1977

NEUROPSYCHOLOGICAL SIGNIFICANCE OF PHONETICALLY ACCURATE AND PHONETICALLY INACCURATE SPELLING ERRORS IN YOUNGER AND OLDER CHILDREN.

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NEUROPSYCHOLOGICAL SIGNIFICANCE OF PHONETICALLY ACCURATE AND PHONETICALLY INACCURATE SPELLING ERRORS IN YOUNGER AND OLDER CHILDREN

by

James Ernest Sweeney

B.A., University of Windsor, 1965
M.A., University of Windsor, 1968

A Dissertation
submitted to the Faculty of Graduate Studies
through the Department of
Psychology in Partial Fulfillment
of the requirements for the Degree
of Doctor of Philosophy at
The University of Windsor

Windsor, Ontario, Canada

1977

ABSTRACT

NEUROPSYCHOLOGICAL SIGNIFICANCE OF PHONETICALLY ACCURATE AND PHONETICALLY INACCURATE SPELLING ERRORS IN YOUNGER AND OLDER CHILDREN

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A clear picture of the composite of abilities which underly the development of the ability to spell does not seem to have emerged from the research up to the present time. Since the complexity of the spelling process may necessitate different abilities being involved at different stages, it is not surprising that an almost exclusive reliance upon a "level of performance" approach for any one particular measure has not been as contributory as was originally expected. The purpose of the present research was to explore the possibility that qualitatively distinct approaches to spelling (as indicated by either a preponderance of phonetically inaccurate or phonetically accurate spelling errors) in children retarded in the ability to spell is related significantly to very different underlying deficits. Hypotheses regarding the adaptive deficiencies associated with these qualitatively different forms of spelling retardation in younger ($\underline{M}$ = 119.33 months) and older ($\underline{M}$ = 160.75 months) children were derived from Luria's (1973) neuropsychological model of the spelling process.

There were two younger and two older experimental groups (spelling retardates), and two normal spelling groups (Ns) each representing one age level. Each of the six groups consisted of eight subjects. One younger and one older experimental group were composed of retardates

in spelling who rendered 40% or less of syllables misspelled in a phonetically accurate manner (PIs). One younger and older experiemental group were composed of spelling retardates who rendered at least 60% of misspelled syllables in a phonetically accurate manner (PAs).

The performances of PIs, PAs, and Ns were compared across a wide range of language and language-related measures. Clear support for the contention that PIs are, in general, inferior to PAs and Ns in the development of language abilities was obtained. Upon closer inquiry, it was revealed that PIs performed consistently in an impaired fashion relative to Ns and PAs on tests which involved the carrying out of some rudimentary operation upon relatively short sequences of word sounds or word strings which conveyed little or no meaning. PAs, on the other hand, also exhibited a generalized impairment in language functioning relative to Ns. More specifically, in comparison to Ns, PAs appeared to encounter consistent difficulty in verbal abstract reasoning and in processing relatively lengthy word strings. Moreover, the level of performance of PAs appeared to deteriorate even further (to the point of being similar to that of PIs) when they were required to formulate relatively lengthy, complex, syntactical strings.

The results of this study were interpreted as suggesting that PIs, relative to PAs, may encounter extreme difficulty in completing those processes thought to be carried out in spelling beyond simple immediate memory for a word, i.e. segmentation of sequences of speech-sounds, and "visualizing" letters and words. PAs, moreover, would

seem to be experiencing some difficulty in spelling only when the cognitive process involved is somewhat more complex than a straightforward sound-symbol associational procedure, i.e. when the word-to-be spelled has a relatively low phoneme-grapheme correspondence.

The differences in adaptive deficiencies between PIs and PAs would seem quantitative rather than qualitative in nature, with PIs exhibiting a significantly greater degree of impairment than PAs. Furthermore, the data suggests that degree of impairment in the processing of relatively complex language for PIs and PAs is very similar relative to chronological age at both the younger and older age levels.

The nature of the difficulties exhibited by PAs and PIs are in line with the "higher order" language processing difficulties attributed to adult patients with lesions within the tertiary region of the left cerebral hemisphere by Luria (1973).

This dissertation is dedicated
to my children, Kerry, Tara, and Sean,
who, hopefully, will not always
have the narrow impression that
"daddies go to school" and "mommies work".

PREFACE

The impetus for this research originated from the realization that little was known in the field of special education concerning the adaptive significance of a preponderance of qualitatively different errors in attempting to learn to read and spell. It is anticipated that an expansion of knowledge in this direction will eventuate in the formulation of more effective programs of remediation for children retarded in reading and spelling skills.

Disraeli once remarked that "The secret of success is constancy to purpose". The author extends his sincere gratitude to his mentor, Dr. Byron Rourke, for sharing this most important principle through his sound direction and for unwittingly demonstrating its validity through his many professional accomplishments. A vigorous "thank you" is also sent out to Dr. Meyer Starr who eased this researcher ever so gently into the world of computers. In addition, the author is indebted to the following people: Helen Czudner, Janet Orr and Gene Mascola for test administration; Marilyn Chedour for spelling dictation; Marilyn Frederick and Pat Holland for typing assistance; and Wendy Nesseth for her willingness to help whenever possible. A note of grateful appreciation is expressed to the administration, principals, teachers, and pupils of the Windsor Separate School Board for their cooperation in this venture. Finally, a very special "thank you" is extended to Carole Sweeney, wife and friend, for her patience, understanding, and encouragement.

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CHAPTER 1

INTRODUCTION

The results of studies designed to reveal those skills crucial to the development of spelling ability have, for the most part, yielded rather unclear, inconsistent, and sometimes contradictory findings (see Appendix A for a review of this research). Most of these studies have been correlational in nature and have made exclusive use only of a "level of performance" approach to the measurement of spelling ability. Since the complexity of the spelling process may necessitate different abilities being involved at different stages, it is not surprising that exclusive reliance upon a "level of performance" approach has not been as contributory as was originally expected. Qualitatively distinct deficits may produce qualitatively distinct approaches to spelling which, nevertheless, may eventuate in quantitatively similar levels of spelling retardation. The purpose of the present study was to delineate the nature and extent of language and language-related abilities underlying phonetically inaccurate and phonetically accurate approaches to spelling in children who are classified as retarded in the ability to spell. Hypotheses regarding the adaptive deficits underlying these qualitatively different approaches were formulated on the basis of Luria's neuropsychological model of the spelling process (1973).

Luria's Neuropsychological Model and its Relation to Spelling Difficulties

It is well known that acoustic impulses are carried by nerve fibres arising in the organ of Corti in the cochlea of the inner ear, that these nerve fibres decussate partially in the medial lemniscus and relay in the medial geniculate body, and that they

terminate in the transverse gyrus of Heschl which is the primary projection zone of the auditory cortex. There is no complete representation of acoustic impulses from one ear in either cerebral hemisphere, although they are represented predominantly in the contralateral hemisphere. Luria (1973) points out that unilateral lesions of the primary auditory zones of the cortex do not produce total loss of hearing, but do effect a disturbance of the sensitivity of auditory perception. On the basis of numerous experiments (Baru & Karasseva, 1970; Gershuni, 1968; Karasseva, 1967) he concludes that unilateral lesions of the transverse gyrus of Heschl increase the threshold of auditory sensation for sounds presented to the opposite ear with a duration of only 1 - 5 ms. (tones of 1,000 Hz. were used). This inability to perceive ultrashort sounds at a decibel level which is normally adequate suggests that the primary zones of the auditory cortex prolongs acoustic excitation as well as transmits such excitation to other areas of the cortex.

Numerous experiments directed by Pavlov (Babkin, 1910; Elyasson, 1908; Kryzhanovsky, 1909; Kudrin, 1910) and other studies (Butler, Diamond, & Neff, 1957; Goldberg, Diamond, & Neff, 1957) provide results which suggest that lesions of the secondary zones of the auditory cortex (Brodmann's area 22 and part of area 21) in animals impairs the ability to differentiate between combinations of sounds, although the ability to distinguish simple sounds remains unimpaired. Investigations by Babenkova (1954), Kabelyanskaya (1957), Kaidanova (1954, 1967), and Traugott (1947) demonstrated that humans with small lesions of the secondary zones in the left temporal region were able to distinguish simple sounds, encountered only mild difficulty in differentiating simple sounds, and were not able to differentiate

combinations of sounds. In the same vein, Semernitskaya (1945) showed that patients with lesions of the temporal cortex were unable to differentiate between groups of 2 or 3 high-frequency tones or between rhythmic patterns of sounds. There is considerable evidence, then, that the secondary zones of the auditory cortex play a critical role in the differentiation of groups of acoustic stimuli and rhythmic acoustic patterns.

Numerous investigators, including Luria (1973), have made the (rather undisputed) observation that lesions of the secondary zones of the left (dominant) temporal lobe in man produce a marked impairment in the ability to differentiate sounds of speech (phonemic hearing), a disorder known as "sensory aphasia." In light of such an observation, Luria states rather unequivocally (1973, p. 134) that the secondary zones of the temporal cortex of the left (dominant) hemisphere "are specifically adapted for the analysis and synthesis of the sounds of speech or, in other words, for qualified speech hearing". In this connection, Luria characterizes language as being composed of a system which organizes phonemes into a particular sequence. He maintains that sounds are coded by the perceiver in accordance with this system, thereby distinguishing the useful phonemic features from the unessential characteristics of the language. In this view, the development of phonemic organizational skills are essential to the development of language abilities in general. Thus, it is not unexpected that patients experiencing the disorder of sensory aphasia exhibit a profound disturbance in language functioning.

The core of the syndrome produced by lesions of the secondary zones of the left temporal lobe would appear to be a disturbance of phonemic hearing. However, lesions somewhat further removed from the primary projection area of the auditory cortex (which

involve either the region of the middle temporalgyrus or deep temporal regions) may not produce an impairment of phonemic hearing, but may effect a profound disturbance in auditory-verbal memory. This disturbance is most apparent when the patient attempts to remember even a short series of sounds, syllables, or words. Luria, Sokolov, and Klimkovsky (1967) have obtained results which suggest that neighbouring auditory traces have a mutually inhibitory effect upon one another which, in turn, leads to a significant decrease in the amount of auditory-verbal information successively perceived. Tsvetkova (1970) has demonstrated that this inhibitory effect can be reduced by presenting a series of acoustic elements at longer intervals. Thus, it would appear that sequential auditory-verbal information can be remembered adequately in the presence of middle or deep left temporal lesions when there is sufficient time for consolidation. The secondary or systemic effects of disorders in phonemic hearing and auditory-verbal memory have been documented by Luria (1973).

Difficulty in the comprehension of spoken speech follows upon a disturbance in the ability to distinguish between closely sounding phonemes. Furthermore, stored phonemes, structurally similar, are not differentiated properly. In consequence, the phonemic structures of words retrieved for verbal expression are defective, producing a disorder in the patient's speech. In attempting to spell words, patients with a phonemic hearing disorder confuse phonemes which are somewhat similar, and are not able to analyze complex combinations of sounds. Consequently, there is an inability to write words properly which may be reflected by phonetic inaccuracies. (In the context of this study, "phonetic" refers to the representation of speech sounds or the phonemic elements of language, through written

symbols.) However, words which are very familiar (such as a signature) are not affected, because they have become stable motor stereotypes and do not require precise acoustic analysis. Similarly, the reading of words which have become firmly impressed visual stereotypes (and consequently are recognized readily by sight) are unaffected, because acoustic analysis is not required. However, the reading of words which do not have firmly impressed visual stereotypes (and which thus require precise acoustic analysis) is severely disturbed.

Luria (1973) also outlines the systemic effect of disturbances of auditory-verbal memory, which he terms "acoustico-mnestic aphasia". In this case, acoustic analysis functions remain unimpaired, but the patient's ability to remember sequences of sounds, syllables, or words of increasing length is severely impaired. It may be that the traces of each component of an auditory-verbal series inhibit one another from becoming imprinted in memory (Luria, Sokolov, & Klimkovsky, 1967). One would expect patients suffering from acoustico-mnestic aphasia to encounter difficulty in spelling and in reading relatively length words. In the case of spelling, memory for an extended sequence of phonemes would be markedly impaired, leading to phonemic omissions or additions and, consequently, a phonetically inaccurate product. In reading, the sequence of phonemes, especially for lengthy words, would not be remembered adequately, resulting in phonemic inaccuracies when the word is verbally expressed.

Luria maintains that articulatory analysis is also intimately involved in the phonetic analysis of words. The pronunciation of phonemes differentiates them from others and assists in the

clarification of the phonetic structure of words. Luria contends that this process involves the kinesthetic analyzer, "located" within the inferior portions of the post-central region of the left (dominant) hemisphere. He has observed that patients with lesions in this area present with "kinesthetic (afferent) motor aphasia"; in spelling, sounds similar in their articulation are confused (e.g., "b" is substituted for "m", or "n" is substituted for "l" or "t").

Finally, lesions of the parieto-temporo-occipital region of the left (dominant) cerebral hemisphere give rise to a disturbance in the naming of objects and the ability to evoke visual images in response to a given word (Luria, 1973). In the case of a disorder in the nominative function of speech as a result of such a lesion, it would appear that there is a disturbance in the production of visual images which prompt the retrieval of appropriate verbal labels. Reciprocally, lesions in this particular region are said to disrupt the visualization process prompted by verbal information. Consequently, sentences composed of relatively complex logical-grammatical (syntactical) relationships would not be comprehended adequately because of a deficiency in conjuring up visualizations of "quasi-spatial" relationships. In attempting to spell, it would be predicted that such localized lesions would result in a disturbance in the process through which accurate visualizations of words are evoked. This phenomenon would be expected to be characterized by an over-reliance upon the phonemic qualities of a word and little appreciation of what words are "supposed to look like". It is clear that these characteristics would be most reflected in the spelling of lengthy words which do not have a close phoneme-grapheme correspondence.

The phonemic and kinesthetic elements of words are transcribed into visualizations of combinations of language symbols which, in turn, give rise to motor acts through which these words are written, or spelled orally. In this connection, Luria has noted that lesions of the inferior zones of the pre-motor area of the left (dominant) hemisphere interfere with the automatic switching from one movement to another. In oral participation in spelling, one would expect, in such cases, a significant disturbance in the ability to move smoothly from one articulation to another. Such lesions also produce a deautomization in writing; the smooth transition from one component of a word to another is no longer possible.

Luria (1966) has pointed out that the writing of letters, syllables, or words, appears to be influenced very little by most frontal lesions. However, patients with frontal lesions very often have difficulty in maintaining a constant plan of action and in persistently comparing the results of their actions with the original plan. Consequently, such patients' writing may reflect difficulty in retaining general meaning or in inhibiting irrelevant words.

It almost goes without saying that Luria's neuropsychological model of the spelling process is highly complex, requiring the participation of several collaborating zones of the cerebral cortex. Speech sounds are analyzed acoustically within the secondary zones of the left (dominant) temoral lobe, which lie immediately adjacent to the primary projection area of the auditory cortex. The middle temporal gyrus and the deep temporal regions of the left cerebral hemisphere subserve memory for sequences of speech sounds for the purpose of phonetic analysis. Kinesthetic analysis of speech sounds, which takes place within the inferior parietal region of the left

cerebral hemisphere, further assists in clarifying the phonetic composition of the word. The phonemic and kinesthetic elements of the word give rise to a visualization of the proper combination of phonetic symbols (visual-spatial structuring) within the left parieto-temporo-occipital region. The aforementioned elements, in combination, give rise to motor acts mediated principally by the inferior zones of the pre-motor and motor regions through which the word is written, or spelled orally.

Luria's neuropsychological model of the spelling process suggests very clearly that there are numerous brain-related links in the system which, when defective, can lead to the disorganization of the functional system as a whole. This renders it very likely, therefore, that qualitatively different underlying problems would be in evidence in any fairly large group of spelling retardates. Hence, it should not be surprising that studies which have investigated relationships between levels of performance in spelling and "basic abilities" have yielded unclear, inconsistent, and sometimes contradictory results. In order to study abilities which underlie the complex skill of spelling, it would appear worthwhile to focus on the adaptive significance of qualitatively different approaches to spelling. Such studies are beginning to emerge in the literature.

Current Studies

The results of a study by Nelson and Warrington (1974), with children 8 to 14 years of age, suggest that (1) a preponderance of phonetically inaccurate spelling errors (e.g., "DAL" for "DARE") is related to (a) a substantial WISC Verbal-Performance IQ discrepancy (Verbal IQ being more than 15 points below Performance IQ) and

(b) retardation in both spelling and reading; and, (2) a high proportion of phonetically accurate spelling errors (e.g., "DAIR" for "DARE") is associated with (a) little or no WISC Verbal-Performance IQ discrepancy in the direction of lower Verbal IQ and (b) spelling retardation and a significantly lesser degree of retardation in reading.

Further evidence for a relationship between phonetically inaccurate spelling errors and a generalized impairment in language functioning is found in the results of studies by Newcombe (1969) and Kinsbourne and Warrington (1964) which suggest that phonetically inaccurate spelling errors are associated with dysphasia in adult patients. In this connection, as was documented earlier, Luria maintains that some language disorders are symptomatic of dysfuntion with the temporal regions of the left (dominant) cerebral hemisphere.

An hypothesis regarding the possible mechanism underlying the production of a large proportion of phonetically accurate spelling errors emerges from the work of Boder (1973). She differentiated a group of dyslexic children who exhibited poor memory for the visual-spatial characteristics of letters and words (as reflected in a very limited "sight-word" vocabulary) and found that this group tended to spell in a phonetically accurate manner. One theoretical explanation (of perhaps many) for this empirical observation is that a preponderance of phonetically accurate spelling errors in children is related to a deficit in visualizing clearly the spatial characteristics of words and, more generally, visual experiences encountered previously. It has been suggested that lesions of the parieto-temporo-occipital region of the left (dominant) cerebral hemisphere give rise to a disturbance in the ability to evoke visual images in response to a give word.

Hypotheses

The adaptive significance of qualitatively different spelling errors suggested by the aforementioned studies fits rather neatly into the neuropsychological model of spelling behaviour proposed by Luria. The present study represented an attempt to explore the neuropsychological significance of phonetically inaccurate and phonetically accurate spelling errors in younger and older children.

One major hypothesis of this study was that spelling retardates who exhibit a preponderance of phonetically inaccurate errors in spelling would present with adaptive deficits similar to those expected were they to be experiencing the untoward effects of significant dysfunction within the secondary zones of the left (dominant) temporal region as documented by Luria (1973) in adults. The predicted symptomatology was as follows: (1) a disturbance in phonemic hearing; (2) difficulty in the comprehension of spoken speech; (3) an impairment in the ability to retrieve words for verbal expression; (4) a deficiency in short-term memory for auditory-verbal information; (5) a general deficiency in language abilities. In order to determine whether or not phonetically inaccurate spelling is associated significantly with disturbances in language functioning, verbal measures of a phonetically inaccurate group of children retarded in the ability to spell (PIs) were compared with those of a group of spelling retardates who exhibited a preponderance of phonetically accurate errors in spelling (PAs) and with those of a group of normal spellers (Ns). It was hypothesized that the language abilities of the PIs would be significantly inferior to those of the PAs and Ns (Hypothesis 1a). Also, in view of the results of the Nelson and Warrington (1974) study, it was expected that PIs

would exhibit a significant WISC Verbal-Performance IQ discrepancy (in the direction of low Verbal IQ); the magnitude of this discrepancy was expected to be much less in PAs, and no significant VIQ-PIQ discrepancy was expected for Ns (Hypothesis 1b).

The second major hypothesis of this study was that PAs would exhibit adaptive deficits consistent with those anticipated were they to be encountering the debilitating influence of significant dysfunction within the parieto-temporo-occipital region of the left (dominant) cerebral hemisphere as observed by Luria (1973) in adults. Lesions of the left parieto-temporo-occipital region are said to interfere with (1) the evokation of visual images which prompt, or are prompted by, appropriate verbal labels, and (2) the comprehension of relatively complex logical-grammatical relationships. In order to test the second major hypothesis, it was proposed that PAs would have more difficulty than PIs or Ns in visualizing accurately common objects (as indicated by verbal identification) on the basis of a limited number of pictorial clues of drawings of these objects (Hypothesis 2a). PAs were expected to perform in a fashion which was significantly inferior to that of PIs on the latter task because (1) the capacity to "visualize" appeared essential for efficient performance and (2) the verbal requirements seemed minimal. It was also expected that PAs would demonstrate an impaired level of performance as compared to Ns in the comprehension of relatively complex logical-grammatical relationships (Hypothesis 2b). Due to the anticipated inferiority of PIs in regard to the comprehension of spoken speech in general, it was hypothesized that PAs would be significantly superior to PIs in the comprehension of logical-grammatical relationships (Hypothesis 2c).

In interpreting neuropsychological test data, the present author has observed that this proposed discrepancy in the development of language abilities between PIs and PAs increases with age. Moreover, this possibility is reflected in the central role that Luria attributes to phonemic hearing and auditory-verbal memory in the development of language skills. Since inadequate phonemic hearing and/or auditory-verbal memory may eventuate in linguistic deficiencies which increase in degree relative to age, it was hypothesized (Hypothesis 3) that the superiority of PAs over PIs in language skills would be significantly greater at the "older" as compared to the "younger" age level.

On the basis of Luria's model of brain-behaviour relationships it would be expected that (besides associations between qualitatively different spelling errors on the one hand, and disturbances in language functioning and the evokation of visual images on the other) there would be relationships between qualitatively distinct spelling errors and (1) level of achievement in reading, and (2) qualitative approach to reading. If phonetically inaccurate spelling errors are indeed a product of deficits in phonemic hearing and short-term auditory-verbal memory, it would follow that this type of spelling error should be related to a markedly impaired level of performance in reading. (This conclusion is based on the presumed necessity of a complete repertoire of well differentiated phonemes for efficient reading.) On the other hand, phonetically accurate spelling errors, if brought about by a deficiency in the ability to evoke visual images of words, would be associated with a limited repertoire of visual "models" of words (frequently referred to by educators as "sight-word" vocabulary). Consequently, words-to-be-read which have a low grapheme-phoneme correspondence (i.e., which cannot be decoded properly using a strict

phonetic approach) would not have readily available visual models as "matches" and would therefore not be read accurately. Since there is a considerable (but not complete) degree of grapheme-phoneme correspondence in words of the English language (Hanna & Moore, 1953; Rudorf, 1964; Stanford Spelling Project, 1966), it would be predicted, on the basis of Luria's model, that PAs would be significantly less impaired in level of reading ability then PIs, although significantly impaired in this skill relative to Ns. Thus, an additional hypothesis of this study is that the level of oral reading performance of PAs would fall at a position intermediate to that of PIs and Ns. More specifically, the level of oral reading ability of PAs would be significantly superior to that of PIs and significantly inferior to that of Ns (Hypothesis 4a).

However, it is obvious that such "level of performance" findings would provide only very tentative support for the theoretical formulation that the reading styles of PIs, PAs, and Ns are qualitatively different. Very distinct reading approaches of these three spelling groups must be demonstrated rather than presumed in order to provide substantive support for the neuropsychological model of spelling behaviour being proposed. In this connection, it was expected that (1) the reading style of PIs would reflect a significant emphasis upon a "sight-word" approach relative to those of PAs and Ns (Hypothesis 4b),(2) PAs would exhibit a significant over-reliance upon phonetic analysis in reading as compared to PIs and Ns (Hypothesis 4c), and (3) the reading approach of Ns would reflect a balanced interplay between "sight" and "phonetic" styles (Hypothesis 4d).

