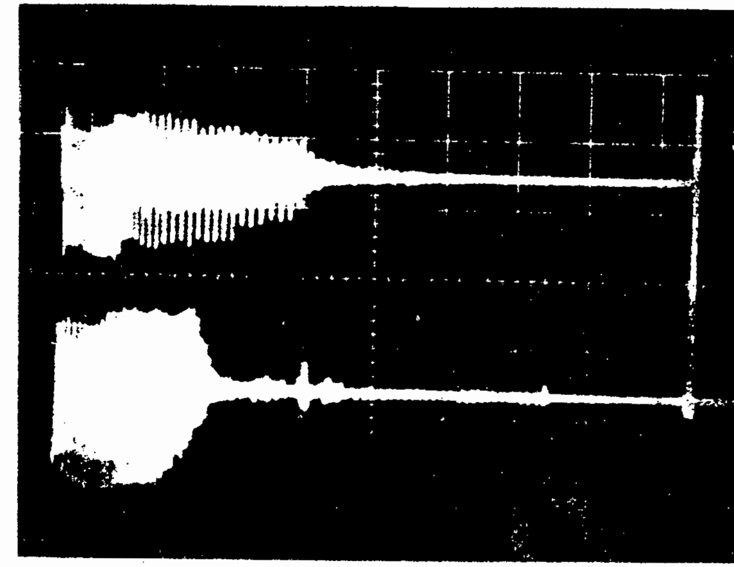
The oscillograms display amplitude along the ordinate and duration along the abscissa. Each of the sequential calibrations represents .10 seconds.

Very brief reference will be made to one or two articulatory features reflected in the oscillograms. It will be observed that these features correlate with features cited in the section on articulatory analysis.

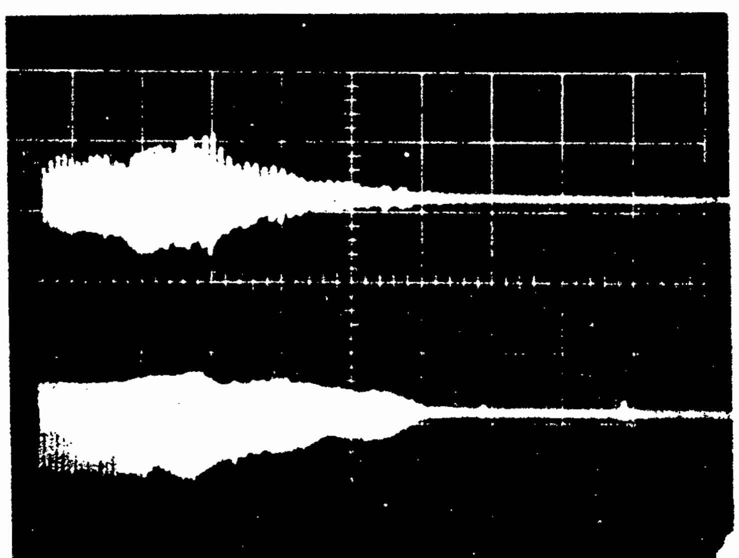
1. "leave": duration of the Norm's vocoid is about .10 sec. longer than that of the Bilingual subject.
2. "starve": difference in duration is the same as for "leave" above.
3. "name": (a) duration is about the same.
   (b) i. Norm: The vocoid element of the diphthong is prominent and the glide element marked by regular, reduced intensity.
   ii. Bilingual: The glide element is marked by sustained, prolonged intensity.



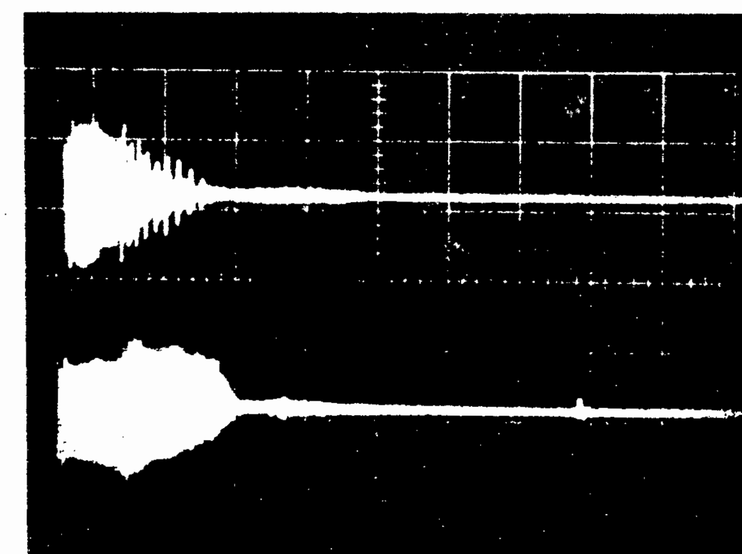
A. "leave".



B. "starve".



C. "name".



D. "fierce".

Fig. D. 1. 4. 2. (i).

4. "fierce": Norm: There is a brief, prominent vocoid element followed by a rapid decline of the glide element of the diphthong.

Bilingual: There is a sustained glide element, more prominent than the vocoid element, marked by abrupt cessation of resonance.

D.1.5.

Additional Diagrams.

Three additional diagrams, illustrating features relevant to the contrastive, acoustical analysis, are given in this subsection.

D.1.5.1.

Musical Relation of Distribution of Formants.

Fig. D.1.5.1.(i) displays the musical relation of the distribution of the first three formants of the spectra of utterances of the Norm and those of Bilingual subjects respectively, for the average distribution of eleven vocoids, (central /ə/ is not included). Only the first two formants of vocoids /ɑ, ɒ, ω / are recorded as the resolution of F3 of these spectra of Bilingual subjects could not be determined with any degree of accuracy, because of the timbre of the utterances.