CHAPTER II

METHOD

Subjects

The subjects selected for this study were right-handed students at age levels commensurate with grades four ("younger", M = 119.33 months) and eight ("older", M = 160.75 months) who had attended school regularly from the age of six years. English was the primary language in the home of all subjects. Children who had a history of "cultural deprivation", an impairment in vision or hearing, or who were viewed as being in need of psychiatric treatment for an emotional disorder were excluded. The WISC Performance Scale IQ for all subjects fell within the range of 85-115 (M = 100.04). (The Maze subtest was substituted for the Coding subtest in the determination of WISC PIQ.)

Retardation in spelling was defined operationally as a centile score of 20 or below on the Spelling subtest of the Wide Range Achievement Test (WRAT; Jastak & Jastak, 1965). Normal spellers (Ns) were selected on the basis of a centile score of 50 or above on the Spelling subtest of the WRAT (M = 66.50).

There were two younger and two older experimental groups, and two control (normal) groups, each representing one age level. Each of the six groups consisted of eight subjects (5 males and 3 females). [The subjects were matched for sex across groups.]

One younger and one older experimental group were composed of retardates in spelling who rendered 40% or less of syllables misspelled in a phonetically accurate manner (PIs). One younger and one older experimental group were composed of spelling retardates who rendered at least 60% of misspelled syllables in a

phonetically accurate manner (PAs). There was no statistically significant difference in degree of retardation in spelling between PIs ($\underline{M}$ = 9%ile) and PAs ($\underline{M}$ = 14.25%ile). Moreover, the difference in degree of phonetic accuracy of misspelled syllables between Ns ($\underline{M}$ = 70.87) and PAs ($\underline{M}$ = 74.00) was not statistically significant.

PIs, PAs and Ns were selected so as to equate these groups as closely as possible for age and WISC Performance IQ. Analyses of variance did not reveal statistically significant differences in age or WISC Performance IQ between PIs ($\underline{M}$ age = 140.00 months, $\underline{M}$ PIQ = 98.12), PAs ($\underline{M}$ age = 140.93 months, $\underline{M}$ PIQ = 98.68) and Ns ($\underline{M}$ age = 139.18 months, $\underline{M}$ PIQ = 103.31).

Measure for Subject Selection

Two experienced teachers, a male and a female, were enlisted to dictate the words which compose the two levels of spelling lists on the WRAT. Their backgrounds included teaching grades 4 and 8 and residing within the geographical region of this study for most of their lives. They dictated these words as a spelling exercise to a senior elementary school student in a classroom. These dictations were tape recorded and analyzed phonetically utilizing a pronunciation symbol system provided by Cassano (1976). A phonetic analysis for each word as pronounced by a teacher in a spelling exercise was thus obtained for this particular geographical area. Syllabic bounderies for each analysis were imposed on the basis of the breaks in sound heard within the pronunciation of each word. From these analyses, a conventional phonetic spelling of each word, reflecting syllabication in pronunciation, was rendered to provide conventional pronunciation guide words (see Appendix B).

Normal spellers and spelling retardates were selected through group administrations of the WRAT Spelling subtest conducted by an experienced psychometrist native to the geographical region of this study whose pronunciations were found to be in accord with those represented by the pronunciation guide. Approximately 1,000 children in groups of about 30 were screened using this measure.

Phonetic Accuracy

Degree of phonetic accuracy was determined in the following manner: (1) a list of the possible phonetically accurate spellings for each syllable of each word (see Appendix C) was compiled using lists of common regional pronunciations and common spellings provided by Cassano (1976); (2) misspelled words were divided in such a way as to make as close a fit as possible with the syllabic structure of the word in pronunciation as provided by the pronunciation guide word; (3) each misspelled syllable was scored as phonetically accurate only if it was included within the list of phonetically accurate spellings for that syllable previously compiled. The overall percentage of misspelled syllables rendered in a phonetically accurate manner represented the phonetically accurate error score for each spelling retardate. The criteria for the selection of the PI and PA groups were then applied for the determination of the experimental groups.

Dependent Measures

The Goldman-Fristoe-Woodcock Test of Auditory Discrimination (Goldman, Fristoe, & Woodcock, 1970), the Auditory Closure Test (Kass, 1964), the Sentence Memory Test (Benton, 1965), the Peabody Picture Vocabulary Test (PPVT; Dunn, 1965), the Verbal Fluency Test (Strong), the WISC Information, Comprehension, Arithmetic, Similarities,

Vocabulary, Digit Span, and Coding subtests, and an Index of General Language Ability (sum of raw scores for all preceding verbal tests and subtests) were included as dependent measures in order to investigate the proposed relationship between phonetically inaccurate spelling errors and impaired language functioning. The sum of the scaled scores for the six WISC Verbal subtests were prorated for the determination of Verbal IQ. The WISC Verbal-Performance IQ discrepancy measure utilized consisted of the algebraic sum of Verbal IQ minus Performance IQ (the Maze subtest being substituted for the Coding subtest in the determination of PIQ). The inclusion of the Higgins-Wertman Test of Visual Closure (Higgins & Wertman, 1968) and the Logico-Grammatical Sentence Comprehension Test (Wiig & Semel, 1972) was prompted by the possibility that the "visualization" capacity and the presumably related ability to comprehend complex syntactical relationships was impaired for PAs. Lastly, the Reading subtest of the Wide Range Achievement Test (WRAT; Jastak & Jastak, 1965) and the Diagnostic Screening Procedure for Developmental Dyslexia (Boder, 1973), adapted to accommodate grades seven and eight, was utilized in exploring the possibility of quantitative and qualitative differences in oral reading among PIs, PAs, and Ns. The adapted version of the Diagnostic Screening Procedure for Developmental Dyslexia consists of 20 words at each of ten grade levels from the pre-primer level to grade eight. Beginning with the pre-primer level, each word on a card was "flashed" in front of the subject for one second. If he was able to read it, the word was recorded as having been read "by sight". If he was unable to read it, the word was presented once again for ten seconds. If he was able to read it under this condition, the word was recorded as having been read

by phonetic analysis. Testing was discontinued when the subject failed to read 12 consecutive words under both conditions. A number representing the ratio composed of the number of words read "by sight" over the number of words read by phonetic analysis was the measure obtained. The higher this "qualitative index" the more a "sight-word" approach has been adopted; the lower the index, the more phonetic analysis has been employed.

All dependent measures were recorded and analyzed in the form of raw scores, with the exceptions of VIQ-PIQ discrepancy scores and WRAT grade level reading scores.

All tests were administered by psychometrists trained extensively in the administration of neuropsychological test batteries to children. The testing was carried out within the school attended by the subject. The order of presentation of tests was essentially random.

CHAPTER III

RESULTS

The Statistical Analysis Systems designed by Barr & Goodnight (1972) and Barr, Goodnight, Sall and Helwig (1976) were utilized for data analyses, employing the IBM-360-65 Computer (Model IH with LCS).

The means and standard deviations for age, WISC Performance IQ, and degree of phonetic accuracy for Ns, PAs, and PIs are presented in Table 1.

TABLE 1

Means and Standard Deviations for Age, WISC Performance IQ and Phonetic Accuracy for Ns, PAs, and PIs.

Age (in months)			
M	139.18	140.93	140.00
SD	21.71	21.36	22.63
WISC PIQ			
M	103.31	98.68	98.12
SD	6.46	8.67	8.38
% of Phonetic Accuracy			
M	70.87	74.00	29.93
SD	19.57	9.22	6.01

Two-factor analyses of variance were utilized to analyze the effects of qualitatively distinct spelling performances and age on (1) verbal abilities, (2) the capacity to "visualize", and (3) oral reading skills.

The means and standard deviations for Ns, PAs, and PIs for each measure are presented in Table 2. In order to permit meaningful comparisons among test performances, all data, with the exception of VIQ - PIQ discrepancies, were converted to standardized T scores. A graphic illustration of this converted data is presented in Figure 1.

TABLE 2

Means and Standard Deviations
for Ns, PAs, and PIs for each measure

Dependent Measure (number correct unless otherwise indicated	Group (n = 16 for each)		
	Ns	PAs	PIs
Digit Span - backward			
M	4.12	3.81	3.06
SD	0.88	0.91	0.68
Digit Span - total			
M	10.62	9.87	8.75
SD	1.20	2.33	1.29
Auditory Closure[a]			
M	17.75	16.06	13.00
SD	4.12	4.12	4.97
Verbal Fluency[b]			
M	8.81	7.90	6.78
SD	2.46	2.22	1.95
WRAT Reading[c] (grade level)			
M	9.14	5.01	3.54
SD	2.87	1.42	1.87
Arithmetic[c]			
M	10.37	9.25	7.37
SD	1.40	1.65	1.66
Index of General Language[d]			
M	336.50	298.21	278.78
SD	52.23	32.60	35.35
Logico-Grammatical Sentence Comprehension[f]			
M	44.68	41.56	36.75
SD	4.04	4.61	7.05
Peabody Picture Vocabulary[c]			
M	92.06	86.00	78.75
SD	15.25	10.80	7.96

TABLE 2 (cont'd)

Means and Standard Deviations
for Ns, PAs, and PIs for each measure

Dependent Measure (number correct unless otherwise indicated)	Group (n = 16 for each)		
	Ns	PAs	PIs
Similarities[e]			
M	12.68	11.18	9.37
SD	4.42	3.35	2.72
Coding[h]			
M	48.18	42.75	39.56
SD	11.73	9.33	9.25
Vocabulary[g]			
M	41.43	34.12	32.18
SD	7.63	5.32	5.86
Comprehension[g]			
M	14.87	11.93	10.93
SD	3.38	3.08	4.28
Qualitative Index[g] (Ratio)			
M	21.93	5.99	7.18
SD	21.90	2.43	5.57
Information[g]			
M	16.56	11.62	11.56
SD	4.25	2.41	2.60
Visual Closure			
M	80.00	71.56	62.06
SD	33.57	31.03	15.22
Sentence Memory			
M	15.75	14.81	13.50
SD	2.48	2.50	2.85
Digit Span - forward			
M	6.50	6.06	5.68
SD	0.73	1.61	1.07

TABLE 2 (cont'd)

Means and Standard Deviations
for Ns, PAs, and PIs for each measure

Dependent Measure (number correct unless otherwise indicated)	Group (n = 16 for each)		
Auditory Discrimination - noise			
M	20.06	21.06	19.87
SD	2.99	2.86	2.52
Auditory Discrimination - quiet			
M	27.31	27.87	27.62
SD	1.62	1.40	1.70
VIQ-PIQ Discrepancy[g]			
M	5.00	-5.50	-9.56
SD	10.72	7.40	11.92

(a) Comparison between Ns and PIs and PAs and PIs yields $p = .01$.

(b) Comparison between Ns and PIs yields $p = .01$; comparison between PAs and PIs yields $p = .05$.

(c) Comparison between Ns and PAs and Ns and PIs and PAs and PIs yields $p = .01$.

(d) Comparison between Ns and PAs and Ns and PIs yields $p = .01$; comparison between PAs and PIs yields $p = .05$.

(e) Comparison between Ns and PIs yields $p = .01$; comparison between Ns and PAs and PAs and PIs yields $p = .05$.

(f) Comparison between Ns and PIs and PAs and PIs yield $p = .01$; comparison between Ns and PAs yield $p = .05$.

(g) Comparison between Ns and PAs and Ns and PIs yield $p = .01$.

(h) Comparison between Ns and PIs yield $p = .01$; comparison between Ns and PAs yield $p = .05$.

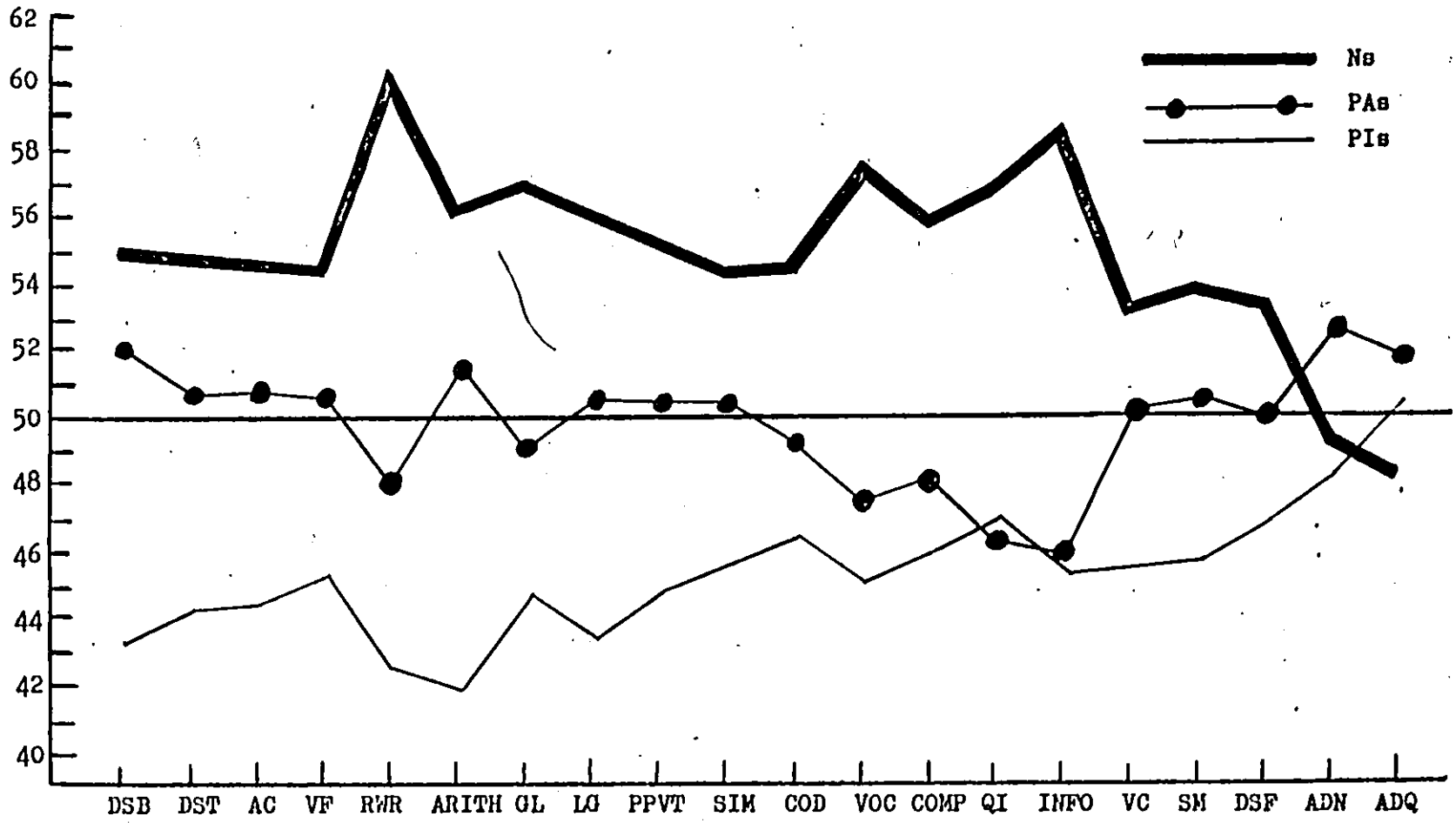


Fig. 1. Mean T scores for Ns, PAs, and PIs.

Note. Abreviated: DSB = WISC Digit Span - backward; DST = WISC Digit Span - forward; AC=Auditory Closure; VF=Verbal Fluency Test; RWR=WRAT Reading; ARITH=WISC Arithmetic; GL=Index of General Language Ability; LG=Logico-Grammatical Sentence Comprehension; PPVT=Peabody Picture Vocabulary Test; SIM=WISC Similarities; COD=WISC Coding; VOC=WISC Vocabulary; COMP=WISC Comprehension; QI=Qualitative Index; INFO=WISC Information; VC=Visual Closure; SM=Sentence Memory; DSF=Digit Span - forward; ADN=Auditory Discrimination (noise); ADQ=Auditory Discrimination (quiet).

There were no statistically significant differences between pairs of PIs, PAs, and Ns in the discrimination of speech-sounds under conditions of "quiet" and "noise" (Test of Auditory Discrimination), in immediate memory for auditory-verbal information (WISC Digit Span subtest - forward and the Sentence Memory Test), and on the Test of Visual Closure. Statistically significant differences were obtained between pairs of these groups on the WISC Digit Span subtest - backward, the WISC Digit Span subtest - total, the Auditory Closure Test, the Verbal Fluency Test, the WRAT Reading subtest, the WISC Arithmetic subtest, the Index of General Language Ability, the Logico-Grammatical Sentence Comprehension Test, the Peabody Picture Vocabulary Test, the WISC Similarities subtest, the WISC Coding subtest, the WISC Vocabulary subtest, the WISC Comprehension subtest, the Qualitative Index, and the WISC Information subtest.

Utilizing the Newman-Keuls statistical procedure, it was found that the performances of Ns and PAs were significantly more efficient than those of PIs (with the differences between Ns and PAs being statistically nonsignificant) on the following measures: (1) WISC Digit Span subtest - backward; (2) WISC Digit Span subtest - total; (3) Auditory Closure Test; (4) Verbal Fluency Test.

Ns, PAs, and PIs differed from one another in a statistically significant fashion in the order Ns> PAs> PIs on the following measures: (1) WRAT Reading subtest; (2) WISC Arithmetic subtest; (3) Index of General Language Ability; (4) Logico-Grammatical Sentence Comprehension Test; (5) Peabody Picture Vocabulary Test; (6) WISC Similarities subtest.

The performances of Ns were statistically superior to those of PAs and PIs (with no significant differences being reflected between PIs and PAs) on (1) the WISC Coding subtest, (2) the WISC Vocabulary

subtest, (3) the WISC Comprehension subtest, (4) the Qualitative Index, and (5) the WISC Information subtest.

The spelling factor yielded a highly significant main effect on the WISC Verbal-Performance IQ discrepancy measure which is illustrated graphically in Figure 2. Further analysis of the differences between pairs of means revealed that Ns differed in a statistically significant manner from PAs and PIs but that the latter two groups did not.

Statistically significant developmental main effects were found for all measures with the exception of WISC Digit Span subtest - backward, WISC Digit Span subtest - total, WISC Digit Span subtest - forward and the Test of Auditory Discrimination (quiet condition). The means and standard deviations for Ns, PAs, and PIs at the younger and older age levels are presented in Table 3.

Statistically significant interactions of the factors of spelling and age were obtained for the following measures: (1) WRAT Reading subtest; (2) Qualitative Index; (3) WISC Information subtest; (4) Index of General Language Ability; (5) Peabody Picture Vocabulary Test. These interactions are presented graphically in Figure 3. Analyses of simple effects were carried out in order to determine statistically the nature of these interactions. The WISC Information subtest, the Peabody Picture Vocabulary Test and the Index of General Language Ability yielded measures which indicated (1) no statistically significant differences between pairs of PIs, PAs, and Ns at the younger age level, (2) a significant positive developmental effect for Ns and PAs, and (3) statistically significant differences between older spellers. The Newman-Keuls procedure revealed that the performances of older Ns were statistically superior to those of older PIs

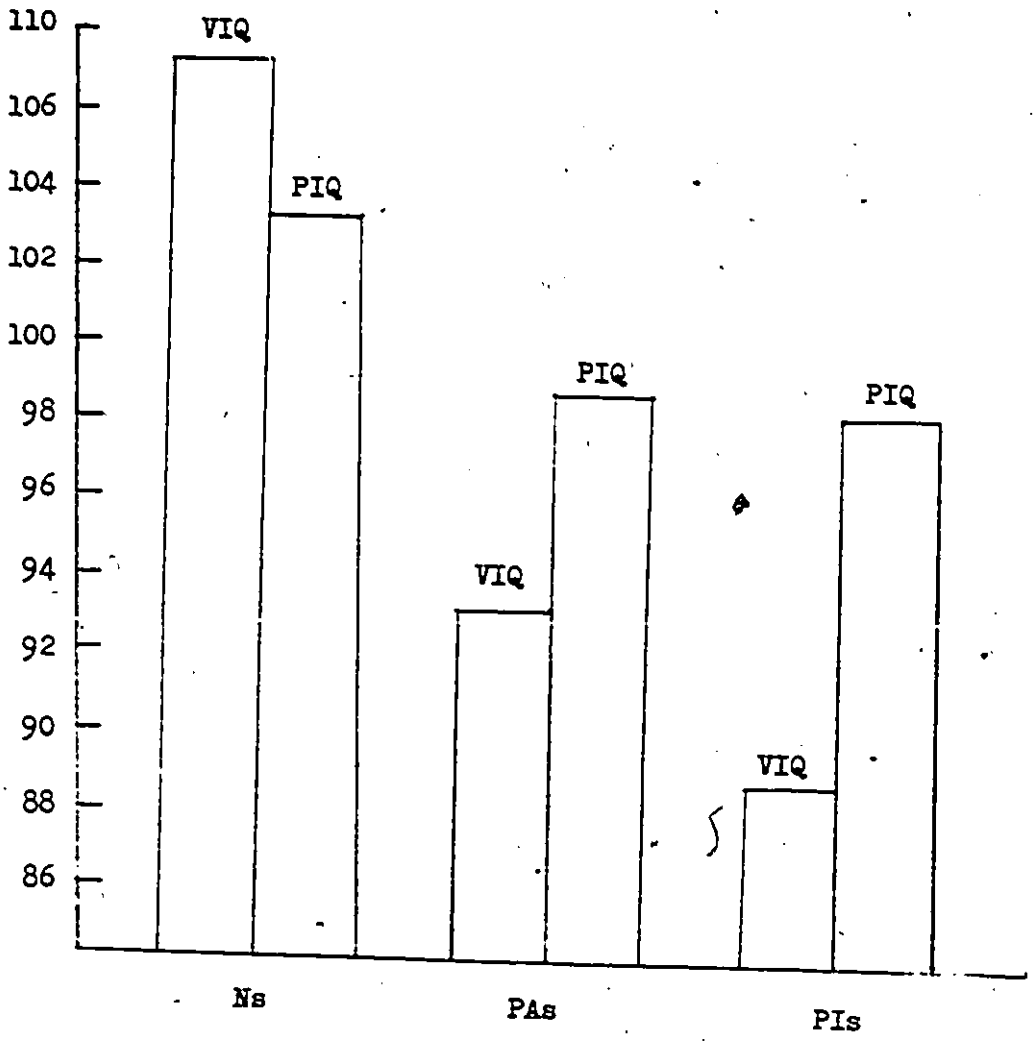


Fig. 2 Mean WISC VIQ-PIQ discrepancy for Ns, PAs, and PIs.

TABLE 3

Means and Standard Deviations for Younger and Older Ns, PAs, and PIs for each measure.

Dependent Measure (number correct unless otherwise indicated)	NORMALS		PHONETICALLY ACCURATE		PHONETICALLY INACCURATE	
	YOUNG	OLD	YOUNG	OLD	YOUNG	OLD
Digit Span – backward						
M	3.87	4.37	3.62	4.00	3.12	3.00
SD	0.99	0.74	0.74	1.06	0.64	0.75
Digit Span – total						
M	10.12	11.12	9.50	10.25	8.87	8.62
SD	0.99	1.24	2.07	2.65	1.12	1.50
Auditory Closure[b]						
M	15.50	20.00	14.62	17.50	11.62	14.37
SD	3.89	3.11	3.62	4.30	4.37	5.44
Verbal Fluency[c]						
M	7.56	10.06	6.93	8.87	6.81	6.75
SD	2.00	2.33	1.45	2.51	1.98	2.07
WRAT Reading[aa] (grade level)						
M	6.65	11.63	4.27	5.75	3.02	4.06
SD	1.39	1.23	1.09	1.38	1.00	2.42
Vocabulary[a]						
M	35.75	47.12	31.12	37.12	30.87	33.50
SD	5.41	14.64	4.35	4.61	6.17	5.63

TABLE 3 (cont'd)

Means and Standard Deviations for Younger and Older Ns, PAs, and PIs.