The following gross, resonance cavity arrangements are displayed by the disposition of the formants. The regular rise of F1 matches the gradual enlargement of the front cavity with a concomitant lowering of F2 and F3. The resolution of the formants of vocoids /æ, ɜː/ is marked by regular spacing. The progressive diminution of the pharyngeal resonance cavity

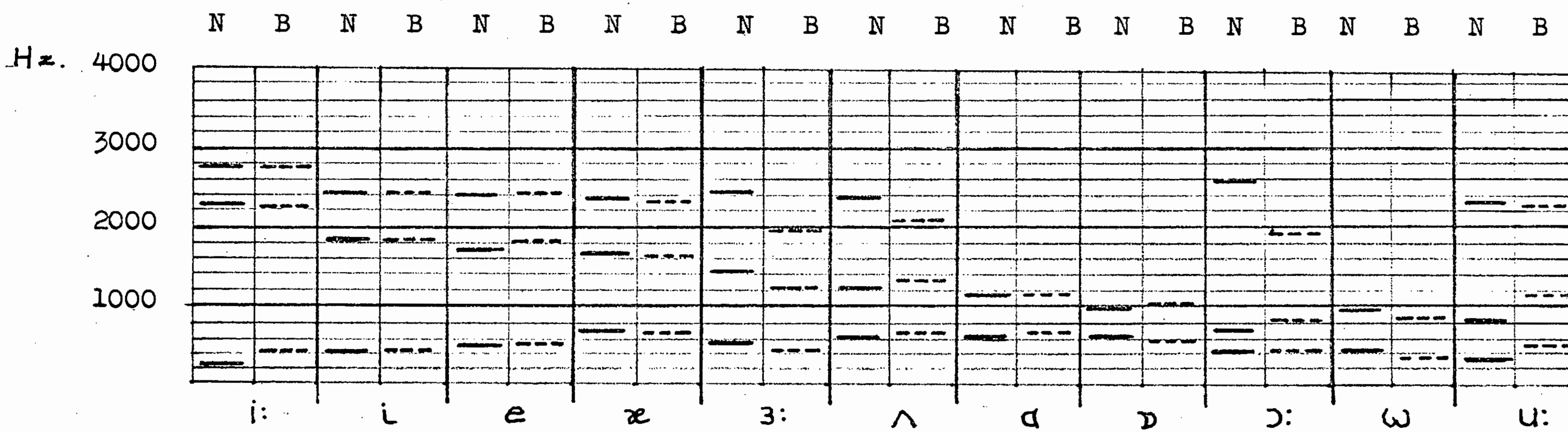


Fig. D.1.5.1.(i). Norm: ——

Bil.: -----

Comparative musical relation of distribution of formants.

For vocoids/ɑ, ɒ, ω/ only two formants are recorded in each case.

with the articulation of back vocoids from /a/ to /u:/ is also evident.

The regular raising and lowering of the formants are interrupted by slight fluctuations, but the general trend is clear. (See Fig. D.1.5.1.(i)).

D.1.5.2.

Comparative Intensity.

Fig. D.1.5.(ii) depicts the intensity distribution, in terms of decibles, of the first three formants of one structure each of the Norm and a Bilingual subject. The intensity was calculated from a momentanic intensity-frequency spectrum in each case. It is virtually impossible to fix upon identical moments in the course of the same utterance by two subjects. Each section was taken at a point when there appeared to be the least conditioning impact by preceding and succeeding contoids.

The main features, in articulatory terms, demonstrated by the distribution of the intensity, are, in general:

(a) the regular distribution of intensity in the articulation of the Norm as against the irregular distribution of intensity in the articulation of Bilingual subjects; and

(b) the average greater intensity in the articulation of the Norm: in seven of the spectra, the totals in decibles, are greater than those of the Bilingual subjects. The totals are displayed in the following table:

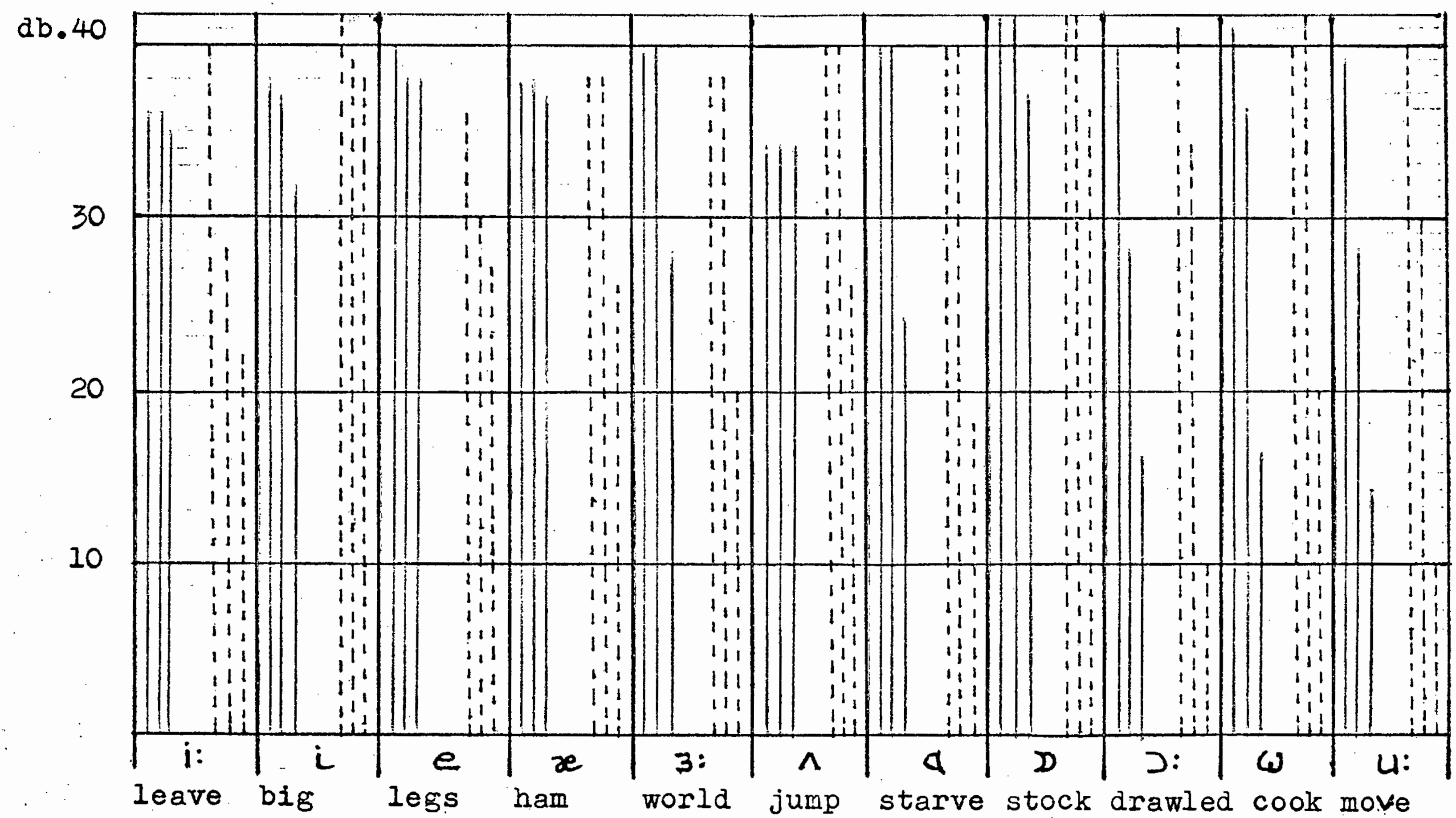


Fig. D.1.5. (ii). Norm: ———

Bil.:------

Comparative intensity distribution of first three formants.

Structure	Norm	Bilingual subjects
leave	106 db	90 db
big	107	117
legs	116	104
ham	113	102
world	108	96
jump	102	106
starve	104	98
stock	122	120
drawled	84	85
cook	93	97
move	82	80

D.1.5.3.

Acoustic Chart on Logarithmic Scale.

Fig. D.1.5.(iii) is an acoustic chart depicting, on logarithmic scale, the frequency distribution of the first two formants of the spectra of the structures by the Norm and by A.-E. Bilingual subjects. The charted points represent the average values in Hz of F1 and F2 of all the test words.

A logarithmic scale has been used as it more closely reflects the rearrangement of the tongue hump represented in the traditional two-dimensional vocoid diagram.

When lines are drawn joining the extreme values in the formants of the Norm's spectra, the acoustical figure, thus constructed, bears a close resemblance to the articulatory figure displaying the positions of the peripheral vocoids and those of the non-peripheral vocoids, namely, /ɩ,ɜ:,ʌ,ω/. The figure displaying the F1 and F2 values of the same

(Contd on p.229)

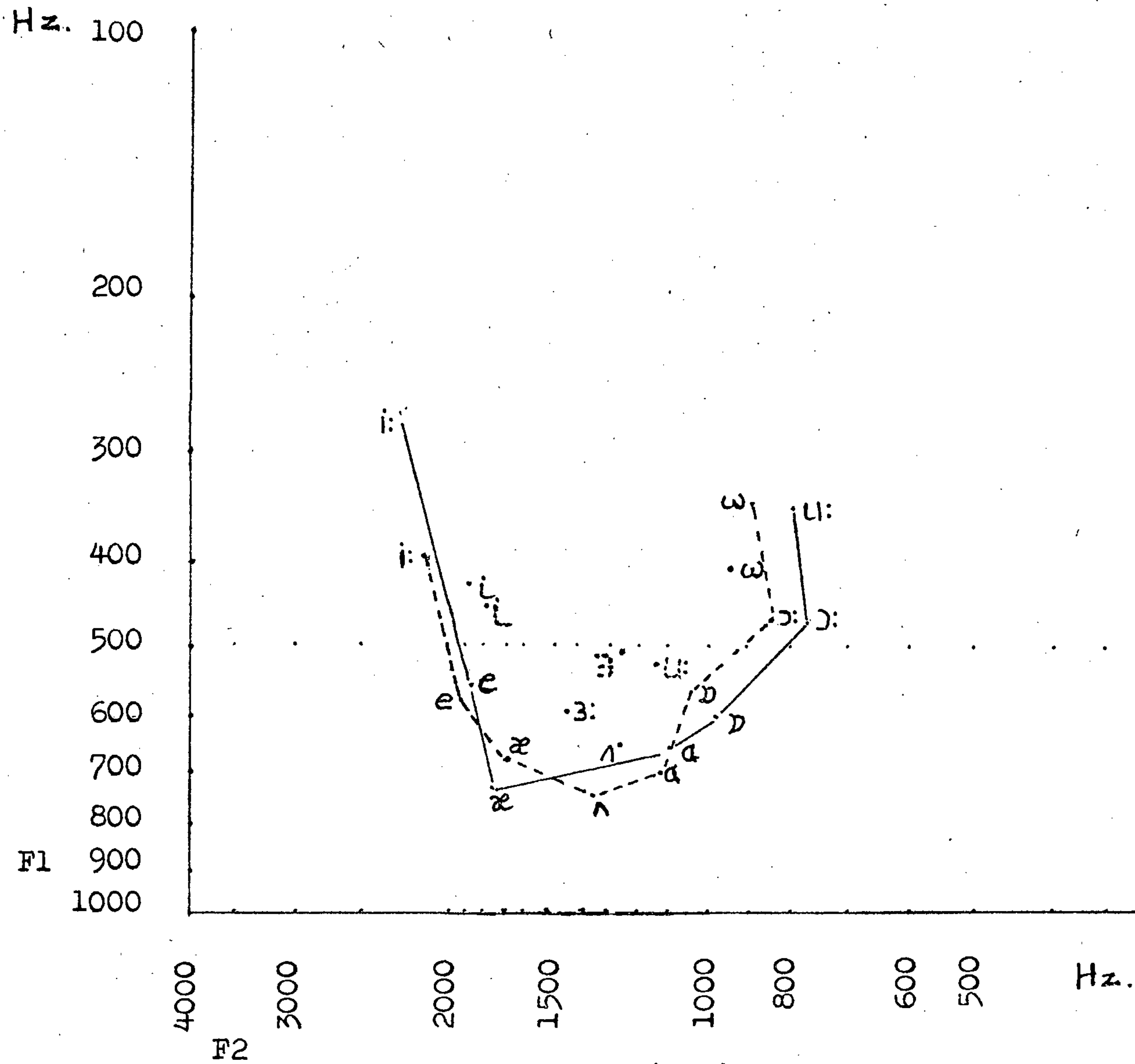


Fig. D.1.5. (iii). Norm: ———— Bil.: --------

Acoustic chart, on logarithmic scale, of average F1, F2 distribution in the spectra of structures by the Norm and A.-E. Bilingual subjects.

utterances by Bilingual subjects is superimposed.