Dependent Measure (number correct unless otherwise indicated)	NORMALS		PHONETICALLY ACCURATE		PHONETICALLY INACCURATE	
	YOUNG	OLD	YOUNG	OLD	YOUNG	OLD
Comprehension[b]						
M	12.62	17.12	11.37	12.50	9.50	12.37
SD	3.11	1.80	3.54	2.67	3.58	4.65
Qualitative Index[of] (Ratio)						
M	12.00	31.86	5.28	6.71	7.35	7.00
SD	7.70	27.26	1.28	3.13	4.02	7.08
Information[ad]						
M	12.87	20.25	10.25	13.00	11.25	11.87
SD	1.35	2.43	1.90	2.13	2.49	2.85
Visual Closure[b]						
M	58.75	101.25	60.12	83.00	59.00	65.12
SD	28.47	23.92	27.35	31.89	17.76	12.63
Sentence Memory[o]						
M	14.37	17.12	14.12	15.50	13.25	13.75
SD	2.66	1.35	2.58	2.39	3.37	2.43
Arithmetic[a]						
M	9.37	11.37	8.50	10.00	6.75	8.00
SD	0.74	1.18	1.30	1.69	1.48	1.69

TABLE 3 (cont'd)

Means and Standard Deviations for Younger and Older Ns, PAs, and PIs.

Dependent Measure (number correct unless otherwise indicated)	NORMALS		PHONETICALLY ACCURATE		PHONETICALLY INACCURATE	
	Young	Old	Young	Old	Young	Old
Index of General Language[ae]						
M	291.81	381.18	281.81	314.62	264.81	292.75
SD	28.74	21.33	19.37	35.87	34.12	32.66
Logico-Grammatical Sentence Comprehension[b]						
M	43.50	45.87	38.75	44.37	34.00	39.50
SD	4.20	3.75	4.16	3.20	7.98	5.07
Peabody Picture Vocabulary[ad]						
M	79.12	105.00	79.12	92.87	76.12	81.37
SD	9.12	5.80	7.97	8.85	8.40	7.02
Similarities[a]						
M	9.50	15.87	9.37	13.00	8.75	10.00
SD	2.07	3.79	2.55	3.16	2.65	2.82
Coding[a]						
M	39.62	56.75	38.25	47.25	34.50	44.62
SD	5.68	9.75	7.14	9.45	5.75	9.59
Digit Span - forward						
M	6.25	6.75	5.87	6.25	5.75	5.62
SD	0.70	0.70	1.45	1.83	1.28	0.91

TABLE 3 (cont'd)

Means and Standard Deviations for Younger and Older Ns, PAs, and PIs.

Dependent Measure (number correct unless otherwise indicated)	NORMALS		PHONETICALLY ACCURATE		PHONETICALLY INACCURATE	
	YOUNG	OLD	YOUNG	OLD	YOUNG	OLD
Auditory Discrimination - noise[c]						
M	18.25	21.87	20.87	21.25	19.37	20.37
SD	3.05	1.55	2.23	3.53	2.72	2.38
Auditory Discrimination - quiet						
M	27.12	27.50	27.75	28.00	27.12	28.12
SD	1.64	1.69	0.88	1.85	1.95	1.35
VIQ-PIQ Discrepancy[c]						
M	6.37	3.62	-3.37	-7.62	-4.12	-15.00
SD	7.48	13.63	9.17	4.77	10.49	11.26

(a) Comparison between age levels yields $p = .001$.
(b) Comparison between age levels yields $p = .01$.
(c) Comparison between age levels yields $p = .05$.
(d) Interaction $p = .001$.
(e) Interaction $p = .01$.
(f) Interaction $p = .05$.

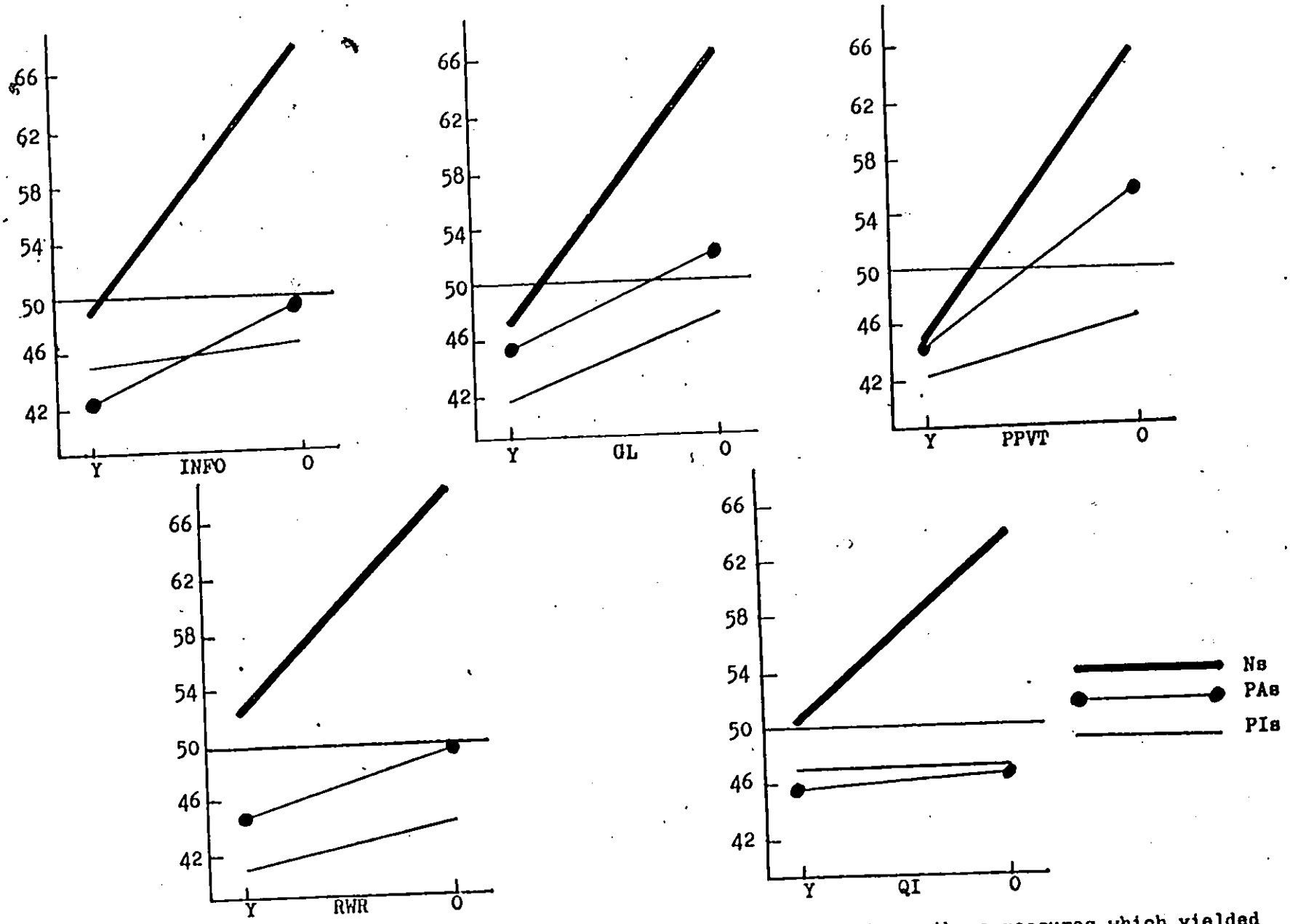


Fig. 3. A comparison of mean T scores for younger and older Ns, PAs, and PIs on those measures which yielded a significant spelling x age interaction. Note. Abbreviated: Y = younger; O = older; INFO = WISC Information; GL = Index of General Language; PPVT = Peabody Picture Vocabulary Test; RWR = WRAT Reading; QI = Qualitative Index.

and older PAs on these three measures. Moreover, the performances of older PAs were significantly more efficient than older PIs on only one of these three measures, the Peabody Picture Vocabulary Test.

Significant differences in performance on the WRAT Reading subtest measure were obtained between pairs of younger spellers, and pairs of older spellers. Further analysis of the differences between pairs of means indicated that younger Ns and older Ns were significantly superior to younger PIs and PAs and older PIs and PAs, respectively. Although younger PAs did not differ statistically from younger PIs in level of performance in oral reading, older PAs were significantly better than older PIs. A significant age effect (which was positive in direction) was in evidence solely for Ns on the WRAT Reading measure.

The differences between younger PIs, PAs, and Ns on the Qualitative Index measure were statistically non-significant. However, significant differences obtained on this measure for older PIs, PAs, and Ns. The Newman-Keuls procedure revealed that older Ns were significantly different from older PIs and PAs but that the latter two groups were not. A positive age effect which was statistically significant was obtained only for Ns.

Spearman rank order correlation coefficients were obtained between the measure of phonetic accuracy of misspellings and all dependent measures within each individual N and PA group (PIs were excluded because their range of phonetic accuracy was restricted). Phonetic accuracy was found to correlate significantly with the following measures for Ns: (1) Sentence Memory Test .72 (p = .01); (2) WISC Digit Span subtest - backward .66 (p = .01); (3) Auditory Closure Test .64 (p = .01); (4) WISC Digit Span subtest - total .56 (p = .05).

The measure of phonetic accuracy of spelling errors for PAs did not correlate significantly with any of the dependent measures utilized in this study. The correlations obtained between phonetic accuracy and the latter four measures within the PA group are presented for the purpose of comparison: (1) Sentence Memory - .18; (2) WISC Digit Span subtest - backward - .03; (3) Auditory Closure Test .00; (4) WISC Digit Span subtest - total .04.

CHAPTER IV

DISCUSSION

Hypothesis 1a was strongly supported. The language abilities of PIs were, in general, significantly inferior to those of PAs and Ns. This deficiency was reflected rather clearly in an accumulative measure of language skills (Index of General Language Ability). The finding of a significant positive relationship between phonetically inaccurate spelling retardation and a generalized impairment in language functioning relative to PAs and Ns is in line with the conclusions of Kinsbourne & Warrington (1964) and Newcombe (1969) that phonetically inaccurate spelling errors are associated with dysphasia. However PIs, relative to PAs and Ns, did not perform in an impaired manner on all of the component measures of the Index of General Language Ability as predicted on the basis of Luria's neuropsychological model of the spelling process. Measures of phonemic hearing (Test of Auditory Discrimination) and immediate memory for auditory-verbal information (Digit-Span-forward and Sentence Memory Test) did not discriminate, significantly, PIs from PAs and Ns. Hence, some doubt is cast upon the possibility that the principal material substrate of phonetically inaccurate spelling is significant dysfunction within the secondary zones of the left (dominant) temporal region in children.

Although PAs were quite similar to Ns in their performance in retrieving words beginning with particular sounds (Verbal Fluency) and on some tests involving immediate auditory-verbal memory and some form of processing (Digit-Span-backward and Auditory Closure),

they were not exempt from linguistic deficiencies. PAs obtained Indices of General Language Ability which reflected significantly inferior language development relative to Ns.

A statistically significant difference in WISC Verbal-Performance IQ discrepancy (in the direction of low Verbal IQ - Hypothesis 1b) did not obtain between PIs and PAs, although PIs did exhibit a VIQ-PIQ discrepancy (in the direction of low Verbal IQ) which was somewhat greater than that of PAs. A highly significant difference in VIQ-PIQ discrepancy scores was found between PIs and PAs (whose discrepancy scores tended to be in the direction of low Verbal IQ) and Ns (who tended to exhibit discrepancies in the direction of high Verbal IQ). From a statistical point of view, these results would not support the contentions of Nelson & Warrington (1974) that a preponderance of phonetically inaccurate spelling errors is associated with a greater VIQ-PIQ discrepancy (in the direction of low Verbal IQ) than is an excess of phonetically accurate spelling errors. However, it should be made clear that this analysis of the possibility of a relationship between phonetically inaccurate and phonetically accurate spelling errors and VIQ-PIQ discrepancy scores does not represent an exact replication of the Nelson and Warrington (1974) study since the Maze subtest was substituted for the Coding subtest in the determination of PIQ in the current investigation. The positive direction of the discrepancy score differences for PAs relative to PIs and the significant differences in these scores for Ns (in the direction of high Verbal IQ) as compared to PIs and PAs would seem to directly

reflect one principal finding of this study: that PAs tend to fall in an intermediate position between PIs and Ns in the development of many language skills.

The results of this study, in the main, do not support Hypothesis 2a. PAs were not significantly inferior to PIs and Ns in visualizing common objects on the basis of pictorial clues of drawings of these objects. Younger and older PIs, PAs, and Ns separately or in combination did not differ significantly in their performances on the Test of Visual Closure. This result provides little support for the contention that a specific deficit in language-related "visualizing" underlies the production of a preponderance of phonetically accurate spelling errors. PAs did not exhibit performances on the Test of Visual Closure which would, relative to the performances of Ns and PIs, reflect a deficiency viewed as concomitant with dysfunction within the parieto-temporo-occipital region of the left cerebral hemisphere (Luria, 1973).

The order of level of performance of these three spelling groups on the Test of Visual Closure was similar to that obtained for most language measures (i.e. Ns > PAs > PIs) which would raise the possibility that the language requirement of this test (i.e., the retrieval of a verbal label) was somewhat operative in determining the order of level of performance. Hypotheses 2b and 2c (i.e. Ns > PAs > PIs) were strongly supported by the results obtained. PAs demonstrated significantly impaired levels of performance relative to Ns in the comprehension of relatively complex logical-grammatical relationships (Hypothesis 2b). Furthermore, PAs were significantly superior to PIs in the comprehension of logical-grammatical

relationships (Hypothesis 2c). These significant differences between PIs, PAs, and Ns in the comprehension of logical-grammatical relationships provide further support for the contention that the development of general language ability associated with these three groups is in the order Ns > PAs > PIs.

The generalized impairment in language functioning exhibited by PIs and PAs is reminiscent of that observed in adult patients with well-documented lesions of the left cerebral hemisphere (Luria, 1973; Reitan, 1966). Furthermore, PIs and PAs as a group would appear to be reminiscent of the dyslexic children studied by McLeod (1965) and Ackerman, Dykman and Peters (1976) who exhibited a significant level of impairment on the WISC Digit Span, Arithmetic, and Coding subtests. The skill(s) tapped by the latter WISC subtests have been referred to as the "sequencing" factor by Ackerman et al. (1976) and Bannatyne (1974).

The hypothesis that the superiority of PAs over PIs in language abilities in general would be significantly greater at the "older" as compared to the "younger" age level (Hypothesis 3) was not supported. Whatever the nature of the disorder(s) underlying phonetically inaccurate spelling, the discrepancy in general language functioning (as measured by the Index of General Language Ability) between PIs and PAs was very similar at both age levels. In contrast, there was a dramatic, positive shift in level of general language functioning for Ns relative to PIs and PAs from the "younger" to the "older" age level.

The finding that the levels of oral reading ability (as measured by the WRAT) of PAs were significantly superior to those

of PIs and significantly inferior to those of Ns provided clear support for Hypothesis 4a. Moreover, the developmental patterns of oral reading ability for these three groups of spellers was reminiscent of those exhibited for the Index of General Language Ability measure; that is, the discrepancy in oral reading ability between PIs and PAs was similar at both age levels (the effect of age on this measure being non-significant for both groups) and a marked, positive shift in oral reading ability from the "younger" to the "older" age level was exhibited only by Ns.

In a longitudinal study by Burgher (1976), retarded readers were found to exhibit a significantly greater number of phonetically inaccurate spelling errors as compared to normal readers in grades 2, 4, 5, and 6. This finding supports the contention reflected in the cross-sectional data of this study that a preponderance of phonetically inaccurate spelling errors is related consistently with retardation in reading ability. The persistence of a relationship between reading retardation and phonetic inaccuracy in spelling over a time span of four years in Burgher's study is consistent with the "deficit" position in the "deficit-lag" theoretical controversy regarding reading retardation (Rourke, 1976).

The Qualitative Index measure provided little evidence that (1) PIs adopt a "sight-word" strategy in order to attempt to circumvent their reading problems relative to PAs and Ns (Hypothesis 4b), (2) PAs exhibit a significant over-reliance upon phonetic analysis in reading as compared to PIs and Ns (Hypothesis 4c), and (3) the reading approach of Ns reflect a balanced interplay

between "sight" and "phonetic" styles (Hypothesis 4d). The qualitative indices of Ns were significantly higher than those of PIs and PAs which were not significantly different. In retrospect, there is little reason to predict that PIs would be able to read correctly words "by sight" since their ability to "unlock" words through initial phonetic analysis would be deficient. The measure of qualitative approach to reading utilized in this study, a ratio between the number of words read "by sight" and through phonetic analysis, is a composite of only words read correctly — a measure of effective reading strategy. Consequently, this measure would not reflect the possibility that PIs are attempting to read on the basis of a limited number of distinctive features of a word but are unsuccessful in so doing. A more meaningful measure of reading style for PIs as well as for Ns and PAs would have been a ratio between the number of words attempted "by sight" and the number of words attempted by phonetic analysis (since level of development in reading would not be reflected in this measure).

The intermediate position of PAs relative to PIs and Ns in oral reading development would tentatively support the contention that while PAs are quite capable of reading words of high grapheme-phoneme correspondence, they encounter considerable difficulty in reading words with a low grapheme-phoneme correspondence. The significant differences in Qualitative Index (with Ns obtaining much higher indices) between-PAs and Ns would indicate that this may be the case. Nevertheless, the absence of a significant difference in qualitative index between PIs and PAs precludes any meaningful support for this possibility.

The qualitative indices of Ns did not fall in an intermediate position between PIs and PAs, as predicted in Hypothesis 4d. Ns exhibited a significantly better developed effective "sight-word" approach than did PIs and PAs in reading orally. This would suggest that Ns, being able to "unlock" unfamiliar words with a close grapheme-phoneme correspondence through phonetic analysis and assimilate stable "visualizations" of words with a low grapheme-phoneme correspondence, develop a significantly more effective "sight-word" vocabulary than PIs and PAs.

It may be worthwhile, from an heuristic point of view, to speculate as to the nature of this generalized impairment in language functioning for PIs and PAs on the basis of an evaluation of linguistic complexity for those measures which did and did not discriminate significantly among younger and older PIs, PAs, and Ns in some fashion.

Implications for Future Research

Measures of the perception of speech-sounds (Test of Auditory Discrimination), immediate memory for auditory-verbal information (Digit-Span-forward and Sentence Memory) and the retrieval of simple verbal labels for a limited number of pictorial clues of drawings of common objects (Visual Closure) did not discriminate PIs, PAs, and Ns significantly. However, when these three groups were required to (1) process, in a rather circumscribed manner, short strings of words or phonemes and (2) report the results in a relatively short word string (Digit-Span-backward and Auditory Closure), the performances of PIs were significantly inferior to those of PAs and Ns (with no significant differences in the performances of PAs and Ns). These observations would suggest that one adaptive deficiency contributing to the relatively low level of language functioning of PIs is an impairment in being able to perform, at a rather rudimentary level,

some basic operation on word strings rather limited in length and to reflect the results of this cognitive process through a relatively short sequence of words. It would appear that PIs, relative to Ns and PAs, are encountering pronounced difficulty in coping with tasks involving even a mild degree of "language-related cognitive complexity".

The relationships between Ns and PAs in regard to levels of performance changed significantly on tasks which involved (1) appreciating the meaning of interrogatives composed of strings of words of varied lengths, (2) processing this information on somewhat higher cognitive planes than required on tests involving the execution of a simple operation, (3) formulating a brief answer consisting of one or two words or a pointing gesture (Arithmetic, Logico-Grammatical Sentence Comprehension, PPVT, Similarities). Measures of this nature discriminated these groups in the order Ns > PAs > PIs. A seemingly significant increase in the level of cognitive complexity required for language tasks discriminated Ns and PAs, suggesting that PAs encounter significant difficulty when the level of cognitive demand of a language task rises above a particular critical level.

A dramatic shift in the relationship between performances of PIs and PAs was in evidence on tasks involving either (1) the formulation of relatively lengthy, complex, syntactical strings (Vocabulary, and Comprehension), or (2) the retrieval of relatively specific verbal information (Information), or (3) the rapid association of a lengthy sequence of numerals with geometric configurations (Coding). PIs and PAs performed in a very similar manner and were significantly inferior to Ns on tasks of this nature. This shift in level of performance for PAs from that of an intermediate position between PIs and Ns would suggest that the adaptive difficulties of PAs are enhanced when the

language or language-related demands of a task are increased. It would appear that the level of performance of PAs on any one task is related directly and inversely with the level of language-related cognitive complexity required.

It is most interesting to note that measures for the comprehension of individual spoken words (PPVT) and the comprehension and retrieval of small amounts of relatively specific verbal information (Information) did not discriminate these three spelling groups at the "younger" age level but did differentiate them significantly in the order Ns > PAs > PIs (PPVT) and Ns > PAs = PIs (Information) at the "older" age leve. This may suggest that PAs and PIs have a rather limited capacity, relative to Ns, to store in memory word meanings and specific verbal information but that this capacity is taxed beyond its limitations only after the "younger" age level. However, when these spelling groups were required to reason abstractly in response to small amounts of verbal information (Similarities) they were discriminated at both age levels in the order Ns > PAs > PIs. It would appear that PIs and PAs at the "younger" age level encounter significant difficulty not only when auditory-verbal information to-be-processed is relatively lengthy, but also when the processing of even small amounts of such information requires a critical level of abstract reasoning.

The following possibilities emerge in speculating as to the nature of the exhibited generalized impairment in language functioning for PIs and PAs: (1) PIs encounter significant difficulty, relative to PAs and Ns, in performing rather basic, rudimentary, operations on word strings rather limited in length. This deficiency

would seem to inhibit the proper development of "higher-level" linguistic abilities; (2) PAs experience a mild deficiency, relative to Ns, (a) when required to reason abstractly in response to relatively short strings of auditory-verbal information, and (b) in processing relatively lengthy syntactical strings; (3) PAs encounter moderate difficulty, relative to Ns, in formulating relatively lengthy, complex, syntactical strings in response to auditory-verbal information.

The possibility that degree of cognitive complexity of task requirement represents a formidable obstacle for PAs, and to a greater extent for PIs, in the development of language abilities would appear to have considerable import for the development of spelling and reading skills. It would be expected that, relative to PAs and Ns, PIs would encounter extreme difficulty in completing those processes thought to be carried out in spelling beyond simple immediate memory for the word (i.e. phonemic segmentation and "visualizing" letters and words). PAs, on the other hand, because of their better developed skills in cognitive processes, would experience minimal difficulty in segmenting phonemically and "visualizing" letters and words if such words had a relatively high phoneme-grapheme correspondence (because of the relatively simple associational procedure involved). However, if a word to-be-spelled had a relatively low phoneme-grapheme correspondence, the cognitive process involved would most assuredly become more complex. In this context, PAs would, seemingly, experience considerable difficulty in processing or screening numerous alternative possibilities as to what the word "should look like" and, not having conjured up an accurate "visualization" of the word, would "simplify" the task by focusing on phonemic structure principally and

spell in a phonetically accurate fashion. If PAs were dealing with this hypothesized deficiency through "simplification", high significant positive correlations between degree of phonetic accuracy in misspellings and measures involving short-term memory for auditory-verbal information would be readily forthcoming. However, high significant positive correlations between these measures were obtained in this study solely for Ns and not for PAs suggesting (1) memory for auditory-verbal information is strongly associated with normal spelling, and (2) phonetic accuracy is not necessarily contingent upon the development of immediate memory for auditory-verbal information. On the other hand, if PAs were attempting to compensate for this hypothetical deficit in processing language by adopting some form of strategy (e.g., verbal rehearsal), very low correlations between degree of phonetic accuracy and measures involving auditory-verbal memory would be expected. The finding of no correlational relationship between degree of phonetic accuracy and measures involving immediate auditory-verbal memory would lend some support to the possibility that PAs adopt a strategy for "compensatory" purposes in the spelling process which is, at best, ineffective.