A noteworthy feature of the Bilingual values, in articulatory terms, is that the figure displays some of the dominant variants in the utterances of the Bilingual subjects - variants that were observed in both the auditory and the acoustical analysis - e.g. open allophone of R.P. /i:/; open, retracted allophone of R.P. /ɩ/; close allophone of R.P. /æ/.

The correlation is not in complete complementation, but the trend is obvious.

It is a significant feature of this investigation that Figs. D.1.4.1.(iv), (diagrammatic illustration of durations), D.1.5.(iii) (acoustic chart on logarithmic scale), - all of which reflect data deriving from the acoustical analysis in this section - reveal a high degree of correlation with trends observed in the findings of some other investigators, e.g. Jakobson, Fant and Halle (1955), Wells (1962), Fant (1962), and Gimson (1965).

No attempt has been made to include a detailed discussion of the acoustic diagrams. The object was mainly, to explore trends, and to illustrate correlates in contrastive analysis deriving from different aspects of acoustical analysis.

SECTION E

METHODOLOGICAL INFERENCES

E.1.

Introduction.

In the field of second language teaching in South Africa, there does not appear to exist, what could be called the science of language study and teaching, in the same way that other sciences are recognized. If such a science did exist, the majority of trained teachers would be working on the same lines, differing only in minor details. A superficial inquiry tends to show that there exists a wide divergency of views not only on questions of detail, but also on questions of approach and method. To my knowledge no inquiry into the whole field of second language teaching has been undertaken. No empirical data are available upon which fundamental principles could be established and stated in categorical terms. Any such principles should be confirmed and justified by being put to the test of actual and continual practice.

In the field of second language teaching comparative experiments are wanted on the various materials and ways of presenting these materials. In South Africa, inadequate descriptions and lack of contrastive analysis of English and Afrikaans have been a stumbling block in teaching either of the two as a second language. R.M. Jones, in a paper entitled, "How and when do persons become bilingual?", read at an international seminar on aspects of bilingualism in 1967, (v. under "Kelly" in bibliography; op. cit., p.25), cites some of the basic aspects that should be investigated in any bilingual education. "So often.....research workers.....have ignored, even deliberately refrained from examining experimentally the cruciality of such basic questions as - What is the best age for introducing the second language? What is the best method of presentation? How best can materials be arranged? How much time should be devoted in a school to each of the two languages? After presenting a second language, what is the best way of organizing a subsequent bilingual education?". It is a truism that a bilingual education is a discipline of many aspects, and a full discussion of these aspects is beyond the ambit of this section.

In the pages that follow, aspects of methodology, related both directly and indirectly to the findings in this investigation, will be discussed briefly. The discussion will be limited, more specifically, to articulatory and phonological problems inherent in the acquisition of a second language. Some of the principles involved are of universal significance and apply to the learning of any language as an L2; but, as this investigation deals with the problems of Afrikaans - English Bilinguals, the principles must be inferred to apply specifically to a universe in which native Afrikaans pupils have to be taught English.

E.2.

At What Age Should Pupils be Taught a Second Language?

The ideal manner of acquiring a language, whether native or second, is to be exposed to it in its natural habitat from infancy and to "pick it up" in a spontaneous and unplanned fashion. Most native Afrikaans pupils, however, acquire bilingualism as the result of deliberate and systematic teaching.

As far as the age at which pupils should be taught a second language is concerned, all investigators appear to agree that pupils should be exposed to the second language before the native linguistic habits have become so firmly entrenched as to inhibit both the perceptive and articulatory potential of the subjects. In his foreword to Mary Finocchiaro's "Teaching Children Foreign Languages", Theodore Huebener observes: "The simplest, the most natural, and the most effective way of learning a language is to begin early. The young child's speech organs are flexible; his mind is uninhibited. He takes a natural delight in learning new speech patterns, and he imitates readily. Pedagogically and psychologically, the reasons for teaching young children a foreign language and the culture of the people who speak that language are of the soundest".

According to Harold E. Palmer, (The Scientific Study and Teaching of Languages", 1968, p.29) a child should learn a second language before he has reached the age of ten. Before ten, he learns "with the aid of his imitative faculties", but after that age, he tends to "liken the foreign sounds to his own". The teacher should utilize and take full advantage of "the precious factor of ignorance or the undeveloped powers of analogy", (Palmer, op. cit.,p.26). Palmer maintains that beyond the age of ten the learning of an L2 is impeded by the pupils' tendency to compare and contrast, to translate and to draw analogies between their native system and the system that has to be learned. Ernest F. Haden, in a paper entitled "Phonetics in Teaching a Foreign Language", (v. under "Allen",

p.104 in bibliography), reduces the age of the unbiassed acquisition of a second language to eight or ten. "For younger children we will depend most heavily on imitation. This means that with students below the age of eight to ten we will capitalize on the fact that their imitative powers are such that they can reproduce with sufficient accuracy the foreign sounds they hear". Furthermore, for students beyond this age, and progressively as their age increases, it will have to be recognized that the habits of hearing the signals of their own language become stronger and stronger. The native Afrikaans pupil, for instance, grows more and more accustomed to hearing English speech in terms of the signals which operate in Afrikaans. The fact that native linguistic habits at adult level inhibit the perceptive potential of native Afrikaans subjects, is adequately substantiated by the results of the perception tests referred to in section C of this investigation.
Robert Lado, in his "Linguistics across Cultures", (op. cit.,p.11), also stresses the conditioning impact, upon perception, of native linguistic habits at adult level. "An unbelievably strong force binds phonemes of any language in their complex contrasts. The adult speaker cannot easily pronounce the language sounds of another. And more startling, - he cannot hear language sounds other than those of his native language, even though he suffers no hearing defect".