The nature of the language deficiency of PIs, as reflected in the data of this study, would suggest that this group of spelling retardates may be encountering a significant impairment in synthesizing a sequence of speech-sounds once retrieved. PAs, on the other hand, due to their hypothesized difficulty in performing linguistic operations "a step above" basic, rudimentary processes, may be experiencing some difficulty in reading words with a low grapheme-phoneme correspondence.

It has been noted that the generalized deficiency in language functioning exhibited by PIs and PAs is reminiscent of the language

difficulties observed in adult patients with well-documented lesions of the left cerebral hemisphere. On the basis of clinical observation of patients with lesions within the parieto-temporo-occipital region (known as the "tertiary" area) of the left cerebral hemisphere, Luria (1973) has deduced that this cortical region mediates the synthesis of modality-specific information (especially concerning language), is involved in the integration and further processing of past and present language-related information, and plays a crucial role in the appreciation of temporal and quasi-spatial relationships transmitted through language. It would be expected that dysfunction within this region would effect a significant disturbance in the processing and generating of language at various structural levels (i.e. phonemic, phonetic, morphemic, and syntactical) and could bring about a general deficiency in linguistic competencies. The increases in level of impairment from PAs to PIs in language and language-related cognitive processes, as reflected by the data of this study, would suggest the possibility that the differences in adaptive deficiencies between these groups is quantitative rather than qualitative in nature. In addition, on the basis of Luria's model of brain-behaviour relationships, the general pattern of adaptive deficits exhibited by both PIs and PAs would not rule out the possibility of dysfunction within the parieto-temporo-occipital region of the left cerebral hemisphere, with this hypothesized dysfunction being somewhat more extensive for PIs. However, it should be emphasized in regard to the latter possibility, that a neuropsychological account of the adaptive problems of PIs and PAs in only one of perhaps many possible theoretical explanations.

A deficit in selective attention has frequently been invoked for the explanation of specific dyslexia and, indeed, learning disabilities in general. In addition, this approach would seem, at first glance, to be particularly attractive as a general explanation for the adaptive deficiencies exhibited by PIs and PAs in the current study, since most of the measures that discriminated PIs and PAs from Ns required some degree of sustained attention. If an impairment in selective attention was underlying the impairment in language abilities exhibited by PIs and PAs it would be expected that significant deficiencies would be in evidence in regard to both skills of a verbal and non-verbal variety involving selective attention. A number of language measures employed in this study involving selective attention did not reflect differences in attentional skills among PIs, PAs, and Ns. Moreover, Sweeney (1976) tested the selective attention hypothesis in a preliminary study of the adaptive significance of phonetically accurate and phonetically inaccurate spelling errors in which he controlled for WISC Full Scale IQ. His analyses revealed that PIs, PAs, and Ns did not differ significantly in regard to memory for non-verbal visual-spatial information and WISC Performance IQ. On the other hand, these groups differed significantly on numerous measures of language and language-related abilities. It would appear, therefore, that the adaptive differences between these groups are linguistic in nature suggesting that a theoretical explanation of their spelling difficulties based on a deficit in selective attention is less than comprehensive.

CHAPTER V

SUMMARY AND CONCLUSIONS

The purpose of this study was to explore the possibility that a preponderance of phonetically accurate and phonetically inaccurate spelling errors in younger and older children retarded in the ability to spell were associated with qualitatively different, perhaps brain-related, adaptive deficiencies. To that end, hypotheses were formulated as to relationships between phonetically accurate and phonetically inaccurate spelling retardation and language and language-related deficits on the basis of Luria's (1973) neuropsychological model of the spelling process.

The performances of younger and older phonetically accurate spelling retardates (PAs) and phonetically inaccurate spelling retardates (PIs) and normal spellers (Ns) were compared across a wide range of language and language-related measures. Although some support was obtained for the contention that PIs are, in general, inferior to PAs and Ns in the development of language abilities, the nature of the deficiency which appeared to be underlying this impairment was not in line with that originally proposed. The hypotheses that PIs were significantly impaired in phonemic hearing and/or immediate memory for auditory-verbal information were not borne out. Interestingly enough, however, PIs performed consistently in an impaired fashion relative to Ns and PAs on tests which involved the carrying out of some elementary operations on relatively short sequences of word strings (e.g. WISC Digit Span-backward). On the basis of this finding, the possibility was raised that PIs, relative to Ns and PAs, are encountering pronounced difficulty in coping with tasks involving even a mild degree of language-related cognitive complexity.

There was little evidence to suggest that, as originally hypothesized, PAs were deficient in the ability to "conjure up" language-related "visualizations". However, they did exhibit a generalized impairment in language functioning relative to Ns. Moreover, in comparison to Ns, PAs encountered consistent difficulty in comprehending and processing strings of words of varied lengths which transmitted meaningful information. The level of performance of PAs appeared to deteriorate even further relative to Ns when they were required to comprehend and process, and/or formulate relatively lengthy, complex, syntactical strings. It would appear, then, that in general, the level of performance of PAs on any one task is related directly and inversely with the level of language-related cognitive complexity required beyond a particular critical point.

The results of this study would appear to have considerable import for the understanding of spelling disorders. It would be expected that, relative to PAs, PIs would encounter extreme difficulty in completing those processes thought to be carried out in spelling beyond simple immediate memory for a word, i.e. phonemic segmentation, and "visualizing" letters and words. In addition, PAs may experience minimal difficulty in phonemically segmenting and "visualizing" letters and words in comparison to PIs if such words have a relative high phoneme-grapheme correspondence. If, on the other hand, the word-to-be spelled has a relatively low phoneme-grapheme correspondence, the cognitive process involved would most assuredly become more complex, perhaps rendering it somewhat unlikely that PAs would be able to screen all of the numerous alternative possibilities as to what the word "should look like". In this context, PAs may elect to spell in a rigid, phonetically accurate fashion.

A measure of oral reading ability discriminated these groups significantly in the order Ns>PAs>PIs. This raises the rather tentative possibilities, in the framework of the results of this study, that in reading orally (1) PIs may be encountering a significant impairment in synthesizing a sequence of speech-sounds if retrieved successfully and (2) PAs may be experiencing some difficulty in reading words with a low grapheme-phoneme correspondence because of processing difficulties beyond a simple letter-sound associational system.

The data of this study would suggest that, in general, the differences in adaptive deficiencies between PIs and PAs are quantitative rather than qualitative in nature, with PIs exhibiting a significantly greater degree of impairment than PAs. Furthermore, differences in degree of impairment in verbal abstract reasoning and in the processing of relatively lengthy word strings between PIs and PAs would appear to be very similar at both the "younger" and "older" age levels. On the other hand, little difference in degree of impairment in formulating relatively lengthy syntactical strings was in evidence between PIs and PAs at each age level.

The nature of this difficulties exhibited by PAs and PIs in this study are in line with the "higher order" language-related processing difficulties attributed to adult patients with lesions within the tertiary region of the left cerebral hemisphere by Luria (1973).

APPENDIX A

Over the past two decades, researchers have persisted in attempting to elucidate relationships between level of performance in spelling and "basic" abilities in a search for those skills underlying the ability to spell. The results of a study by Russell (1955) suggest that auditory-verbal abilities are more important for the development of spelling in the lower, as opposed to the higher, grade levels. In a further study of the characteristics of good and poor primary grade spellers, Russell (1958) concluded that sound recognition (or phonemic analysis) in various parts of a word is more closely related to spelling ability (r = .66, $p < .01$) than is discrimination of sounds of whole words in same-different (r = .22, $p > .01$), or rhyming tests (r = .22, $p > .01$). Other interesting findings of this study were that reading ability was significantly related to achievement in spelling (r = .65, $p < .01$), and that the ability to comprehend verbal information presented orally was not as closely related to achievement in spelling (r = .33, $p < .01$) as may be commonly expected.

In a more extensive correlational analysis of factors related to spelling achievement using 498 grade six students, Newton (1961) found that the most significant factor studied was verbal psychometric intelligence (r = .68), as measured by the Lorge-Thorndike Intelligence Tests, Verbal Battery (1954). Other correlations found were as follows: non-verbal psychometric intelligence, .39; spelling phonetic syllables, .60; phonetic analysis, .63; reading vocabulary, .61; word derivation, .60; word recognition, .55; accurate pronunciation, .51; visual memory, .44; visual discrimination, .40; structural analysis, .38; auditory discrimination of syllables, .36; auditory discrimination, .24; and auditory memory, .35 ($p < .01$ for all rs). The high correlations of spelling phonetic syllables and

phonetic analysis with spelling achievement suggests that phonetic analysis continues to play an important role in spelling achievement with children beyond the primary grades. The relatively low coefficient of correlation obtained between auditory memory and spelling achievement suggests that this factor may be of little significance in regard to the development of spelling skills in older children (although, intuitively, it would appear that educators in general would probably have some difficulty in accepting this conclusion). The contributions to variance in spelling achievement by the two most statistically significant factors studied, verbal intelligence and spelling phonetic syllables, was 16.77% and 14.21%, respectively. Approximately 7% of the variance was contributed by each of the following factors: accurate pronunciation, word recognition, phonetic analysis, reading comprehension and visual memory (the ability to remember the forms of words).

Bannatyne and Wichiarajote (1969), in studying the relationship of auditory- and visual-sequential memory to spelling achievement, found that performance on the Auditory-Motor Sequencing and Visual-Motor Sequencing subtests of the Illinois Test of Psycholinguistic Abilities (ITPA; McCarthy & Kirk, 1961) did not differentiate between good and poor third grade spellers. However, when Peters (1970) asked children to write from memory words presented on flash cards, she found their performance to be highly correlated with spelling achievement. Day and Wedell (1972) selected children between the ages of eight and ten on the basis of high-low and low-high patterns of performance on the Visual-Motor Sequencing Test (VMS), from the experimental version of the ITPA, and the Stambak Reproduction de Structures Rhthmique (RSR; Stambak, 1964) and, with the inclusion

of a control group, compared spelling performances. The three groups did not differ significantly in level of spelling achievement. However, the group whose performance on the RSR test was substantially higher than that on the VMS test made significantly fewer syllable confusions (e.g., becus for because) than the other two groups. This finding would appear to suggest that the ability to appreciate rhythmic stimulation is advantageous in perceiving accurately phonemes in sequence.

The conclusion that the spelling of a considerable percentage of words is not predictable from phonic generalization of spelling rules (Davis, 1972) and Brown's (1970) suggestion that many words are learned as units, prompted Walker's (1974) proposal that visual memory could be an important underlying mechanism in spelling performance. He measured vividness of imagery for under-graduate university students using the shortened form of Betts' Questionnaire Upon Mental Imagery (Sheehan, 1967). He found that poor visualizers, as compared to good visualizers, made significantly more errors which were not due to faulty pronunciation or inapplicable phonic generalization. This finding would appear to suggest that poor visualization skills may underly the production of a qualitatively distinct type of spelling error.

A clear picture of the composite of abilities which underly the development of the complex skill of spelling does not seem to have emerged from the research done up to the present time. This is not at all surprising when it is considered that the complexity of the skill may necessitate different abilities being involved at different levels of performance. In summarizing the research reviewed, the following factors appear to be related to spelling achievement

for both younger and older children: (1) level of development of verbal skills in general; (2) phonetic analysis; (3) memory for the visual forms of words; (4) recognition of the graphic form of orally presented words; and, (5) reading comprehension. The research suggests that auditory-verbal memory abilities (at least for older children) are not intimately related to spelling achievement. There is also little evidence of any significant relationships between non-verbal psychometric intelligence and achievement in spelling.

APPENDIX B

LEVEL I SPELLING LIST

	WORD		PRONUNCIATION GUIDE WORD
1.	go	Children go to school	góe
2.	cat	The cat has fur	kát
3.	in	We are in the room	ín
4.	boy	The boy plays ball	bói
5.	and	Bill and Bob play together	ánd
6.	will	They will wait for you	wíl
7.	make	She can make a dress	máke
8.	him	They saw him in town	hím
9.	say	Say it slowly	sáy
10.	cut	Mother will cut the cake	kút
11.	cook	We cook our own dinner	kóok
12.	light	The light is bright	líte
13.	must	We must do our work	múst
14.	dress	The dress fits well	drés
15.	reach	He couldn't reach the ball	reéch
16.	order	The captain's order was obeyed	ór der
17.	watch	My watch is fast	wáuch
18.	enter	Enter this way	én ter
19.	grown	Potatoes are grown in the field	gróne
20.	nature	The study of nature is interesting	náe cher
21.	explain	Explain how it happened	eks plain
22.	edge	He sat on the edge of the chair	éj
23.	kitchen	Our kitchen is small	kích en
24.	surprise	He may surprise you	ser príze
25.	result	The result of your work is good	ree zúlt
26.	advice	My advice is forgotten	ad víse
27.	purchase	We did not purchase the car	púr chis
28.	brief	I received a brief note	breef
29.	success	Success makes people happy	suk sés
30.	reasonable	His request was reasonable and just	reé zen abul
31.	imaginary	He told us an imaginary story	i máj i nari
32.	occupy	We occupy a small apartment	ó kue pie
33.	character	Her fine character was praised	kár ak ter
34.	society	Every society has rules	su sý e ty
35.	official	An official invitation came today	oh fí shil
36.	recognize	He did not recognize me	rék og nize
37.	familiar	We are familiar with the news	fa míl yer
38.	commission	The commission reported to the mayor	ko mísh un
39.	beneficial	Good food is beneficial to health	ben e fí shul
40.	appropriation	Congress made an appropriation for schools	a pro pri áy shun
41.	enthusiasm	People showed enthusiasm for the hero	en thoo zi asem
42.	criticize	It is easy to criticize others	krít i size
43.	prejudice	Prejudice is harmful to people	préj e dis
44.	belligerent	The soldier was belligerent and brave	be líj er ent
45.	occurrence	War is a tragic occurrence	oh kér ens

APPENDIX B (cont'd)
LEVEL II SPELLING LIST

	WORD		PRONUNCIATION GUIDE WORD
1.	cat	The cat has fur	kát
2.	run	Bob can run fast	rún
3.	arm	His arm hurt	árm
4.	train	The train was crowded	train
5.	shout	If you shout, he'll hear you	shówt
6.	correct	Put down the correct answer	ko rékt
7.	circle	The circle is a round drawing	sír kel
8.	heaven	Heaven surrounds the earth	hév in
9.	educate	Parents educate their children	éj oo kate
10.	material	The material was expensive	ma tée ri al
11.	ruin	The house was in ruin after the fire	róo in
12.	fashion	The dress is now in fashion	fásh en
13.	believe	I believe you are right	bee leév
14.	suggestion	My suggestion was followed	sug jés chun
15.	equipment	The office got new equipment	ee kwíp ment
16.	majority	The majority voted for the bill	ma jór i tee
17.	institute	The art institute held an exhibit	ín sti toot
18.	literature	Some literature is worth reading	lít er a cher
19.	reverence	Old people are treated with reverence	rév er ens
20.	museum	The art museum held an exhibit	mew zée um
21.	precious	Health is precious	pré shus
22.	illogical	His thinking was illogical	il lóg i cal
23.	decision	Your decision was accepted by all	de sí zhun
24.	quantity	He ate a large quantity of food	kwón ti tee
25.	executive	The governor is a state executive	eg zék yoo tiv
26.	necessity	Food is a necessity of life	ne sés i tee
27.	opportunity	He had no opportunity for success	au per tóo nitee
28.	anxiety	Floods create anxiety among people	ang zíe ety
29.	conscience	His conscience was clear	kón shens
30.	physician	Our family physician examined me	fi zí shen
31.	courteous	Let's be courteous to everybody	kér tee us
32.	possession	He took possession of the house	po zé shun
33.	lucidity	We think best in moments of lucidity	loo síd i tee
34.	exaggerate	Don't exaggerate your accomplishments	eg zaj er ate
35.	privilege	It was a privilege to meet the astronaut	priv lij
36.	loquacious	He was loquacious during the interview	lo kway shus
37.	medieval	Medieval times were long ago	med ée val
38.	effeminate	He is an effeminate person	ee fém i net
39.	resilient	Steel is more resilient than lead	ree zíl yent
40.	sovereignty	The country kept its sovereignty	sóv er en tee
41.	assiduous	Assiduous effort gets results	a síd you es
42.	irresistible	His idea was irresistible	ir re zís tabel
43.	acquiesce	To acquiesce is to comply with a demand	ak wee és
44.	charlatan	A charlatan is a pretender	chár le ten
45.	pusillanimous	A pusillanimous person is weak in spirit	pew se lán i mes
46.	iridescence	Iridescence is a play of colours	ir i dés ens

APPENDIX C COMMON SPELLINGS - LEVEL I

	WORD	REGIONAL PRONUNCIATIONS	COMMON SPELLINGS
1.	go	gow	g: (g) (gg) (gh) (gu) (gue) — ow: (o) (oe) (oa) (ou) (ow) (ew) (eau) (au) (oo) (oh)
2.	cat	kaet	k: (k) (c) (ck) (cc) (ch) (cch) (cq) (cqu) (cque) (cu) (gh) (ke) (kh) (lk) (q) (qu) — ae: (a) (ai) (au) — t: (t) (tt) (bt) (cht) (ct) (ed) (ght) (phth) (te) (th)
3.	in	In	I: (i) (a) (o) (e) (ea) (u) (ee) (ei) — n: (n) (nn) (gn) (kn) (ne) (pn)

in (cont'd)

(ui)
(ia)
(ie)
(y)

4. boy — boj

b	oj
(b)	(aw)
(bb)	(eu)
(bh)	(oi)
	(oiв)
	(oy)
	(uoy)

5. and — aend

ae	n	d
(a)	(n)	(d)
(ai)	(nn)	(dd)
(au)	(gn)	(de)
	(kn)	(ed)
	(mn)	(ld)
	(nel)	
	(pn)	

aen

ae	n

ʌn

ʌ	n
(u)	
(a)	
(o)	
(ou)	
(oo)	

ən

ə	n
(i)	
(e)	
(a)	
(o)	
(u)	
(ai)	
(au)	
(ea)	
(ei)	

	and (cont'd)		(eo) (eou) (ia) (ie) (oi) (ou) (y) (eu)
		n	n
6.	will	wIl	w: (w) (o) (ou) (u) I: (i) (a) (o) (e) (ea) (u) (ee) (ei) (ui) (ia) (ie) (y) l: (l) (ll) (le) (lle) (sl)
7.	make	mejk	m: (m) (mm) (mn) (ohm) (gm) (lm) (mb) (me) (mh) ej: (ei) (a) (e) (ai) (ay) (ea) (et) (ey) (au) k: (k) (c) (ck) (cc) (ch) (cch) (cq) (cqu) (cque) (cu) (gh) (ke) (kh) (lk) (q) (qu)

8. him hIm

h	I	m
(h)	(i)	(m)
(wh)	(a)	(mm)
	(o)	(mn)
	(e)	(chm)
	(ea)	(gm)
	(u)	(lm)
	(ee)	(mb)
	(ei)	(me)
	(ui)	(mh)
	(ia)	
	(ie)	
	(y)	

9. say sej

s	ej
(s)	(ei)
(c)	(a)
(sc)	(e)
(ss)	(ai)
(ce)	(ay)
(ps)	(ea)
(sch)	(et)
(se)	(ey)
	(au)

10. out kʌt

k	ʌ	t
(k)	(u)	(t)
(c)	(a)	(tt)
(ck)	(o)	(bt)
(cc)	(ou)	(cht)
(ch)	(oo)	(ct)
(cch)		(ed)
(cq)		(ght)
(cque)		(phth)
(cu)		(te)
(gh)		(th)
(ke)		
(kh)		

	out (cont'd)		(lk) (q) (qu)
11.	cook	kuk	k: (k) (c) (ck) (co) (ch) (cch) (cq) (cqu) (cque) (cu) (gh) (ke) (kh) (lk) (q) (qu) u: (u) (ou) (oo) (eu) (o) k: (k) (c) (ck) (co) (ch) (cch) (cq) (cqu) (cque) (cu) (gh) (ke) (kh) (lk) (q) (qu)
12.	light	lajt	l: (l) (ll) (le) (lle) (sl) aj: (i) (ei) (ie) (ai) (y) (uy) (ay) (ey) (oy) t: (t) (tt) (bt) (cht) (ct) (ed) (ght) (phth) (te) (th)
13.	must	mʌst	m: (m) (mm) (mn) ʌ: (u) (a) (o) s: (s) (c) (sc) t: (t) (tt) (bt)

must (cont'd)

(chm) (cm) lm mb mc mh) (ou oo) (ss ce ps sch se) (cht ct ed ght phth te th)

14. dress drEs

d (d dd de ed ld) r (r rr rh wr) E (e ea ai e ei ay eo ie u) s (s c sc ss ce ps sch se)

15. reach rijV

r (r rr rh wr re rrh) ij (ea ei ie ee e i y ey oo oe) V (ch tch c che te ti tu)

16. order order

or (or oar) | d (d dd de ed ld) e (i e a o u ai au) r (r rr rh wr re rrh)

order (cont'd)

(ea)
(ei)
(eo)
(eou)
(ia)
(ie)
(oi)
(ou)
(y)
(eu)
[(-) (re)]

ordur — or | d | u | r
(u)
(ou)
(oo)
(eu)
(o)

ordIr — or | d | I | r
(i)
(a)
(o)
(e)
(ea)
(u)
(ee)
(ei)
(ui)
(ia)
(ie)
(y)

17. watch — wa$\overset{y}{o}$

w | a | y
(w) | (a) | (ch)
(o) | (au) | (tch)
(ou) | (aw) | (o)
(u) | (o) | (che)
(ou) | (te)
(e) | (ti)
(ea) | (tu)
(oa)
(ow)

18. enter

Enter

E	n	t	e	r
(e)	(n)	(t)	(i)	(r)
(ea)	(nn)	(tt)	(e)	(rr)
(ai)	(gn)	(bt)	(a)	(rh)
(e)	(kn)	(cht)	(o)	(wr)
(ei)	(mn)	(ct)	(u)	(re)
(ay)	(ne)	(ed)	(ai)	(rrh)
(eo)	(pn)	(ght)	(au)	
(ie)		(phth)	(ea)	
(u)		(te)	(oi)	
		(th)	(eo)	
			(eou)	
			(ia)	
			(ie)	
			(oi)	
			(ou)	
			(y)	
			(eu)	
			[(-)	(re)]

Entur

E	n	t	u	r
			(u)	
			(ou)	
			(oo)	
			(eu)	
			(o)	

19. grown — grown

g	r	ow	n
(g)	(r)	(o)	(n)
(gg)	(rr)	(oe)	(nn)
(gh)	(rh)	(oa)	(gn)
(gu)	(wr)	(ou)	(kn)
(gue)	(re)	(ow)	(mn)
	(rrh)	(ew)	(ne)
		(eau)	(pn)
		(au)	
		(oo)	
		(oh)	

20. nature — nejʸcer

n	ej	ʸc	e	r
(n)	(ei)	(ch)	(i)	(r)
(nn)	(a)	(tch)	(e)	(rr)
(gn)	(e)	(o)	(a)	(rh)
(kn)	(ai)	(che)	(o)	(wr)
(mn)	(ay)	(te)	(u)	(re)
(ne)	(ea)	(ti)	(ai)	(rrh)
(pn)	(et)	(tu)	(au)	
	(ey)		(ea)	
	(au)		(ei)	
			(eo)	
			(eou)	
			(ia)	
			(ie)	
			(oi)	
			(ou)	
			(y)	
			(eu)	
			[(-)	(re)]

nejʸour

n	ej	ʸo	u	r
			(u)	
			(ou)	
			(oo)	
			(eu)	
			(o)	

nejʸoIr

n	ej	ʸo	I	r
			(i)	
			(a)	
			(o)	
			(e)	
			(ea)	
			(u)	

nature (cont'd)

(ee)
(ei)
(ui)
(ia)
(ie)
(y)

21. explain

Eksplejn

E	k	s	p	l	ej	n
(e)	(k)	(s)	(p)	(l)	(ei)	(n)
(ea)	(o)	(o)	(pp)	(ll)	(a)	(nn)
(ai)	(ok)	(sc)		(le)	(e)	(gn)
(e)	(co)	(ss)		(lle)	(ai)	(kn)
(ei)	(oh)	(ce)		(sl)	(ay)	(mn)
(ay)	(och)	(ps)			(ea)	(ne)
(eo)	(cq)	(sch)			(et)	(pn)
(ie)	(oqu)	(se)			(ey)	
(u)	(cque)				(au)	
	(ou)					
	(gh)					
	(ke)					
	(kh)					
	(lk)					
	(q)					
	(qu)					
[(-)	(x)	(-)]				
	[(x)	(-)]				

eksplejn

e	k	s	p	l	ej	n
(i)						
(o)						
(a)						
(o)						
(u)						
(ai)						
(au)						
(ea)						
(ei)						
(eo)						
(eou)						
(ia)						
(ie)						
(oi)						
(ou)						
(y)						
(eu						

Iksplejn

I	k	s	p	l	ej	n
(i)						
(a)						
(o)						
(e)						
(ea)						
(u)						
(ee)						
(ei)						
(ui)						
(ia)						
(ie)						
(y)						

22. edge E^{V}J

E	V
e	j
ea	gg
ai	dge
ei	ch
ay	d
eo	dg
ie	di
u	ge
	gi
	jj
	g
	gh

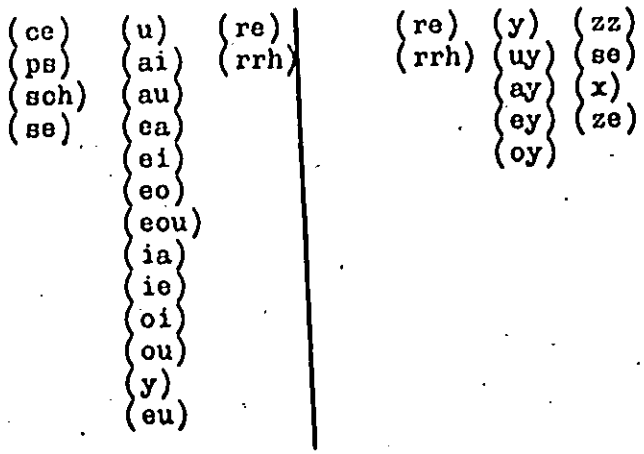
23. kitchen kI^{V}c^{V}en

k	I	V	e	n
k	i	ch	i	n
c	a	tch	e	nn
ck	o	c	a	gn
cc	e	che	o	kn
ch	ea	te	u	mn
cch	u	tu	ai	ne
cq	ee		au	pn
cqu	ei		ea	
cque	ui		ei	
cu	ia		eo	
gh	ie		eou	
ke	y		ia	
kh			ie	
lk			oi	
q			ou	
qu			y	
			eu	

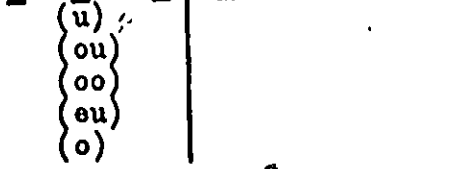
24. surprise serprajz

s	e	r	p	r	aj	z
s	i	r	p	r	i	z
c	e	rr	pp	rr	ei	s
sc	a	rh		rh	ie	sc
ss	o	wr		wr	ai	ss

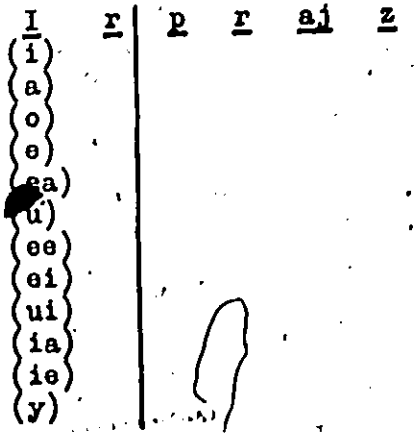
surprise (cont'd)



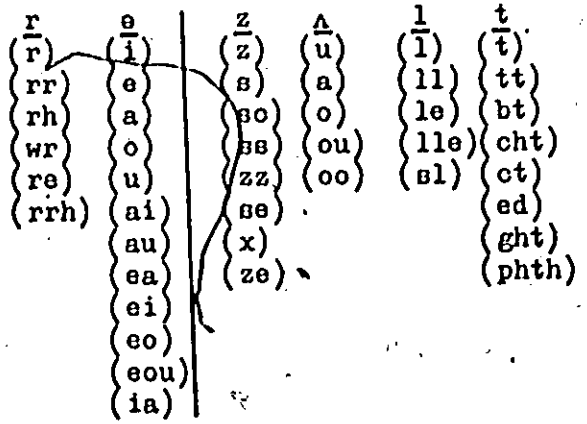
surprajz



SIrprajz



25. result rezʌlt



result (cont'd)

							(ie) (oi) (ou) (y) (eu)
	rijzʌlt	r	ij (ea) (ei) (ie) (ee) (e) (i) (y) (ey) (eo) (oe)	z	ʌ	l	t
26.	advice	ədvajs	ə (i) (e) (a) (o) (u) (ai) (au) (ea) (ei) (eo) (eou) (ia) (ie) (oi) (ou) (y) (eu)	d (d) (dd) (de) (ed) (ld)	v (v) (f) (ph) (ve) (vv)	aj (i) (ei) (ie) (ai) (y) (uy) (ay) (ey) (oy)	s (s) (c) (sc) (ss) (ce) (ps) (sch) (se)
		aədvajs	ae (a) (ai) (au)	d	v	aj	s

27. purchase pervIs

p	e	r	v ó	I	s
(p)	(i)	(r)	(ch)	(i)	(s)
(pp)	(e)	(rr)	(tch)	(a)	(c)
	(a)	(rh)	(c)	(o)	(sc)
	(o)	(wr)	(che)	(e)	(ss)
	(u)	(re)	(te)	(ea)	(ce)
	(ai)	(rrh)	(ti)	(u)	(ps)
	(au)		(tu)	(ee)	(sch)
	(ea)			(ei)	(se)
	(ei)			(ui)	
	(eo)			(ia)	
	(eou)			(ie)	
	(ia)			(y)	
	(ie)				
	(oi)				
	(ou)				
	(y)				
	(eu)				

purvess

p	u	r	v ó	e	s
	(u')			(i)	
	(ou)			(e)	
	(oo)			(a)	
	(eu)			(o)	
	(o)			(u)	
				(ai)	
				(au)	
				(ea)	
				(ei)	
				(eo)	
				(eou)	
				(ia)	
				(ie)	
				(oi)	
				(ou)	
				(y)	
				(eu)	

pIrvess

p	I	r	v ó	e	s
	(i)				
	(a)				
	(o)				
	(e)				
	(ea)				
	(u)				
	(ee)				
	(ei)				
	(ui)				
	(ia)				
	(ie)				
	(y)				

28. brief brijf

b	r	ij	f
b	r	ea	f
bb	rr	ei	ff
bh	rh	ie	gh
	wr	ee	ph
	re	e	lf
	rrh	i	fe
		y	
		ey	
		eo	
		oe	

29. success seksEs

s	e	k	s	E	s
s	i	K	s	e	s
c	e	c	c	ea	c
sc	a	ck	sc	ai	sc
ss	o	cc	ss	e	ss
ce	u	ch	ce	ei	ce
ps	ai	cch	ps	ay	ps
sch	au	cq	sch	eo	sch
se	ea	cqu	se	ie	se
	ei	cque		u	
	eo	cu			
	eou	gh			
	ia	Ke			
	ie	Kh			
	oi	lk			
	ou	q			
	y	qu			
	eu				

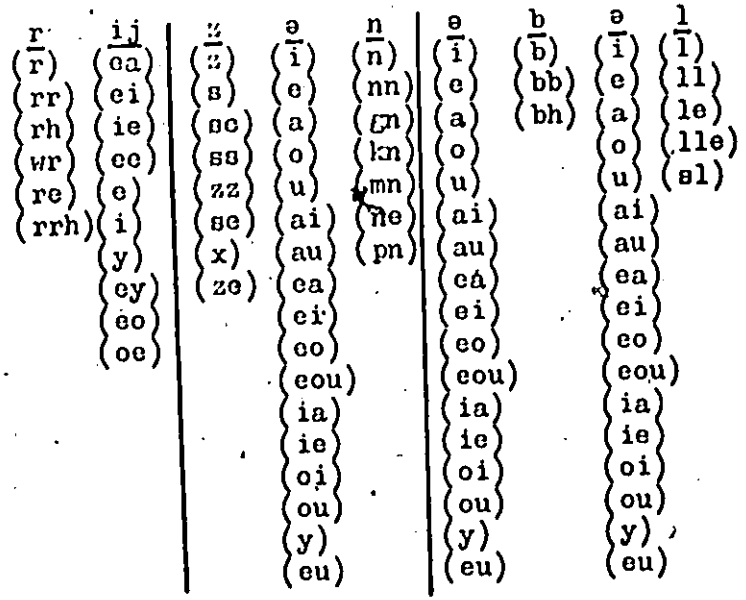
sAksEs

s	A	k	s	E	s
	u				
	a				
	o				
	ou				
	oo				

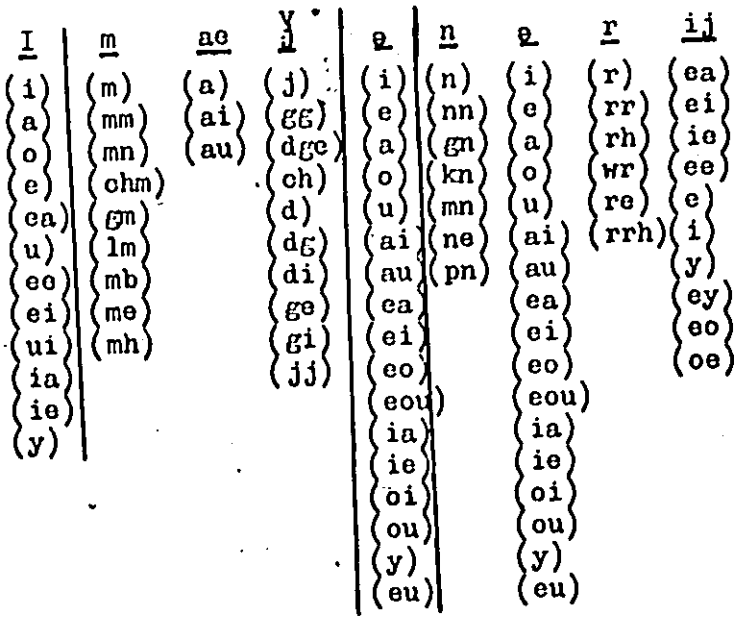
sAksEs

s	A	k	s	E	s
		x			

30. reasonable rijzenebel



31. imaginary Imaejenerij



imaginary (cont'd) əmaeʲənErij

ə	maeʲ	ə	n	E	r	ij
(i)				(e)		
(e)				(ea)		
(a)				(ai)		
(o)				(e)		
(u)				(ei)		
(ai)				(ay)		
(au)				(eo)		
(ea)				(ie)		
(ei)				(u)		
(eo)						
(eou)						
(ia)						
(ie)						
(oi)						
(ou)						
(y)						
(eu)						

32. occupy akjuwpaj

a	k	juw	p	aj
(a)	(k)	(u)	(p)	(i)
(au)	(c)	(eu)	(pp)	(ei)
(aw)	(ck)	(ue)		(ie)
(o)	(cc)	(ew)		(ai)
(ou)	(ch)	(eau)		(y)
(e)	(cch)	(iew)		(uy)
(ea)	(cq)			(ay)
(oa)	(cqu)			(ey)
(ow)	(cque)			(oy)
	(cu)			(ye)
	(gh)			
	(ke)			
	(kh)			
	(lk)			
	(q)			
	(qu)			

33. character kejrekter

k	ej	r	e	k	t	e	r
(k)	(ei)	(r)	(i)	(K)	(t)	(i)	(r)
(o)	(a)	(rr)	(e)	(c)	(tt)	(e)	(rr)
(ck)	(e)	(rh)	(a)	(ck)	(bt)	(a)	(rh)
(oc)	(ai)	(wr)	(o)	(oc)	(cht)	(o)	(wr)
(oh)	(ay)	(re)	(u)	(ch)	(ct)	(u)	(re)
(coh)	(ea)	(rrh)	(ai)	(cch)	(ed)	(ai)	(rrh)
(cq)	(et)		(au)	(cq)	(ght)	(au)	
(cqu)	(ey)		(ea)	(cqu)	(phth)	(ea)	
(cque)	(au)		(ei)	(cque)	(te)	(ei)	
(cu)			(eo)	(cu)	(th)	(eo)	
(gh)			(eou)	(gh)		(eou)	
(ke)			(ia)	(ke)		(ia)	
(kh)			(ie)	(kh)		(ie)	
(lk)			(oi)	(lk)		(oi)	
(q)			(ou)	(q)		(ou)	
(qu)			(y)	(qu)		(y)	
			(eu)			(eu)	
						[(-)	(re)]

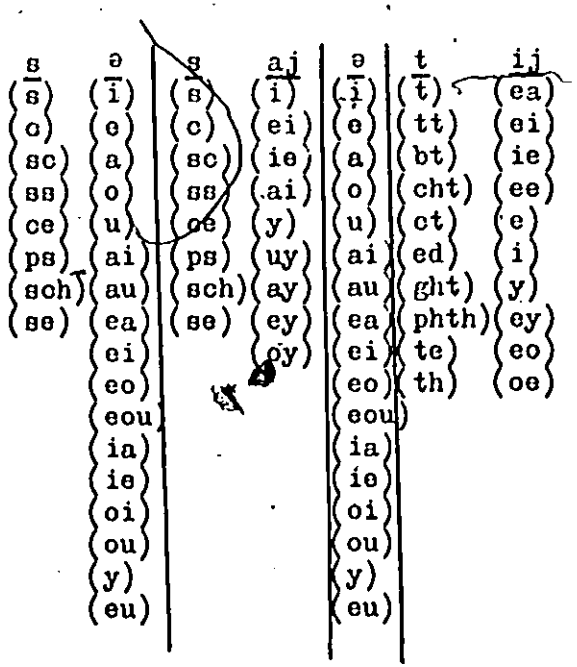
kErektur

k	E	r	e	k	t	u	r
	(e)						
	(ea)						
	(ai)						
	(e)						
	(ei)						
	(ay)						
	(eo)						
	(ie)						
	(u)						

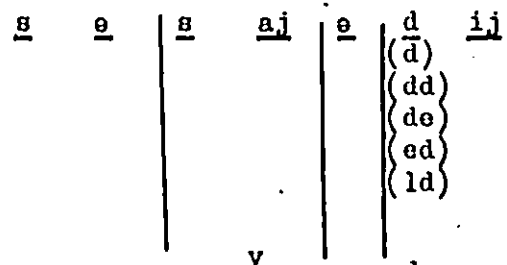
kErektIr

k	E	r	a	k	t	I	r
						(i)	
						(a)	
						(o)	
						(e)	
						(ea)	
						(u)	
						(ee)	
						(ei)	
						(ui)	
						(ia)	
						(ie)	
						(y)	

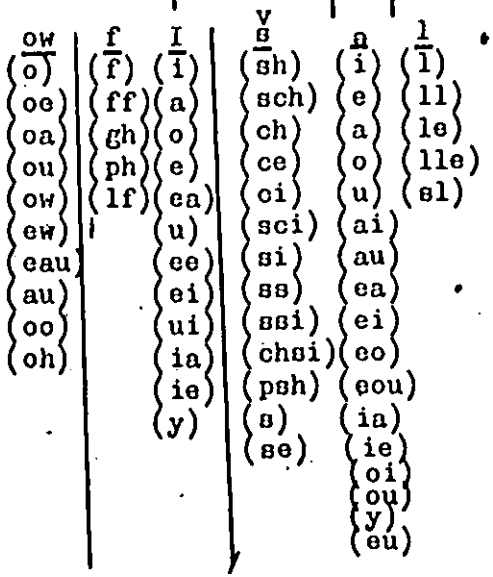
34. society sesajətij



sesajədij



35. official owfIsəl



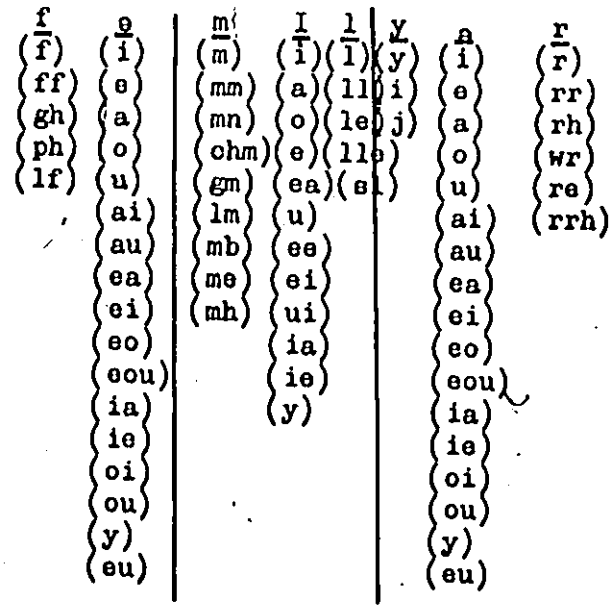
official (cont'd) əfIʌ̈əl

ə	f	I	ʌ̈	ə	l
(i)				(u)	
(e)				(a)	
(a)				(o)	
(o)				(ou)	
(u)				(oo)	
(ai)					
(au)					
(ea)					
(ei)					
(ęo)					
(eou)					
(ia)					
(ie)					
(oi)					
(ou)					
(y)					
(eu)					

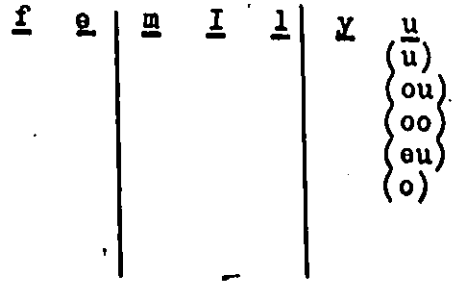
36. recognize rɛkəgnajz

r	ɛ	k	ə	g	n	aj	z
(r)	(ə)	(k)	(i)	(g)	(n)	(i)	(z)
(rr)	(ea)	(c)	(e)	(gg)	(nn)	(ei)	(s)
(rh)	(ai)	(ck)	(a)	(gh)	(gn)	(ie)	(sc)
(wr)	(e)	(cc)	(o)	(gu)	(kn)	(ai)	(ss)
(re)	(ei)	(ch)	(u)	(gue)	(mn)	(y)	(zz)
(rrh)	(ay)	(cch)	(ai)		(ne)	(uy)	(se)
	(eo)	(cq)	(au)		(pn)	(ay)	(x)
	(ie)	(cqu)	(ea)			(ey)	(ze)
	(u)	(cque)	(ei)			(oy)	
		(cu)	(eo)				
		(gh)	(eou)				
		(ke)	(ia)				
		(kh)	(ie)				
		(lk)	(ói)				
		(q)	(ou)				
		(qu)	(y)				
			(ėu)				

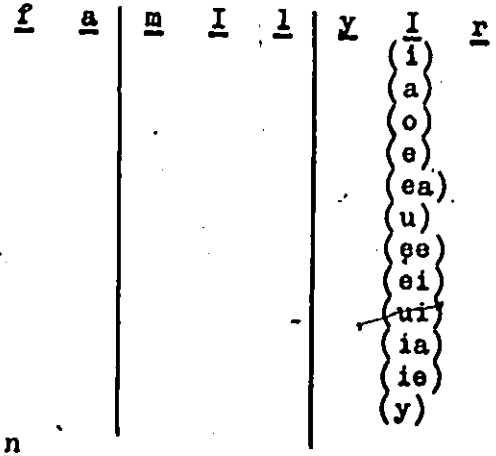
37. familiar fəmIlyər



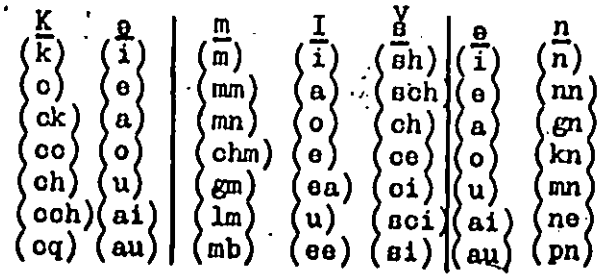
fəmIlyur



fəmIlyIr



38. commission kəmIshən



commission (cont'd)

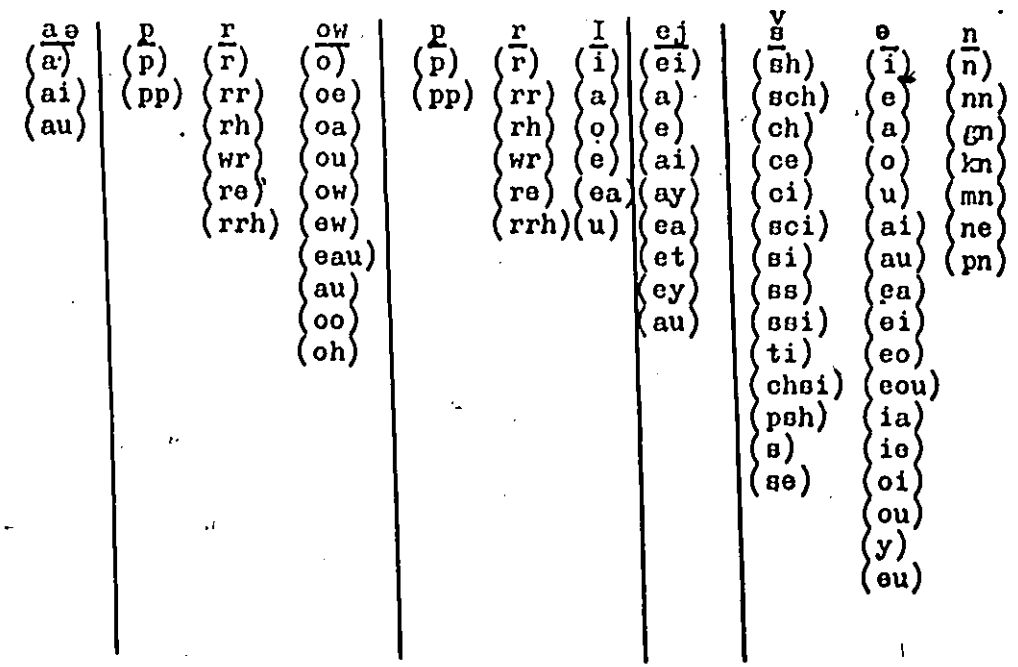
(cqu) (cque) (cu) (gh) (ke) (kh) (lk) (q) (qu) | (ea) (ei) (eo) (eou) (ia) (ie) (oi) (ou) (y) (eu) | (me) (mh) | (ei) (ui) (ia) (ie) (y) | (ss) (ssi) (ti) (chsi) (psh) (s) (se) | (ea) (ei) (eo) (eou) (ia) (ie) (oi) (ou) (y) (eu)

kəmIʃ$\overset{v}{ə}$n K ə | m | I | $\overset{v}{s}$ | ʌ (u) (a) (o) (ou) (oo) | n