In a discussion of Jones's paper referred to under E.1. above, S.M. Ervin - Tripp fixes the age of uninhibited acquisition of a second language at about eleven. "There is strong evidence", he contends, "that for children under eleven language is sound, for adults, sense. Children normally learn new words in the context of visual-motor activity, whereas much of the adults' vocabulary is learned in a purely verbal context so that its meanings are verbal". In his comment upon Jones's paper, E.G. Malherbe, refers to conditions obtaining in South Africa and states that "the weight of evidence in South African experience seems to be in favour of exposing the child already from infancy to both languages, provided that this process is confined only to the hearing and the speaking of the two languages during the child's early years", (Kelly, op. cit.,p.42). Limiting the teaching in the early years to exposure to and verbalization of the second language is an important qualification. It implies that the speech habits should be established first prior to teaching the secondary skills of reading and writing.

None of the investigators quoted above has referred, specifically, to supra-segmental features of length, pitch, stress, the correct manipulation of speech rhythm, and to sub-phonemic features, such as, for instance, aspiration of initial /t/ in English. Obviously, acquiring a second language at an age when the restraining bias of the native system does not operate, would imply using all the features of the second language with native proficiency.

In South Africa, some of the factors that determine the acquiring of an authentic accent and "Englishness" will be the degree of proficiency in English of the teacher, the environment in which the pupils grow up and the pupils' natural propensity for learning languages.

John Macnamara correlates the degree of proficiency in the second language with the age at which the study of the second language begins. In commenting upon a paper entitled "Structure and Process in Language Acquisition" by S.M. Ervin-Tripp, Macnamara observes: "Though there are many individual differences, we may certainly say that the study of an Le, if practical mastery is the aim, should be started early enough to enable the student to acquire a reasonable accent (this author's italics) and conversational ability", (Monograph Series, 1970, op. cit.,p.348). Finocchiaro stresses the importance of manipulating the intonation pattern of a second language correctly if native proficiency is aimed at. She states that "intonation and rhythm are even more important than individual sounds in giving the language its authentic flavour", (op. cit., p.85).

The following conclusions may be listed as representing the findings of the investigators quoted above:

1. For a young child the learning of a second language is predominantly a process of the imitation of sounds, which involves little intellectual exercise.

2. Before the age of eight native linguistic habits do not interfere with the learning of a second language.

3. After the age of ten the native linguistic bias assumes legislative proportions and dictates its own laws to the acquisition of divergent linguistic habits.

4. The proper manipulation of supra-segmental features is essential for a high degree of proficiency in a second language.

5. At adult level the native linguistic system inhibits both the perceptive and the articulatory ability of a student in the learning of a second language.

E.3.

Motivation.

Adequate motivation is the mainspring of students' inclination for studying a second language. "If he realizes that the successful attaining of the end in view is essential to his well-being, this alone will quicken his mental faculties and encourage him to supreme efforts", (Palmer, op. cit.,p.32). Palmer proceeds: "In a very small number of cases the language itself constitutes the interest and the end in view; in the vast majority of cases the study of the language is looked upon as a necessary evil, only endurable on account of the reward which will attend its successful termination".

Palmer's observations, quoted above, apply to conditions prevailing in South Africa. The study of both English and Afrikaans is mandatory in all schools supported by the various provincial administrations and by the central government; but legal obligation does not in itself constitute sufficient motivation and may be regarded as an imposition rather than an impetus.

There must be other stimuli that combine to determine a pupil's attitude to the study of a second language. The prestige of a language is a powerful motivating force. If English enjoys great cultural or social prestige in an Afrikaans language community, the pronunciation of English words in a phonic form close to a high-prestige variety of English, will serve as a mark of education and status. "The exertion of effort to retain the original sounds is probably governed by individual and socio-cultural factors", (Weinreich, op. cit., p.26). "If the attributes of fashionableness become associated with a new manner of rendering a phoneme, it will be all the more likely to spread", (Weinreich, op. cit.,p.24). An adapted version of Weinreich's dictum would be that if the attributes of fashionableness are associated with the ability to speak a particular language, fashion will exert social pressure conducive to the learning of that language. Malherbe correlates the utility of a language to its social prestige. "Bilingualism", he observes, "in a bilingual country is largely functional. It develops in proportion as it functions in a certain social context", (op. cit.,p.44).

In summarizing the role of the socio-cultural setting as a motivating force for promoting bilingualism, Weinreich states: "It is clear that of the factors which make a language dominant for a bilingual.....the usefulness of a language, its role in social advance, and its literary - cultural value are given to the individual by his surroundings", (op. cit.,p.83).

Young children of pre-school or of school admission age are obviously not equipped to rationalize about these "external" forces that shape the attitude of their milieu toward bilingualism. Pre-school native Afrikaans children accept the attitude of their parents with respect to the learning of English as a matter of course, as the disposition of parents is the strongest force in moulding the attitude of their children toward learning a second language. After children have been admitted to school, then, in matters of learning, the influence of the teacher becomes the dominant power which determines the attitude of the pupils.

The influence of both parents and teachers will decide to what degree native Afrikaans pupils are motivated to learn English.

E.4.

Problem Points.

It was pointed out in E.2. above that childhood is the ideal period for acquiring a native or near native pronunciation. The speech organs of the pupils are still flexible and they lack the inhibitions caused by an entrenched linguistic system.

It is an established fact that, in South Africa, - as is the case with parallel processes in other countries - native proficiency in English as a second language is seldom attained at school, in spite of the fact that pupils are taught English soon after their admission to school, i.e. before the age at which rational processes of comparison, translation, drawing analogies, etc., form a barrier between the language and the recipient. It would, therefore, be pertinent to mention the problem points with which both teacher and pupil have to cope in the teaching and the learning of English. Reference will be limited to phonic interference.

Robert Lado in his "Linguistics Across Cultures", (op. cit.,p.11), summarizes the entire impact of L1 upon the acquisition of an L2 in the following words: "We tend to transfer to that language, (i.e. L2), our phonemes and their variants, our stress and rhythm patterns, our transitions, our intonation patterns and their interaction with other phonemes". Haugen defines "foreign accent" as the "transfer of sound features from one language to the other because of a more or less complete identification of the two phonemic systems", (op. cit., p.50).