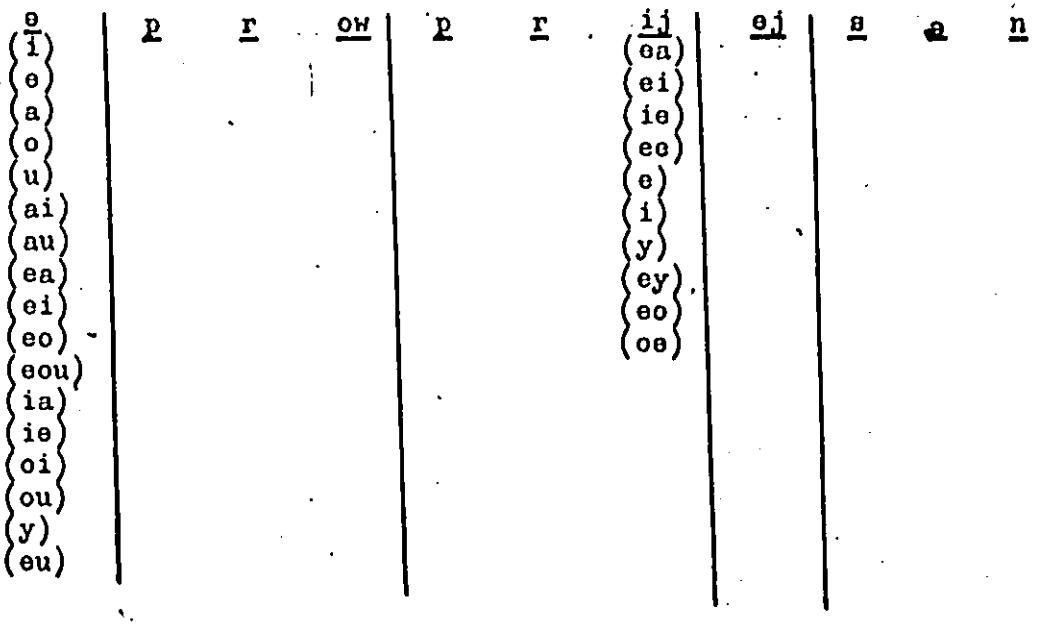
39. beneficial bɛnəfI$\overset{v}{ʃ}$əl

b (b) (bb) (bh) | E (e) (ea) (ai) (e) (ei) (ay) (eo) (ie) (u) | n (n) (nn) (gn) (kn) (mn) (ne) (pn) | ə (i) (e) (a) (o) (u) (ai) (au) (ea) (ei) (eo) (eou) (ia) (ie) (oi) (ou) (y) (eu) | f (f) (ff) (gh) (ph) (lf) | I (i) (a) (o) (e) (ea) (u) (ee) (ei) (ui) (ia) (ie) (y) | $\overset{v}{s}$ (sh) (sch) (ch) (ce) (ci) (sci) (si) (ss) (ssi) (ti) (chsi) (psh) (s) (se) | ə (i) (e) (a) (o) (u) (ai) (au) (ea) (ei) (eo) (eou) (ia) (ie) (oi) (ou) (y) (eu) | l (l) (ll) (le) (lle) (sl)

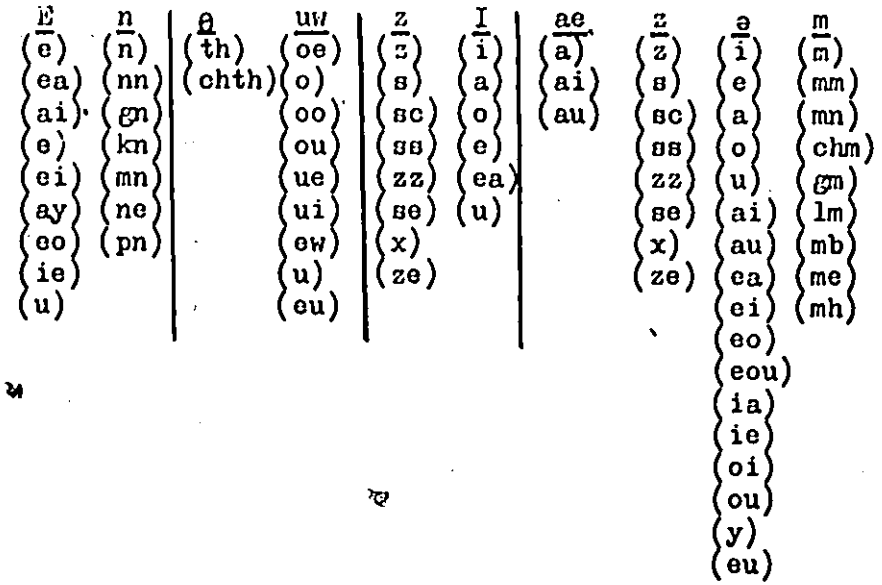
40. appropriation aəprowprIejᵛən

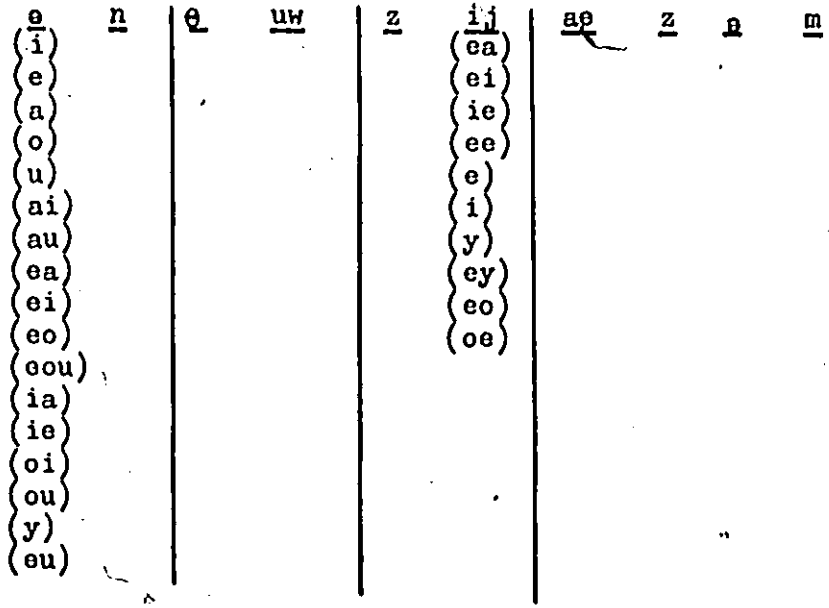


əprowprijeᵛən



41. enthusiasm EnθuwzIaezəm





ənθuwzijaezəm

42. criticize krItIsajz

k	r	I	t	I	s	aj	z
k	r	i	t	i	s	i	z
c	r	a	t	a	c	ei	s
ck	rr	o	tt	o	sc	ie	sc
cc	rh	e	bt	e	ss	ai	ss
ch	wr	ea	cht	ea	ce	y	zz
cch	re	u	ct	u	ps	uy	se
cq	rrh	ee	ed	ee	sch	ay	x
cqu		ei	ght	ei	sc	ey	ze
cque		ui	phth	ui		oy	
cu		ia	te	ia			
gh		ie	th	ie			
ke		y		y			
kh							
lk							
q							
qu							

krIdIsájz

k	r	I	d	I	s	aj	z
			d				
			dd				
			de				
			ed				
			ld				

43. prejudice prEjedIs

p	r	E	j	e	d	I	s
p	r	e	j	i	d	i	s
pp	rr	ea	gg	e	dd	a	c
	rh	ai	dge	a	de	o	sc
	wr	e	ch	o	ed	e	ss
	re	ei	d	u	ld	ea	ce
	rrh	ay	dg	ai		u	ps
		eo	di	au		ee	sch
		ie	ge	ea		ei	se
		u	gi	ei		ui	
			jj	eo		ia	
			g	eou		ie	
				ia		y	
				ie			
				oi			
				ou			
				y			
				eu			

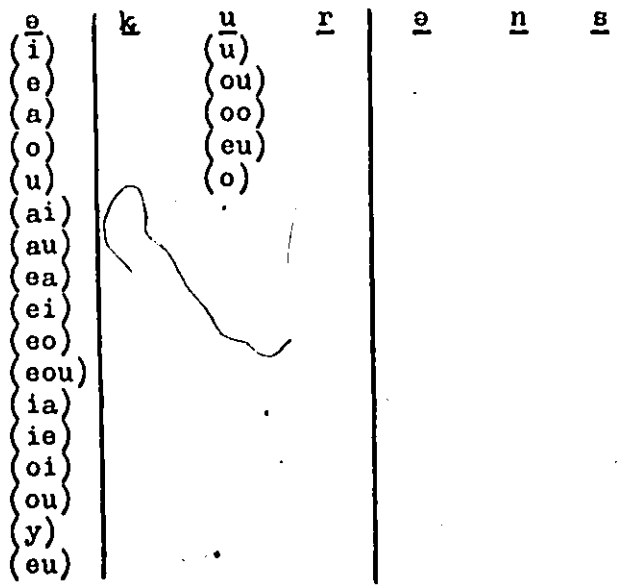
44. belligerent bəlIjərənt

b	ə	l	I	ʝ	ə	r	ə	n	t
(b)	(i)	(l)	(i)	(j)	(i)	(r)	(i)	(n)	(t)
(bb)	(e)	(ll)	(a)	(gg)	(e)	(rr)	(e)	(nn)	(tt)
(bh)	(a)	(le)	(o)	(dge)	(a)	(rh)	(a)	(gn)	(bt)
	(o)	(lle)	(e)	(ch)	(o)	(wr)	(o)	(kn)	(cht)
	(u)	(sl)	(ea)	(d)	(u)	(re)	(u)	(mn)	(ct)
	(ai)		(u)	(dg)	(ai)	(rrh)	(ai)	(ne)	(ed)
	(au)		(ee)	(di)	(au)		(au)	(pn)	(ght)
	(ea)		(ei)	(ge)	(ea)		(ea)		(phth)
	(ei)		(ui)	(gi)	(ei)		(ei)		(te)
	(eo)		(ia)	(jj)	(eo)		(eo)		(th)
	(eou)		(ie)	(g)	(eou)		(eou)		(ts)
	(ia)		(y)		(ia)		(ia)		
	(ie)				(ie)		(ie)		
	(oi)				(oi)		(oi)		
	(ou)				(ou)		(ou)		
	(y)				(y)		(y)		
	(eu)				(eu)		(eu)		

45. occurrence owkərəns

ow	k	ə	r	ə	n	s
(o)	(k)	(i)	(r)	(i)	(n)	(s)
(oe)	(c)	(e)	(rr)	(e)	(nn)	(c)
(ou)	(ck)	(a)	(rh)	(a)	(gn)	(sc)
(ow)	(cc)	(o)	(wr)	(o)	(kn)	(ss)
(ew)	(ch)	(u)	(re)	(u)	(mn)	(ce)
(eau)	(cch)	(ai)	(rrh)	(ai)	(ne)	(ps)
(au)	(cq)	(au)		(au)	(pn)	(sch)
(oo)	(cqu)	(ea)		(ea)		(se)
(oh)	(cque)	(ui)		(ei)		
	(cu)	(eo)		(eo)		
	(gh)	(eou)		(eou)		
	(ke)	(ia)		(ia)		
	(kh)	(ie)		(ie)		
	(lk)	(oi)		(oi)		
	(q)	(ou)		(ou)		
	(qu)	(y)		(y)		
		(eu)		(eu)		

occurrence (cont'd) ɐkurɐns .



APPENDIX C (cont'd) COMMON SPELLINGS - LEVEL II

	WORD	REGIONAL PRONUNCIATIONS	COMMON SPELLINGS		
			k	ae	t
1.	cat	kaet	(k)	(a)	(t)
			(c)	(ai)	(tt)
			(ck)	(au)	(bt)
			(cc)		(cht)
			(ch)		(ct)
			(cch)		(ed)
			(cq)		(ght)
			(cqu)		(phth)
			(cque)		(te)
			(cu)		(th)
			(gh)		
			(ke)		
			(kh)		
			(lk)		
			(q)		
			(qu)		
			r	ʌ	n
2.	run	rʌn	(r)	(u)	(n)
			(rr)	(a)	(nn)
			(rh)	(o)	(gn)
			(wr)	(ou)	(kn)
			(re)	(oo)	(mn)
			(rrh)		(ne)
					(pn)
			a	r	m
3.	arm	arm	(a)	(r)	(m)
			(au)	(rr)	(mm)
			(aw)	(rh)	(mn)
			(o)	(wr)	(ohm)
			(ou)	(re)	(gm)
			(e)	(rrh)	(lm)

	arm (cont'd)		(ea) (oa) (ow)		(mb) (me) (mh)								
4.	train	trejn	t (t) (tt) (bt) (cht) (ct) (ed) (ght) (phth) (te) (th)	r (r) (rr) (rh) (wr) (re) (rrh)	ej (ei) (a) (e) (ai) (ay) (ea) (et) (ey) (au)	n (n) (nn) (gn) (kn) (mn) (ne) (pn)							
5.	shout	vsawt	v s (sh) (sch) (ch) (ce) (ci) (sci) (si) (ss) (ssi) (ti) (chsi) (psh) (s) (se)	aw (ou) (ow)	t (t) (tt) (bt) (cht) (ct) (ed) (ght) (phth) (te) (th)								
6.	correct	kowrEkt	k (k) (c) (ck)	ow (o) (oe) (oa)	r (r) (rr) (rh)	E (e) (ea) (ai)	k (k) (c) (ck)	t (t) (tt) (bt)					

correct (cont'd)

(cc) (ch) (cch) (cq) (cqu) (cque) (cu) (gh) (ke) (kh) (lk) (q) (qu)	(ou) (ow) (ew) (eau) (au) (oo) (oh) (oi)	(wr) (re) (rrh)	(ei) (ay) (eo) (ie) (u)	(cc) (ch) (cch) (cq) (cqu) (cque) (cu) (gh) (ke) (kh) (lk) (q) (qu)	(cht) (ct) (ed) (ght) (phth) (te) (th)	

k•rEkt

k	e (i) (e) (a) (o) (u) (ai) (au) (ea) (ei) (eo) (eou) (ia) (ie) (oi) (ou) (y) (eu)	r	E	k	t

krEkt

k	r	E	k	t	

7. cirole sɘrkɘl

s	a	r	k	a	l
s	i	r	k	i	l
c	e	rr	c	e	ll
sc	a	rh	ck	a	le
ce	o	wr	co	o	lle
ps	u	re	ch	u	sl
sch	ai	rrh	cch	ai	
se	au		cq	au	
	ea		cqu	ea	
	ei		cque	ei	
	eo		ou	eo	
	eou		gh	eou	
	ia		ke	ia	
	ie		kh	ie	
	oi		lk	oi	
	ou		q	ou	
	y		qu	y	
	eu			eu	
				[-	(le)]

Surkul

S	u	r	k	u	l
	u			u	
	ou			ou	
	oo			oo	
	ea			eu	
	o			o	

SIrkIl

S	I	r	k	I	l
	i			i	
	a			a	
	o			o	
	e			e	
	eu			ea	
	u			u	
	ee			ee	
	ei			ei	
	ui			ui	
	ia			ia	
	ie			ie	
	y			y	

8. heaven hEven

h	E	v	ɘ	n
h	e	v	i	n
wh	ea	f	e	nn
	ai	ph	a	gn

	heaven (cont'd)			(e) (ei) (ay) (eo) (ie) (u)	(ve) (vv)	(ʊ) (u) (ai) (au) (ea) (ei) (eo) (eou) (ia) (ie) (oi) (ou) (y) (eu)	(kn) (mn) (ne) (pn)	
9.	educate	Eǰuwkejt	E (e) (ea) (ai) (e) (ei) (ay) (eo) (ie) (u)	ǰ (j) (gg) (dge) (ch) (d) (dg) (di) (ge) (gi) (jj) (g) (dj)	uw (oe) (o) (oo) (ou) (ue) (ui) (ew) (u) (eu)	k (k) (c) (ck) (cc) (ch) (cch) (cq) (cqu) (cque) (cu) (gh) (ke) (kh) (lk) (q) (qu)	ej (ei) (a) (e) (ai) (ay) (ea) (et) (ey) (au)	t (t) (tt) (bt) (cht) (ct) (ed) (ght) (phth) (te) (th)
		Eǰekejt	E	ǰ	e (i) (e)	k	ej	t

educate (cont'd)

E	y	ə	k	əj	t
		(a)			
		(o)			
		(u)			
		(ai)			
		(au)			
		(ea)			
		(ei)			
		(eo)			
		(eou)			
		(ia)			
		(ie)			
		(oi)			
		(ou)			
		(y)			
		(eu)			

10. material mətijrIəl

m	ə	t	ij	r	I	ə	l
(m)	(i)	(t)	(ea)	(r)	(i)	(i)	(l)
(mm)	(e)	(tt)	(ei)	(rr)	(a)	(e)	(ll)
(mn)	(a)	(bt)	(ie)	(rh)	(o)	(a)	(le)
(chm)	(o)	(cht)	(ee)	(wr)	(e)	(o)	(lle)
(gn)	(u)	(ct)	(e)	(re)	(ea)	(u)	(sl)
(lm)	(ai)	(ed)	(i)	(rrh)	(u)	(ai)	
(mb)	(au)	(ght)	(y)		(ee)	(au)	
(me)	(ea)	(phth)	(ey)		(ei)	(ea)	
(mh)	(ei)	(te)	(eo)		(ui)	(ei)	
	(eo)	(th)	(oe)		(ia)	(eo)	
	(eou)				(ie)	(eou)	
	(ia)				(y)	(ia)	
	(ie)					(ie)	
	(oi)					(oi)	
	(ou)					(ou)	
	(y)					(y)	
	(eu)					(eu)	

	material (cont'd)	metijrijel	m	ə	t	ij	r	ij (ea, ei, ie, ee, e, i, y, ey, eo, oe)	ə	l
11.	ruin	ruwIn	r (r, rr, rh, wr, re, ṛrh)	uw (oe, o, oo, ou, ue, ui, ew, u, eu)	I (i, a, o, e, ea, u, ee, ei, ui, ia, ie, y)	n (n, nn, gn, kn, mn, ne, pn)				
		ṛuwn	r	uw	n					
		run	r	u (u, ou, oo, eu, o)	n					

12. fashion faesən

f	ae	ʃ	ə	n
f	a	sh	i	n
ff	ai	sch	e	nn
gh	au	ch	a	gn
ph		ce	o	kn
lf		ci	u	mn
		sci	ai	ne
		si	au	pn
		ss	ea	
		ssi	ei	
		ti	eo	
		ghsi	eou	
		psh	ia	
		s	ie	
		se	oi	
			ou	
			y	
			eu	

13. believe bijlijv

b	ij	l	ij	v
b	ea	l	ea	v
bb	ei	ll	ei	f
bh	ie	le	ie	ph
	ee	lle	ee	ve
	e	sl	e	vv
	i		i	
	y		y	
	ey		ey	
	eo		eo	
	oe		oe	

blijv b l ij v

14. suggestion segǰEsčən

s	ə	g	ǰ	E	s	č	ə	n
(s)	(u)	(g)	(j)	(e)	(s)	(ch)	(i)	(n)
(c)	(a)	(gg)	(g)	(ea)	(c)	(tch)	(e)	(nn)
(sc)	(o)	(gh)	(gg)	(ai)	(sc)	(c)	(a)	(gn)
(ss)	(ou)	(gu)	(dge)	(e)	(ss)	(che)	(o)	(kn)
(ce)	(oo)	(gue)	(ch)	(ei)	(ce)	(te)	(u)	(mn)
(ps)			(d)	(ay)	(ps)	(ti)	(ai)	(ne)
(sch)			(dg)	(eo)	(sch)	(tu)	(au)	(pn)
(se)			(di)	(ie)	(se)		(ea)	
			(ge)	(u)			(ei)	
			(gi)				(eo)	
			(jj)				(eou)	
			(g)				(ia)	
							(ie)	
							(oi)	
							(ou)	
							(y)	
							(eu)	

segǰEsčən

s	ə	g	ǰ	E	s	č	ə	n
	(i)							
	(e)							
	(a)							
	(o)							
	(u)							
	(ai)							
	(au)							
	(ea)							
	(ei)							
	(eo)							
	(eou)							
	(ia)							
	(ie)							
	(oi)							
	(ou)							
	(y)							
	(eu)							

15. equipment ekwIpment

ə	k	(w)	I	p	m	ə	n	t
(i)	(k)	(w)	(i)	(p)	(m)	(i)	(n)	(t)
e	c		a	pp	mm	e	nn	tt
a	ck		o		mn	a	gn	bt
o	cc		e		chm	o	kn	cht
u	ch		ea		gn	u	mn	ct
ai	cch		u		lm	ai	ne	ed
au	cq		ee		mb	au	pn	ght
ea	cqu		ei		me	ea		phth
ei	cque		ui		mh	ei		te
eo	cu		ia			eo		th
eou	gh		ie			eou		
ia	ke		y			ia		
ie	kh					ie		
oi	lk					oi		
ou	q					ou		
y	qu					y		
eu						eu		

ijkwIpm e nt

ij	k	w	I	p	m	ə	n	t
(ea)								
ei								
ie								
ee								
e								
i								
y								
ey								
eo								
oe								

16. majority — maeǰorItij

m	ae	ǰ	or	I	t	ij
(m)	(a)	(j)	(or)	(i)	(t)	(ea)
(mm)	(ai)	(g)	(aor)	(a)	(tt)	(ei)
(mn)	(au)	(gg)		(o)	(bt)	(ie)
(chm)		(dge)		(e)	(cht)	(ee)
(gm)		(ch)		(ea)	(ct)	(e)
(lm)		(d)		(u)	(ed)	(i)
(mb)		(dg)		(oe)	(ght)	(y)
(me)		(di)		(ei)	(phth)	(ey)
(mh)		(ge)		(ui)	(te)	(eo)
		(gi)		(ia)	(th)	(oe)
		(jj)		(ie)		
		(g)		(y)		
		(dj)				

məǰorIdij

m	ə	ǰ	or	I	d	ij
	(i)				(d)	
	(e)				(dd)	
	(a)				(de)	
	(o)				(ed)	
	(u)				(ld)	
	(ai)					
	(au)					
	(ea)					
	(ei)					
	(eo)					
	(eou)					
	(ia)					
	(ie)					
	(oi)					
	(ou)					
	(eu)					
	(y)					

17. institute

Insto tuwt

I	n	s	t	e	t	uw	t
(i)	(n)	(s)	(t)	(i)	(t)	(oe)	(t)
(a)	(nn)	(c)	(tt)	(e)	(tt)	(o)	(tt)
(o)	(gn)	(sc)	(bt)	(a)	(bt)	(oo)	(bt)
(e)	(kn)	(ss)	(cht)	(o)	(cht)	(ou)	(cht)
(ea)	(mn)	(ce)	(ct)	(u)	(ct)	(ue)	(ct)
(u)	(ne)	(ps)	(ed)	(ai)	(ed)	(ui)	(ed)
(ee)	(pn)	(sch)	(ght)	(au)	(ght)	(ew)	(ght)
(ei)		(se)	(phth)	(ea)	(phth)	(u)	(phth)
(ui)			(te)	(ei)	(te)	(eu)	(te)
(ia)			(th)	(eo)	(th)		(th)
(ie)				(eou)			
(y)				(ia)			
				(ie)			
				(oi)			
				(ou)			
				(y)			
				(eu)			

InstItut

I	n	s	t	I	t	u	t
				(i)		(u)	
				(a)		(ou)	
				(o)		(oo)	
				(e)		(eu)	
				(ea)		(o)	
				(u)			
				(ee)			
				(ei)			
				(ui)			
				(ia)			
				(ie)			
				(y)			

18. literature lIterecer

l	I	t	e	r	e	c	e	r
(l)	(i)	(t)	(i)	(r)	(i)	(ch)	(i)	(r)
(ll)	(a)	(tt)	(e)	(rr)	(e)	(tch)	(e)	(rr)
(le)	(o)	(bt)	(a)	(rh)	(a)	(c)	(a)	(rh)
(lle)	(e)	(cht)	(o)	(wr)	(o)	(che)	(o)	(wr)
(sl)	(ea)	(ct)	(u)	(re)	(u)	(te)	(u)	(re)
	(u)	(ed)	(ai)	(rrh)	(ai)	(ti)	(ai)	(rrh)
	(ee)	(ght)	(au)		(au)	(tu)	(au)	
	(ei)	(phth)	(ea)		(ea)		(ea)	
	(ui)	(te)	(ei)		(ei)		(ei)	
	(ia)	(th)	(eo)		(eo)		(eo)	
	(ie)		(eou)		(eou)		(eou)	
	(y)		(ia)		(ia)		(ia)	
			(ie)		(ie)		(ie)	
			(oi)		(oi)		(oi)	
			(ou)		(ou)		(ou)	
			(y)		(y)		(y)	
			(eu)		(eu)		(eu)	

lIdereur

l	I	d	e	r	e	o	u	r
		(d)					(u)	
		(dd)					(ou)	
		(de)					(oo)	
		(ed)					(eu)	
		(ld)					(o)	

lIdereIr

l	I	d	e	r	e	o	I	r
							(i)	
							(a)	
							(o)	
							(e)	
							(ea)	
							(u)	
							(ee)	
							(ei)	
							(ui)	
							(ia)	
							(ie)	
							(y)	

19 reverence rEverens

r	E	v	e	r	e	n	s
r	e	v	i	r	i	n	s
rr	ea	f	e	rr	e	nn	c
rh	ai	ph	a	rh	a	gn	sc
wr	e	ve	o	wr	o	kn	ss
re	ei	vv	u	re	u	mn	ce
rrh	ay		ai	rrh	ai	ne	ps
	eo		au		au	pn	sch
	ie		ea		ea		se
	u		ei		ei		ts
			eo		eo		
			eou		eou		
			ia		ia		
			ie		ie		
			oi		oi		
			ou		ou		
			y		y		
			eu		eu		

rEvurens

r	E	v	u	r	e	n	s
			u				
			ou				
			oo				
			eu				
			o				

rEvIrens

r	E	v	I	r	e	n	s
			i				
			a				
			o				
			e				
			ea				
			u				
			ee				
			ei				
			ui				
			ia				
			ie				
			y				

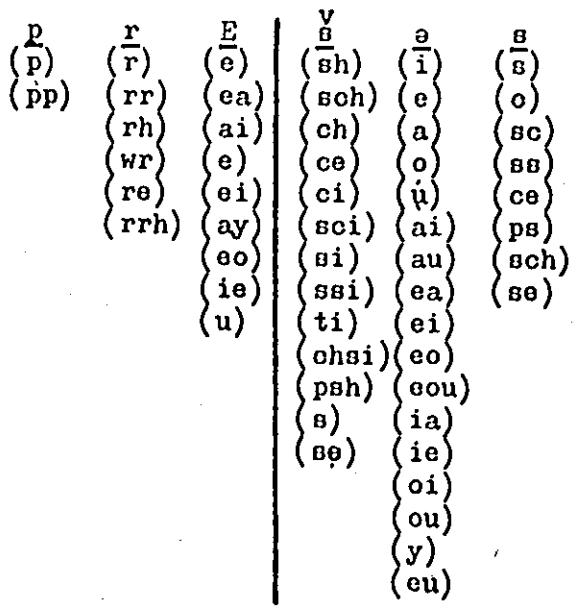
20. museum mjuwzijəm

m	juw	z	ij	ə	m
(m)	(u)	(z)	(ea)	(u)	(m)
(mm)	(eu)	(s)	(ei)	(a)	(mm)
(mn)	(ue)	(so)	(ie)	(o)	(mn)
(chm)	(ew)	(ss)	(ee)	(ou)	(chm)
(gm)	(eau)	(zz)	(e)	(oo)	(gm)
(lm)	(iew)	(se)	(i)		(lm)
(mb)		(x)	(y)		(mb)
(me)		(ze)	(ey)		(me)
(mh)			(eo)		(mh)
			(oe)		

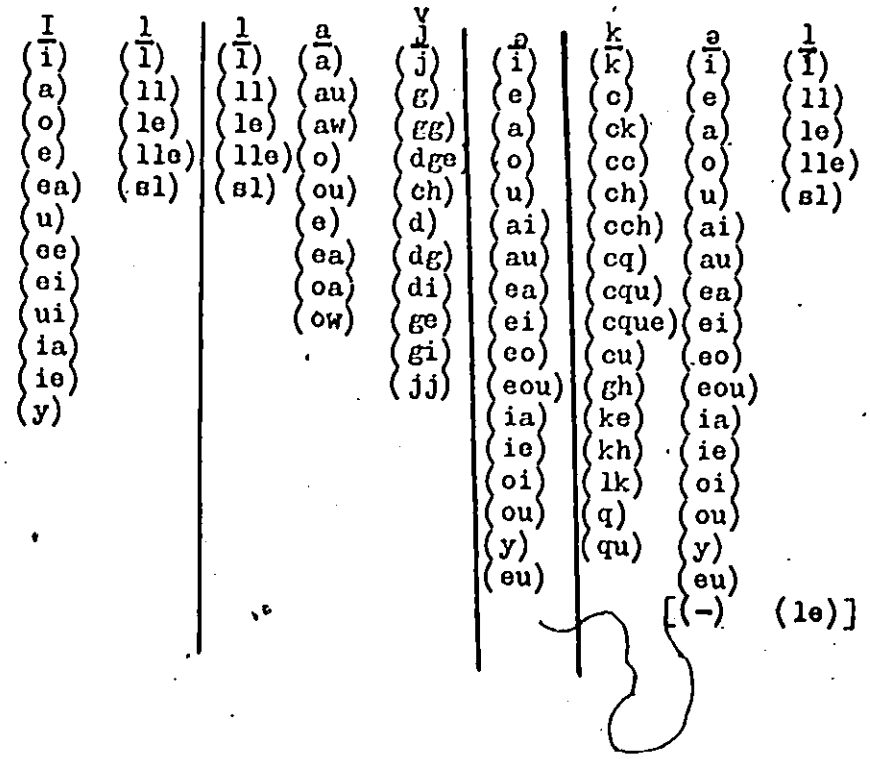
mjuwzijʌm

m	juw	z	ij	ʌ	m
				(i)	
				(e)	
				(a)	
				(o)	
				(u)	
				(ai)	
				(au)	
				(ea)	
				(ei)	
				(eo)	
				(eou)	
				(ia)	
				(ie)	
				(oi)	
				(ou)	
				(y)	
				(eu)	

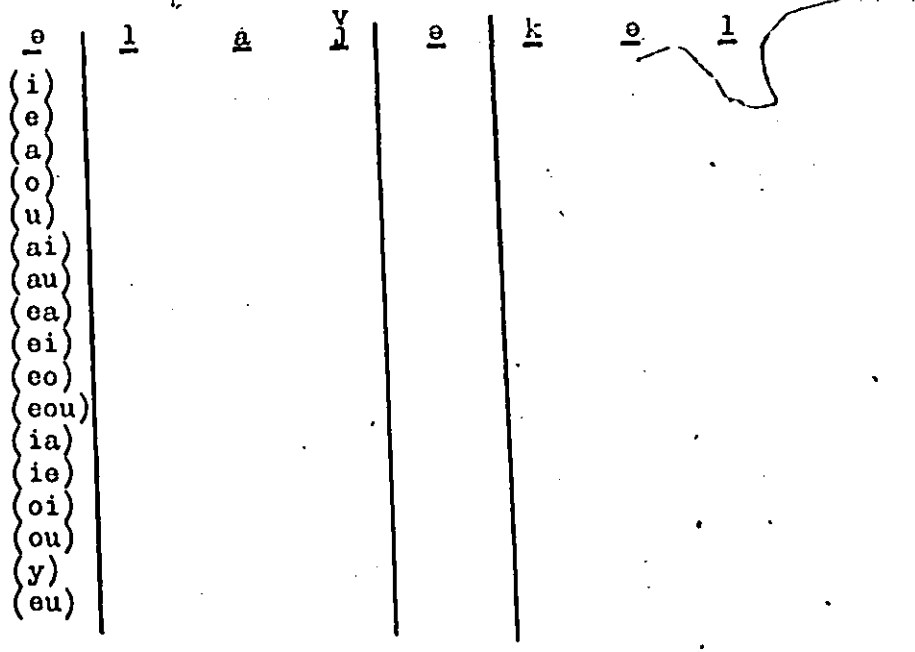
21. precious prE^{V}əs



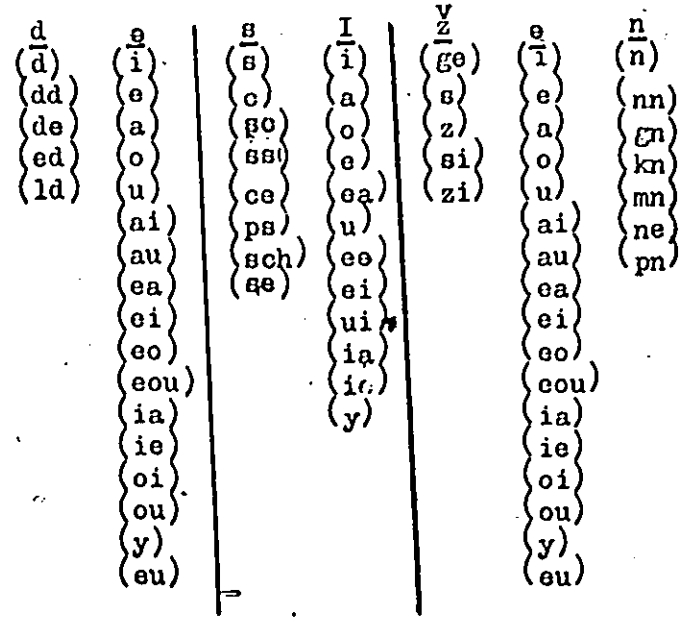
22. illogical Illa^{V}jəkəl



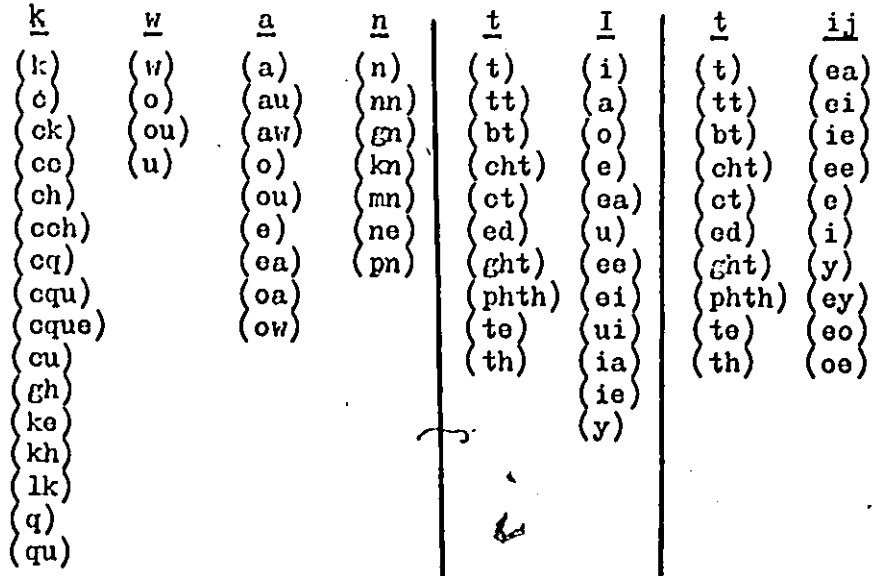
illogical (cont'd) ɔ laʲɔkɔl



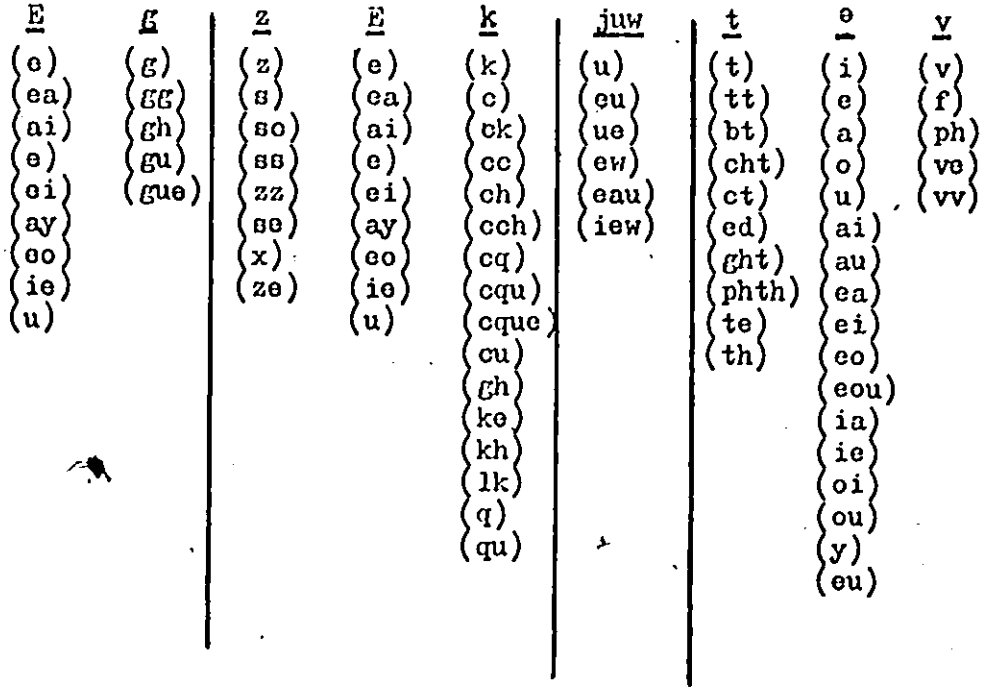
23. decision dɛsɪʲzɛn



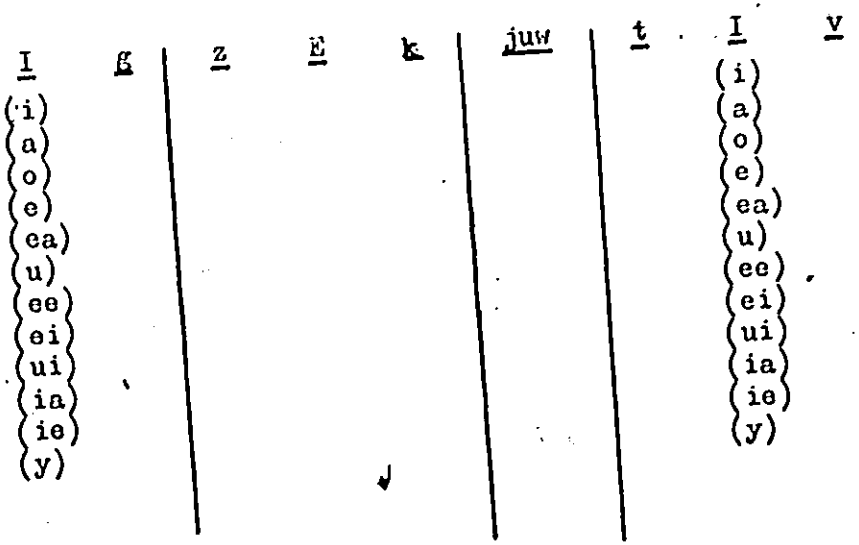
24. quantity kwantItij



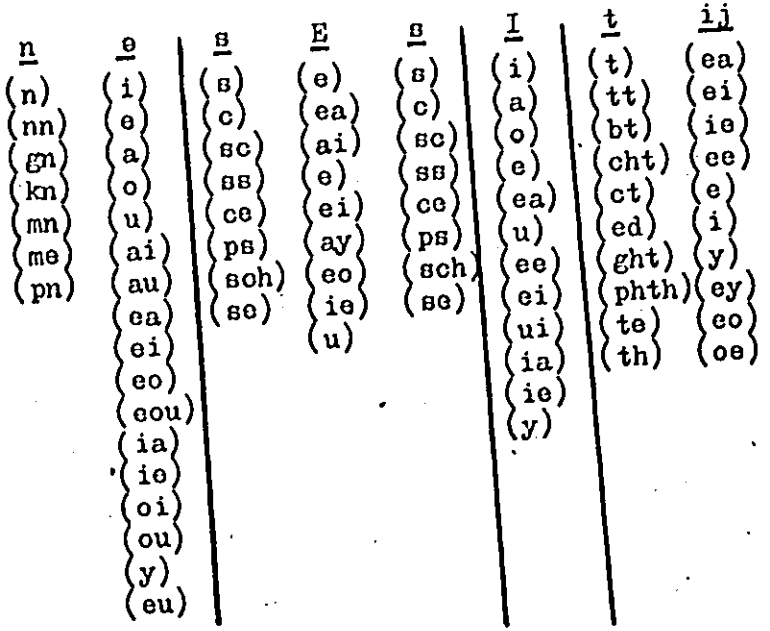
25. executive EgzEkjuwtev



executive (cont'd) IgzɨkjuwtIv



26. necessity nesEsItij



necessity (cont'd) nEsEsIdij

n	E	s	E	s	I	d	ij
	(e)					(d)	
	(ea)					(dd)	
	(ai)					(de)	
	(e)					(ed)	
	(ei)					(ld)	
	(ay)						
	(eo)						
	(ie)						
	(u)						

27. opportunity apertuwnetij

a	p	e	r	t	uw	n	e	t	ij
(a)	(p)	(i)	(r)	(t)	(oe)	(n)	(i)	(t)	(ea)
(au)	(pp)	(e)	(rr)	(tt)	(o)	(nn)	(e)	(tt)	(ei)
(aw)		(a)	(rh)	(bt)	(oo)	(gn)	(a)	(bt)	(ie)
(o)		(o)	(wr)	(cht)	(ou)	(kn)	(o)	(cht)	(ee)
(ou)		(u)	(re)	(ct)	(ue)	(mn)	(u)	(ct)	(e)
(e)		(ai)	(rrh)	(ed)	(ui)	(ne)	(ai)	(ed)	(i)
(ea)		(au)		(ght)	(ew)	(pn)	(au)	(ght)	(y)
(oa)		(ea)		(phth)	(u)		(ea)	(phth)	(ey)
(ow)		(ei)		(te)	(eu)		(ei)	(te)	(eo)
		(eo)		(th)			(eo)	(th)	(oe)
		(eou)					(eou)		
		(ia)					(ia)		
		(ie)					(ie)		
		(oi)					(oi)		
		(ou)					(ou)		
		(y)					(y)		
		(eu)					(eu)		

apertuwnedij

a	p	e	r	t	uw	n	e	d	ij
								(d)	
								(dd)	
								(de)	
								(ed)	
								(ld)	

28. ankiety

aeʃzajEtij

ae	ʃ	z	aj	E	t	ij
(a)	(nɕ)	(z)	(i)	(e)	(t)	(ea)
(ai)	(n)	(s)	(ei)	(ea)	(tt)	(ei)
(au)	(ngg	(sc)	(ie)	(ai)	(bt)	(ie)
	(ngue	(ss)	(ai)	(e)	(cht)	(ee)
		(zz)	(y)	(ei)	(ct)	(e)
		(se)	(uy)	(ay	(ed)	(i)
		(x)	(ay)	(eo	(ɕht)	(y)
		(ze)	(ey)	(ie	(phth)	(ey)
			(oy)	(u)	(te)	(eo
					(th)	(oe)

aeʃzajEdij

ae	ʃ	z	aj	E	d	ij
					(d)	
					(dd)	
					(de)	
					(ed)	
					(ld)	

29. consciencé

Kanvens

K	a	n	v s	e	n	s
(k)	(a)	(n)	(sh)	(i)	(n)	(s)
(c)	(au)	(nn)	(sch)	(e	(nn)	(c)
(ck)	(aw	(gn,	(ch)	(a	(gn	(sc)
(cc	(o)	(kn	(ce	(o	(kn	(ss
(ch)	(ou)	(mn	(ci	(u	(mn	(ce
(cch)	(e)	(ne	(sci)	(ai	(ne	(ps
(cq)	(ea)	(pn)	(si)	(au	(pn)	(sch)
(cqu)	(oa		(ss)	(ea		(se)
(cque)	(ow)		(ssi)	(ei		
(cu			(ti)	(eo		
(gh				(eou)		
(ke				(ia		
(kh				(ie		
(lk)				(oi		
(q)				(ou		
(qu)				(y)		
				(eu)		

30. physician fIzIʃən

f	I	z	I	ʃ	ə	n
f	i	z	i	sh	i	n
ff	a	s	a	sch	e	nn
gh	o	sc	o	ch	a	gn
ph	e	ss	e	ce	o	kn
lf	ea	zz	ea	ci	u	mn
	u	se	u	sci	ai	ne
	ee	x	ee	si	au	pn
	ei	ze	ei	ss	ea	
	ui		ui	ssi	ei	
	ia		ia	ti	eo	
	ie		ie	chsi	eou	
	y		y	psh	ia	
				s	ie	
				se	oi	
					ou	
					y	
					eu	

fəzIʃən

f	ə	z	I	ʃ	ə	n
	i					
	e					
	a					
	o					
	u					
	ai					
	au					
	ea					
	ei					
	eo					
	eou					
	ia					
	ie					
	oi					
	ou					
	y					
	eɹ					

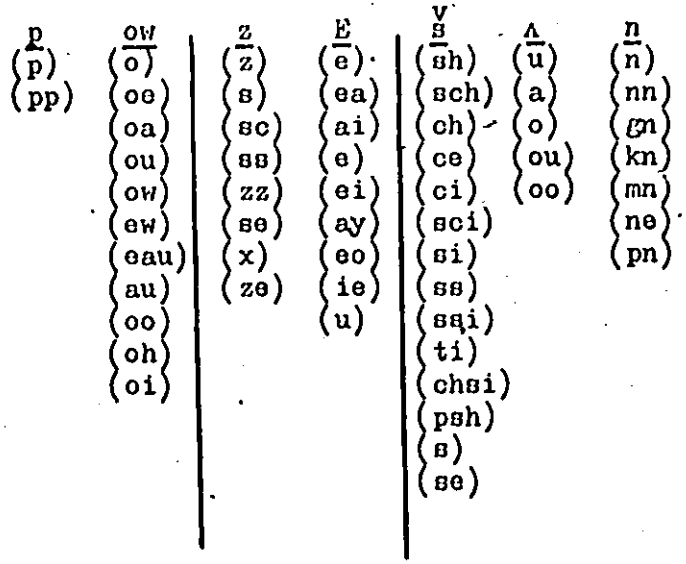
31. courteous kərtijʌs

k	ə	r	t	ij	ʌ	s
k	i	r	y	ea	u	s
c	e	rr	tt	ei	a	c
ck	a	rh	bt	ie	o	sc
cc	o	wr	cht	ee	ou	ss
ch	u	re	ct	e	oo	ce
cch	ai	rrh	ed	i		ps
cq	au		ght	y		sch
cqu	ea		phth	ey		se
cque	ei		te	eo		
cu	eo		th	oe		
gh	eou					
kc	ia					
kh	ie					
lk	oi					
q	ou					
qu	y					
	eu					