From the point of view of the pupils it is important to bear in mind that both perception and interpretation are subject to interference of their Afrikaans phonic system. Speakers of a native system do not actually hear foreign phonemes - they hear their own. Phonemic differences in a second language will be missed by them if there are no similar phonemic differences in their native system. This would apply, especially, to pupils in the higher primary and secondary classes, i.e. from about the age of eleven.

There are additional points of interference in the structure of expression of English that constitute problem points for native Afrikaans pupils. It may be added, in parenthesis, that all points of dissimilarity between two systems represent problems to be overcome by pupils.

English is characterized by discrepancy between the graphic and the phonic image. This feature poses a problem of phonic interference to Afrikaans pupils who are used to a relatively close correlation between orthography and pronunciation.

Furthermore, Afrikaans pupils accept the positional distribution of phonemes and the combinability of phonemes in their native system as a matter of course. Their native system has been absorbed to the point of unconscious reproduction. Confronted by English, which has a different patterning of phonemes, Afrikaans pupils identify the new sequences interlingually with their native system and mispronounce both the individual phonemes as well as combinations of phonemes.

Without fear of contradiction it may be asserted that supra-segmental elements have received the least attention in the teaching of English as a second language. These elements are especially difficult to master. The learner realizes that vocoids and contoids and their patterning are of phonic importance in English; but it is not so obvious that pitch, loudness and duration are of phonic importance. In a paper entitled, "Non-segmental Elements in Foreign Language Learning", (Monograph Series no.7, op. cit., p.130), William E. Welmers observes that contrasts in pitch, intensity and duration are not mere details that can be filled in later in the course of learning a second language, but are basic problems that may involve misunderstandings. "The very nature of the problem would seem to require that it (the feature of non-segmentals) be handled from the very beginning of the student's attempt to learn a new language".

Unless supra-segmental elements are manipulated according to the dictates of the native system, phonic realization of an L2 will retain its foreign savour.

E.5.

Methods and Techniques.

E.5.1.

Speech is Primary.

Teachers of English as a second language in South Africa may be confronted by what they regard as the conflicting claims of phonology, morphology and lexis. Obviously these hierarchies cannot be isolated, but they should be differentiated and, in practice, segregated to a degree, so as to accord pre-eminence to speech - the aspect of language which all investigators in the field of second language teaching regard as primary. In justifying differentiation for the purpose of stressing phonology, Palmer observes, "Exercises devised to give the student command over his organs of speech will not further his power of understanding what he reads". (op. cit., p.44). Finocchiaro states categorically, "The sound system of the language - many call it 'the stream of speech' - should be given priority in teaching", (op. cit., pp.143, 144). Palmer concludes that "the faculty of correct reproduction is not only of phonetic importance, but it has a most direct bearing upon the whole process of study", (op. cit., p.30). "The reason that new methods of teaching languages are not really much improvement on the methods they replace is that language is not being used to communicate. Nobody in a language class wants to say anything to the teacher, and the teacher has nothing to say to the children that they want to hear", (John Macnamara in discussing a paper entitled "Structure and Process in Language Acquisition" by S. Ervin-Tripp, Monograph Series no.23, p.348). This somewhat cynical observation by Macnamara probably does not reflect prevailing conditions, but is intended to stress the vital importance of the primary skill of a vivid, speaking knowledge of a language.

Experience has proved that many teachers of English as a second language in South Africa and most students identify English with its dictionary and define the task of learning English in terms of content vocabulary. "In learning a foreign language you will find that vocabulary is comparatively easy - the harder task is mastering new structures in both content and expression", (C.C. Fries: "Teaching and Learning English as a Foreign Language", p.3); and on the same page Fries singles out the sound system: "In learning a new language, then, the chief problem is not at first that of learning vocabulary items. It is, first, the mastery of the sound system - to understand the stream of speech, to hear the distinctive sound features and to approximate their production".

The mistaken notion many teachers in South Africa have of the pre-eminence of speech, and the fact that in practice it is often relegated to the status of a secondary sub-system in the structure of content and of expression of the English system, warrants the stress accorded to the spoken language in the above paragraphs.

In a paper entitled "How can we measure the effects which one language may have on the other in the Speech of Bilinguals?", (v. Kelly, op. cit.,pp.140, 141), Nils Hasselmo suggests a method which may assist a teacher in coping with interference on phonemic level. This method has been slightly adapted to conditions prevailing in South Africa and is briefly summarized below. The teacher should, in the course of teaching English, keep a check list of the proportion of items representing onterference of the total inventory of items - including a distinction between types and tokens for investigations and corrective drills of interference in speech -; a check list of the proportion of items representing interference in relation to different sub-systems; and a check list of the proportion of items representing phonemic and allophonic interference.

On the evidence of Sections C and D of this investigation, it may be assumed that there will be little regional stratification in the type of interference, though the possibility of regionally bound allophonic renderings is not entirely excluded. One may, broadly speaking, distinguish a "Transvaal" and a "Western Province" Afrikaans accent, but on the whole Afrikaans is characterized by dialectal uniformity, so that variant realizations of English will show trends representative of the entire Republic of South Africa.

Keeping check lists for methodological purposes, as suggested above, entails hard work on the part of the teacher. But, there is no royal road to second-language teaching and success implies assiduous dedication by both teachers and pupils. The teacher cannot delegate his work to a textbook, nor will, in most areas where English is taught to native Afrikaans pupils, the environment perform the teacher's task for him. "In dealing with the second language, the teacher's main task is to teach precisely that which he need not concern himself with in the case of the home language. He is not, in the first place, concerned with the secondary skills of reading and writing, but with the teaching of the language itself", (Venter, op. cit., p.15).

Additional methods and techniques that may be applied to teach pronunciation through intensive listening and speaking, are listed below. These include inferences within the framework of this investigation and suggestions by Finocchiaro, (op. cit., pp.83 et seq.).

In case corrective drills are necessary, make sure that the pupils can identify the sound and <u>hear</u> it in a number of familiar words.

Contrast two (or more, depending upon the level of the pupils), sounds, but make sure that both have been recognized and produced before contrasting.

Say a word containing one of two (or more) sounds and ask the pupils to indicate which of the two sounds you are using.

Say two (or more) words containing the sounds and have the pupils tell you whether the sounds are the same or different.

Give three (or more) words and have the pupils tell you which are the same.

In all the above exercises let the pupils switch roles with the teacher.

As soon as pupils pronounce the words well, insert them in authentic utterances: phrases, rhythm units, structures of various length.

The above techniques of aural perception and oral production have been spelt out, because they are regarded as fundamental in implementing the aural-oral method which is implicit in the comparatively new "linguistic" approach to second-language teaching. The numerous possible variations of the above techniques will undoubtedly be exploited by the enterprising teacher.

The normal rhythm of one's speech should never be slowed down or distorted in the mistaken notion that the change in speed will aid comprehension. One should speak normally at all times. Even though the device of alternating relatively slow and fast speech is practised as an exercise to improve perception and rendition, the sounds and rhythm of normal speech should never be distorted.

E.5.2.

Organic Processes Should be Explained.

Virtually all investigators into the problem of second-language teaching and bilingualism are agreed that there is a need for comparing and contrasting native and foreign sound systems as a means of predicting and describing pronunciation problems of speakers of a given language learning another. Predicting and forestalling or correcting errors in phonic realization can be the result only of a thorough knowledge of the phonological structure of the two systems involved. Fries states that "the most effective materials(i.e. methods and techniques) are those that are based upon a scientific description of the language to be learned, carefully compared with a parallel description of the native language of the learner, (op. cit., p.9). Delattre likewise stresses the importance of a knowledge of the articulatory processes involved in a second language. "The teaching of modern languages in our schools and colleges would certainly improve if we could describe very objectively the new phonetic habits that are to be acquired by a student when......he learns a second language", (op. cit., p.7).

A contrastive analysis of sound systems - which is a direct inference from the present investigation - as an aid in the teaching of a second language, is supported by Delattre's "Interim Report to the United States Office of Education" on comparing the phonetic features of English and a number of other languages that are taught in America, (op. cit., 1965). A language teacher will welcome a separate list, with acoustic and articulatory descriptions, of the sounds in English that are radically different from Afrikaans, as well as a list of the sounds in Afrikaans that are radically different from English. Acoustic and articulatory charts of these new sounds will bring out the regions and types of articulation that are the most characteristic and cause the greatest interference in learning.

Being aware that the pupil's mistaken rendering is the product of his Afrikaans habits of hearing, the teacher will call attention, not so much to the sound, as to the different positions of the vocal organs, "thus bypassing the inadequate avenue of the hearing sense", (Haden, in Allen, op. cit., p.104). The teacher must, for this purpose, be able to identify in physiological terms, the particular muscular activity which will be needed to produce the correct foreign sound.

However, Haden's reference to the hearing sense is qualified in the very next paragraph. In the acquisition of pronunciation skill, the pupil's hearing sense can be exploited to great advantage provided his imitation is informed and guided by the scientific training of the teacher. Wilga M. Rivers, in a paper entitled "Linguistic and Psychological Factors in Speech Perception and their Implication for Teaching Materials", read at the International Congress of Applied Linguistics, Cambridge, 1969, stresses the value of imitation and observes that "training in listening comprehension by parallel production is more than mere imitation: it forces concentration on segmentation as well as providing guided practice in the production of well-informed segments, thus integrating with listening comprehension an operation which is basic to creative speech production as well", (v. Paul Pimsleur and Terence Quinn op. cit., p.123).

Kinesthetic feedback and imitation may not operate as adequate correctives in rendering sounds and isolated words, but I would regard guided imitation as indsipensable in the correct manipulation of rhythm units, stress and pitch.

This subsection may be concluded by quoting the confession of a professional linguist as to her acquisition of English. In a paper entitled, "Cognitive Development in the Bilingual Child", (Monograph Series no.23, 1970, pp.61 et. seq.), Vera John describes how she plunged into college work with little proficiency in English, and she paid little attention to the phonology of the English language. "My primarily cognitive approach", (this is a reference to the manner in which she was taught French), "to language acquisition was of little assistance when I decided to improve my articulation. The instruction I then received was based on modeling,(sic.))for instance, I did not know how to produce the 'th' sound). I was shown with the help of mirrors and drawings" (my italics). "Principles of learning, such as modeling and the use of corrective feedback, were relevant to this aspect of my struggle with the English language; while cognitive approaches, of great benefit to the acquisition of the semantic system, were of little use".

The same techniques, with the required adaptations, can be used effectively at the lower primary school level.

E.5.3.

A Cultural Island.

Creating a cultural island is not a new device, but many teachers of English as a second language have been so preoccupied with teaching lexis and morphology that the potential of a cultural island has escaped their notice. If utilized properly it can be a significant contribution to the successful teaching of English as an L2 in South Africa.

In many predominantly Afrikaans areas the only English that the pupils are exposed to is heard in the classroom. The idea of a cultural island is that a classroom should be equipped with pictures, books, toys, puppets and a myriad of aids associated with the acquisition of English for practical purposes. There should be recordings of songs, playlets, verse and many other items which may be effectively used at primary school level. Pupils must be provided with an environment "that would favour a complete immersion in the foreign language", (Finocchiaro, op. cit., p.96).

In regard to a culture island, a warning should be sounded. The successful transfer of elements of phonology (and morphology) from the cultural island to the social environment of the pupil is of paramount importance. It must be borne in mind that the universe of the pupil's discourse transcends the bounds of what he has been taught at school. As soon as he attempts free expression he encounters pitfalls in the random exchange and intermingling of phonological structures. In the cultural island the teacher must devise practical methods which will enable the pupil to cope with the behavioural requirements beyond the precincts of the cultural island.

E.5.4.

Supra-segmental Features.

Under the above heading sub-phonemic and non-sequential features will be distinguished.

Investigators are agreed that features of stress, intonation, pitch, are essential to give a language its unique savour.

Before referring to the implementation of these features in a teaching programme, it may be pointed out that the surest way to destroy the identity of a language is to mutilate its sounds. Furthermore, deviations from a norm under the influence of an L1, are inclined to proliferate and the distinctions between an L1 and an L2 may be levelled off and neutralized.

The demands of commercial intercourse promoted the development of pidgin English in the East. It is the duty of teachers of English as the L2 in South Africa to guard against the development of "pidgin" English under the force of "linguistic" pressure, or by virtue of the resigned acceptance of the inevitability of the "creation" of "South African" English.

In regard to the phonological structure of English, the native Afrikaans pupil will, in the initial stages, perceive and reproduce only the coarsest contrasts. Finocchiaro maintains that pronunciation, which includes sounds, intonation, rhythm, stress, pauses, is taught best at the beginning level through intensive listening and speaking, (op. cit., p.83).

Reproduction of the finer sub-contrasts will depend upon the guidance of the teacher. Transformations of intonation patterns are best taught through guided imitation. The teacher should at all times observe the authentic rhythm and stress pattern of English because of the profound impact his own speech has upon his pupils.

A distinctive feature of the intonation pattern of A.-E. Bilinguals is a consistent tendency to end declarative intonations at a higher level than normal. L.W. Lanham in his "The pronunciation of South African English", has the same observation and quotes the utterance:

$$\overset{2}{\text{"He's}}\ \text{going to}\ \overset{3}{\text{town}}\ \overset{3}{\text{today".}}$$

The above utterance which is obviously intended to be a statement, sounds like a question in overt realization.

The following exercises are intended to instil habits of recognition and imitation. Some of the utterances have been adapted from J.D. O'Connor, (op. cit., pp.121 et seq.), A.C. Gimson, (op. cit., pp.243 et seq.), and W.E. Welmers, (Monograph Series, Sept. 1954, p.135).

(a) Stress drill consists of short utterances with different stress patterns, e.g.:

door knob; sit here;

speak up; leave it.

(b) Rhythm units will consist of short utterances in which unstressed syllables are said quickly, but stressed syllables are prolonged, e.g.:

it's cold; she's home; some of it;

complain; we'll see.

(c) Intonation may distinguish sentence types, e.g.

Is he here?

He's here.

It is obvious that supra-segmental features are subject to systematic treatment. The initial object of the teacher is to establish recognition of different patterns. Gradually the patterns may be extended and may also be treated as constituents of longer utterances. The patterns may be varied, mixed, compared until they are unconsciously manipulated by native Afrikaans pupils.

An example of a sub-phonemic feature is the aspiration of initial fortis plosives in English structures. Aspiration has no phonemic significance, but it is a feature in the uniqueness of the English system, and that in itself, is sufficient justification for its observance. Aspiration may also contribute to the authentic realization of the succeeding vocoid.

E.5.5.

Technological Aids.

Technology has produced a large number of instruments which are used very successfully as aids in the teaching of languages. In South Africa many of these instruments are being used in the teaching of English as a second language. Experience has proved that young pupils readily take to the use of the instruments, they are intrigued by listening to their own dosembodied voices, and once the novelty of the new device has worn off, they settle down to a successful exploitation of the instruments - under the guidance of a highly motivated teacher.

Instrumental aids permit the obtaining of authentic models for all aspects of language study; they enhance pupils' self-evaluation capacity by sharpening their kinesthetic feedback, and at higher levels they enable pupils to do aural-oral drills on their own.

It must be emphasized that, at elementary school level, instrumental aids are what the name implies, namely, aids.

Some of the technological aids that are readily procurable are listed below.*

(i) Record players and discs. These may be used primarily for passive exposure to the language and the concomitant advantages to be derived from such a technique.

(ii) Tape recorders. These are in such common use that they require no introduction. But, very few, if any, tapes are available for the special requirements of native Afrikaans pupils studying English as a second language. The teacher may have to rely on his own resources and make tapes or adapt existing tapes. It is advisable to procure recorders that operate both from mains and on batteries.

(iii) The Language Master. This instrument can cope with an utterance which has a maximum duration of seven seconds, depending upon the length of the cards used. The cards are procurable in different sizes. It is an excellent instrument for exercises and drills in the pronunciation of single words and shorter utterances, and exercises in the correct manipulation of supra-segmental features.

(iv) The language laboratory. There are models of language laboratories that may be used at elementary school level. The potential of the language laboratory is virtually unlimited. At adult level it is used extensively for learning foreign languages. Literature on the use of language laboratories is

* At the time of writing it is the policy of provincial education authorities to subsidize the purchase of some of the instruments.

readily available.

E.6.

Fundamental Premises.

A number of fundamental premises relative to the teaching and learning of a second language are listed below. The object is to present in condensed form the most salient features pertaining to bilingualism. The items may constitute useful points of departure in an approach to the teaching of a second language with special reference to phonology.

The premises are stated in general terms, but each may be limited in its application to conditions obtaining in South Africa.

The items are not listed in any order of priority.

1. The simplest and most natural way of learning a secong language is to begin early.

2. In most milieus a chlid's environment will not perform a teacher's task for him.

3. A teacher cannot delegate his work to a textbook.

4. Listening and speaking are primary skills in second-language acquisition and should be accorded pre-eminence in the initial stages.

5. Both perception and interpretation of a second language are subject to the influence of the native system.

6. Living language should reflect the mutual effect between language and environment.

7. Supra-segmental features are more important than individual sounds in giving a language its authentic flavour.

8. The most effective materials for second language

teaching are those that are based on a scientific description of the language to be learnt.

9. In a state of bilingualism the native language dictates its laws of phonology and morphology to the second language.

10. A native speaker has no foundation for a habitual discrimination between phonic images of a second language.

11. Teachers should observe the normal rhythm and authentic rendering of a second language at all times.

12. A knowledge of the articulatory processes involved in the production of both the native and the second language is an indispensable adjuvant in the scientific approach to second-language teaching.

13. Phonic integration may be conditioned by graphic images.

E.7.

Conclusion.

If this investigation has made some contribution to the scientific study of aspects of the English speech of Afrikaans - English Bilinguals, the time and research work that have gone into it are rewarded. At the same time many aspects, that present a challenge to investigators, have been revealed; for instance, aspects of borrowing, integration, measuring interference, to mention but a few.

It is to be regretted that so little has been done in the field of the contrastive analysis of languages in an environment which, by virtue of its heterogeneous population and two official languages, lends itself ideally to the scientific exploration of aspects of bilingualism.

It is time that second language study and teaching in South Africa should be placed on a scientific foundation, and to that effect it would be well to institute a general inquiry into the whole question.

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