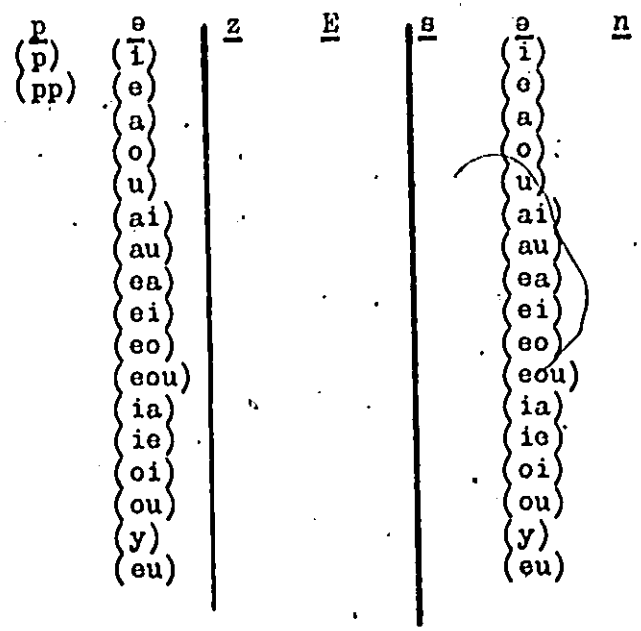
kərdijəs

k	ə	r	d	ij	ə	s
			d		i	
			dd		e	
			de		a	
			ed		o	
			ld		u	
					ai	
					au	
					ea	
					ei	
					eo	
					eou	
					ia	
					ie	
					oi	
					ou	
					y	
					eu	

32. possession powzEs^{v}Λn



pəzEs^{v}ən



33. lucidity luwsIdItij

l	uw	s	I	d	I	t	ij
(l)	(oe)	(s)	(i)	(d)	(i)	(t)	(ea)
(ll)	(o)	(c)	(a)	(dd)	(a)	(tt)	(ei)
(le)	(oo)	(sc)	(o)	(de)	(o)	(bt)	(ie)
(lle)	(ou)	(ss)	(e)	(ed)	(e)	(cht)	(ee)
(sl)	(ue)	(ce)	(ea)	(ld)	(ea)	(ct)	(e)
	(ui)	(ps)	(u)		(u)	(ed)	(i)
	(ew)	(sch)	(ee)		(ee)	(ght)	(y)
	(u)	(se)	(ei)		(ei)	(phth)	(ey)
	(eu)		(ui)		(ui)	(te)	(eo)
			(ia)		(ia)	(th)	(oe)
			(ie)		(ie)		
			(y)		(y)		

luwsIdIdij

l	uw	s	I	d	I	d	ij
						(d)	
						(dd)	
						(de)	
						(ed)	
						(ld)	

34. exaggerate Egzaejerejt

E	g	z	ea	j	e	r	ej	t
(e)	(g)	(z)	(a)	(j)	(i)	(r)	(ei)	(t)
(ea)	(gg)	(s)	(ai)	(g)	(e)	(rr)	(a)	(tt)
(ai)	(gh)	(sc)	(au)	(gg)	(a)	(rh)	(e)	(bt)
(e)	(gu)	(ss)		(dge)	(o)	(wr)	(ai)	(cht)
(ei)	(gue)	(zz)		(ch)	(u)	(re)	(ay)	(ct)
(ay)		(se)		(d)	(ai)	(rrh)	(ea)	(ed)
(eo)		(x)		(dg)	(au)		(et)	(ght)
(ie)		(ze)		(di)	(ea)		(ey)	(phth)
(u)				(ge)	(ei)		(au)	(te)
				(gi)	(eo)			(th)
				(jj)	(eou)			
					(ia)			
					(ie)			
					(oi)			
					(ou)			
					(y)			
					(eu)			

exaggerate cont'd IgzaejVerejt

I	ɛ	z	æ	ʌ	ə	r	ejt
(i)							
(a)							
(o)							
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(ea)							
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(ee)							
(ei)							
(ui)							
(ia)							
(ie)							
(y)							

35. privilege prIvlejV

p	r	I	v	l	ə	~~v~~ j
(p)	(r)	(i)	(v)	(l)	(i)	(j)
(pp)	(rr)	(a)	(f)	(ll)	(e)	(g)
	(rh)	(o)	(ph)	(le)	(a)	(gg)
	(wr)	(e)	(ve)	(lle)	(o)	(dge)
	(re)	(ea)	(vv)	(sl)	(u)	(ch)
	(rrh)	(u)			(ai)	(d)
		(ee)			(au)	(dg)
		(ei)			(ea)	(di)
		(ui)			(ei)	(ge)
		(ia)			(eo)	(gi)
		(ie)			(eou)	(jj)
		(y)			(ia)	
					(ie)	
					(oi)	
					(ou)	
					(y)	
					(eu)	

privilege cont'd prIvəlɛj^{v} p r I v | ə (i e a o u ai au ea ei eo eou ia ie oi ou y eu) l ə j^{v}

prIvlIj^{v} p r I v | l I (i a o e ea u ee ei ui ia ie y) j^{v}

privilege cont'd prIvəlIj

p r I v ə l I j

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36. loquacious lowkwejʃʌs

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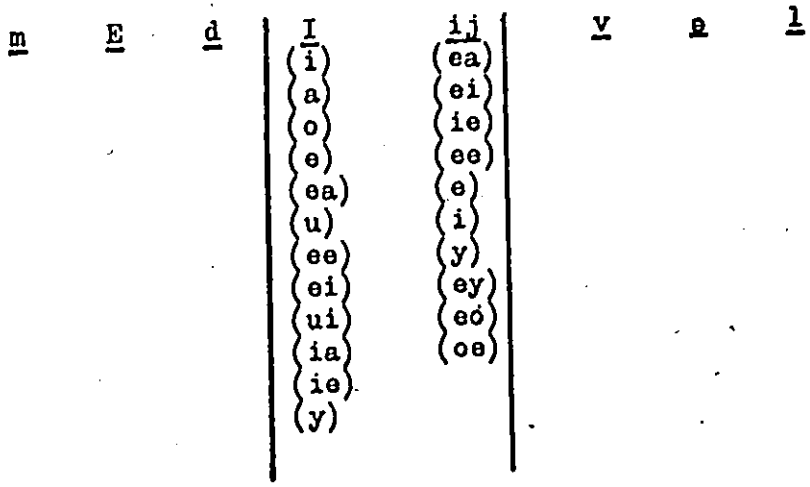
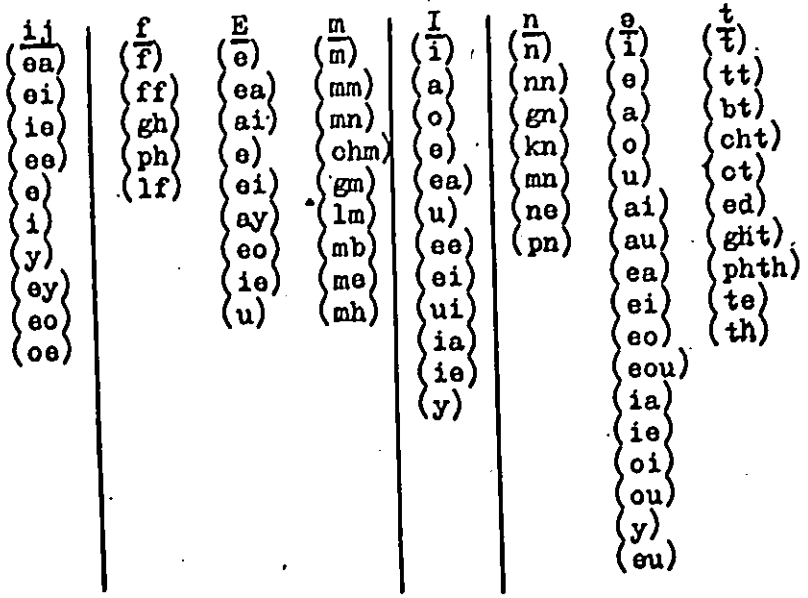
(ps)
(sch)
(se)

			l	ow	k	w	oi	v g	e	s
loquacious cont'd	lowkwejʌs								(i) (e) (a) (o) (u) (ai) (au) (ea) (ei) (eo) (eou) (ia) (ie) (oi) (ou) (y) (eu)	
37. medieval	mEdijvel		m (m) (mm) (mn) (chm) (gm) (lm) (mb) (me) (mh)	E (e) (ea) (ai) (e) (ei) (ay) (eo) (ie) (u)	d (d) (dd) (de) (ed) (ld)	ij (ea) (ei) (ie) (ee) (e) (i) (y) (ey) (eo) (oe)	v (v) (f) (ph) (ve) (vv)	ə (i) (e) (a) (o) (u) (ai) (au) (ea) (ei) (eo) (eou) (ia) (ie) (oi) (y) (eu)	l (l) (ll) (le) (lle) (sl)	

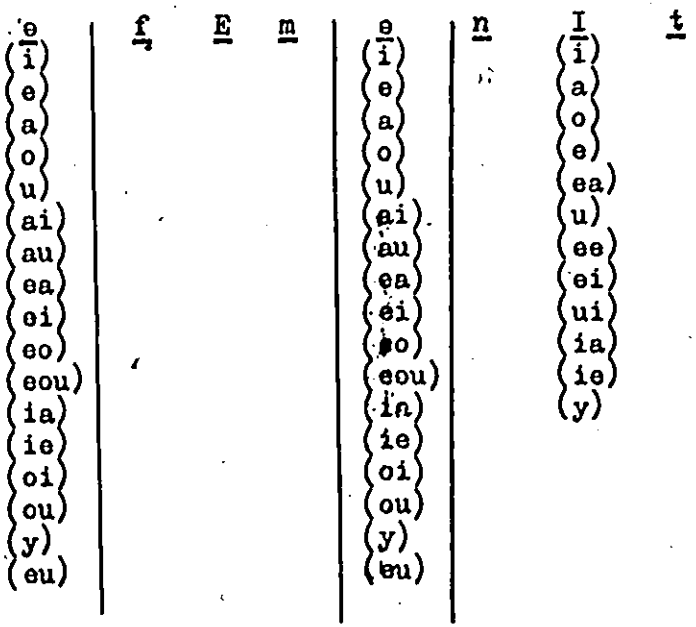
medieval cont'd mEdIijvel



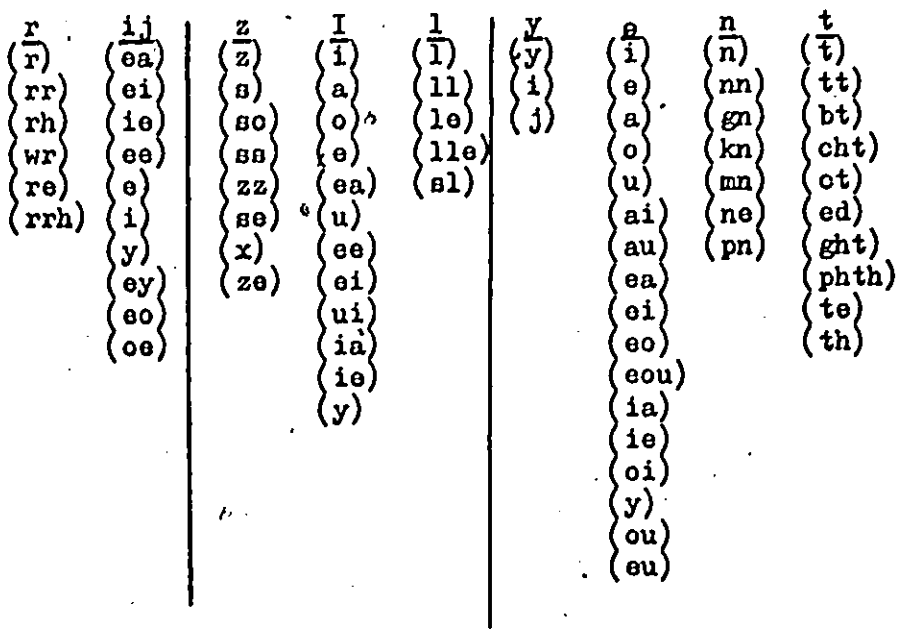
38. effeminate ijfEmInet



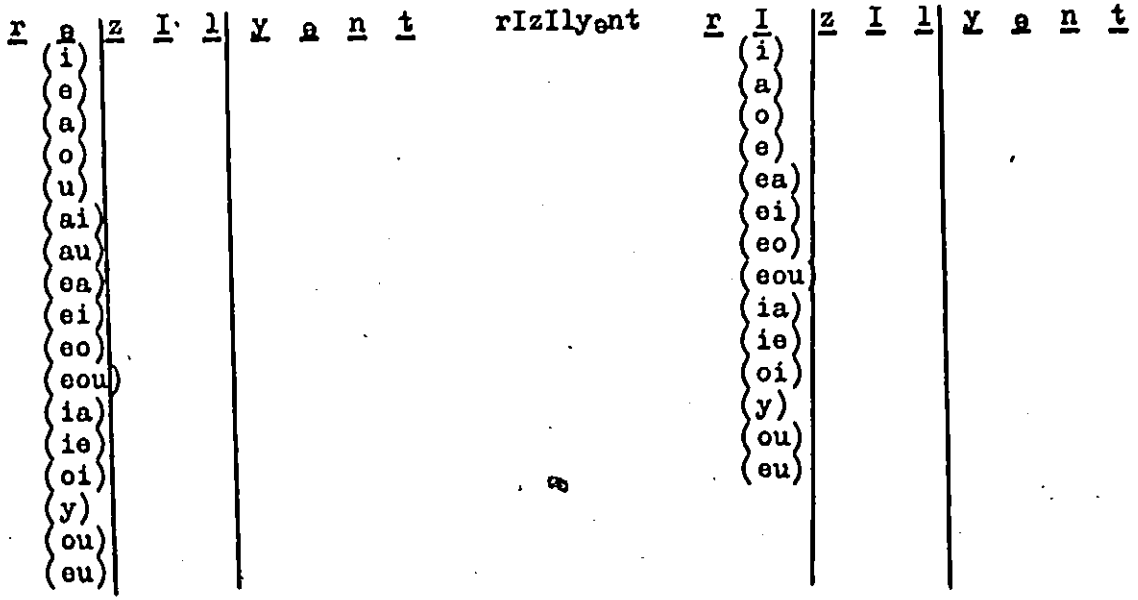
effeminate cont'd ɛfEmənIt



39. resilient rijzIlyənt

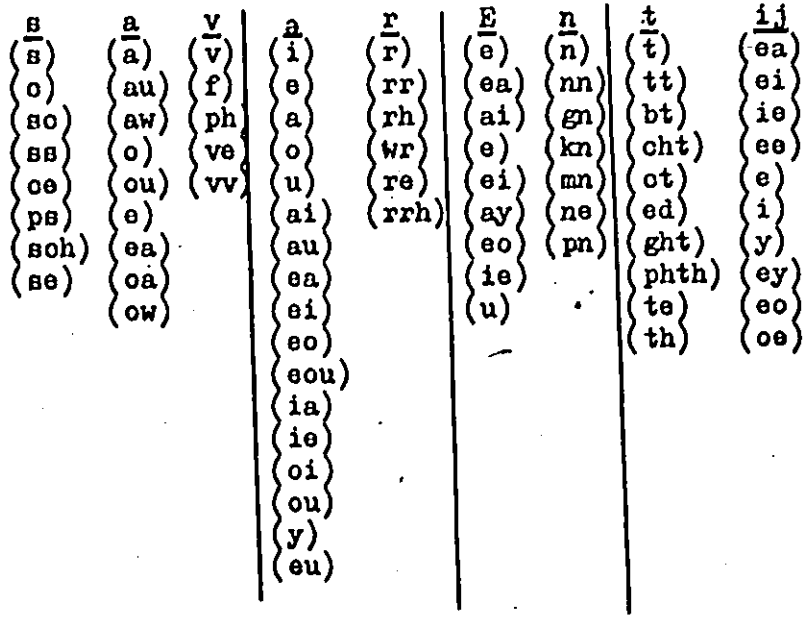


resilient (cont'd) rezIlyent



rIzIlyent

40. sovereignty saverEntij



sovereignty cont'd	savurEntij	s	a	v	u (u) ou oo eu o)	r	E	n	t	ij											
	saverntij	s	a	v	e	r	n	t	ij												
	savurntij	s	a	v	u	r	n	t	ij												
41. assiduous	aesIdjuwes	ae a) ai) au)	s s) o) so) ss) ce) ps) soh) se)	I i) a) o) e) ea) u) ee) ei) ui) ia) ie) y)	d d) dd) de) ed) ld)	juw u) eu) ue) ew) eau) iew)	e i) e) a) o) u) ai) au) ea) ei) eo) eou) ia) ie) oi) ou) y) eu)	s s) o) so) ss) ce) ps) soh) se)													

assiduous cont'd

ə sɪ d j u w ʌ s

ə	s	ɪ	d	juw	ʌ	s
(i)					(u)	
e					a	
a					o	
o					ou	
u					oo	
ai						
au						
ei						
eo						
eou						
io						
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oi						
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ʌ s ɪ d j u w ʌ s

ʌ	s	ɪ	d	juw	ʌ	s
u						
a						
o						
ou						
oo						

42. irresistible ɪ r ɛ z ɪ s t ə b ə l

ɪ	r	r	a	z	ɪ	s	t	ə	b	ə	l
(i)	(r)	(r)	(i)	(z)	(i)	(s)	(t)	(i)	(b)	(i)	(l)
a	rr	rr	e	s	a	c	tt	e	bb	e	ll
o	rh	rh	a	so	o	sc	bt	a	bh	a	le
e	wr	wr	o	ss	e	ss	cht	o		o	lle
ea	re	re	u	zz	ea	ce	ot	u		u	sl
u	rrh	rrh	ai	se	u	ps	ed	ai		ai	
ee			au	x	ee	sch	ght	au		au	
ei			ea	ze	ei	se	phth	ea		ea	
ui			ei		ui		te	ei		ei	
ia			eo		ia		th	eo		eo	
ie			eou		ie			eou		eou	
y)			ia		y)			ia		ia	
			ie					ie		ie	
			oi					oi		oi	
			ou					ou		ou	
			y					y		y	
			eu)					eu)		eu)	

43. acquiesce aekwijEs

ae: a, ai, au
k: k, c, ck, co, ch, coh, cq, cqu, cque, ou, gh, ke, kh, lk, q, qu
w: w, o, ou, u
ij: ea, ei, ie, ee, e, i, y, ey, eo, oe
E: e, ea, ai, e, ei, ay, eo, ie, u
s: s, c, sc, ss, ce, ps, sch, se

44. charlatan Varleten

v: ch, toh, c, che, te, ti, tu
a: a, au, aw, o, ou, e, ea, oa, ow
r: r, rr, rh, wr, re, rrh
l: l, ll, le, lle, sl
e: i, e, a, o, u, ai, au, ea, ei, eo, eou, ia, ie, oi, ou, y, eu
t: t, tt, bt, cht, ot, ed, ght, phth, te, th
e: i, e, a, o, u, ai, au, ea, ei, eo, eou, ia, ie, oi, ou, y, eu
n: n, nn, gn, kn, mn, ne, pn

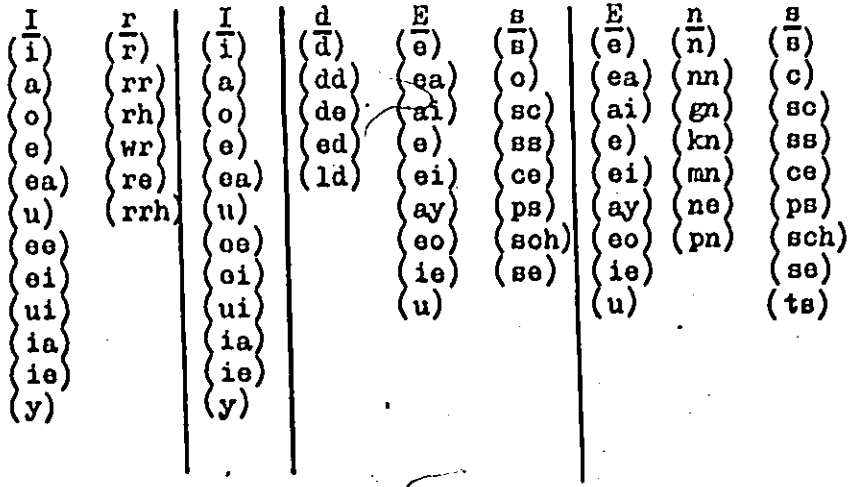
charlatan cont'd — ʏarleten

ʏ	a	r	l	e	t	ə	n
s (sh) (sch) (ch) (ce) (ci) (sci) (si) (ss) (ssi) (ti) (chsi) (psh) (s) (se)							

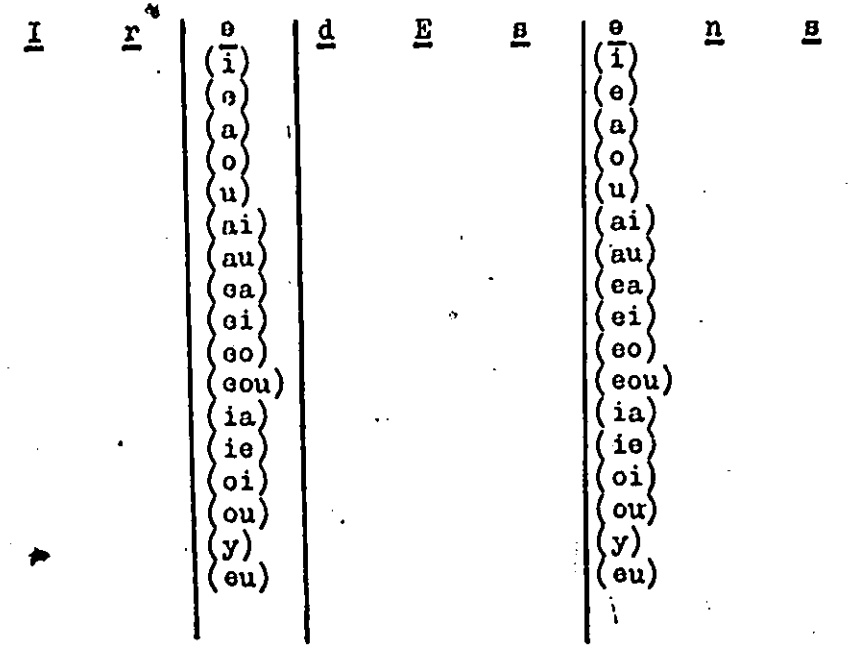
45. pusillanimous — pjuwselaenəməs

p	juw	s	ə	l	ae	n	ə	m	ə	s
(p) (pp)	(u) (eu) (ue) (ew) (eau) (iew)	(s) (c) (sc) (ss) (ce) (ps) (sch) (se)	(i) (e) (a) (o) (u) (ai) (au) (ea) (ei) (eo) (eou) (ia) (ie) (oi) (ou) (y) (eu)	(l) (ll) (le) (lle) (sl)	(a) (ai) (au)	(n) (nn) (gn) (kn) (mn) (ne) (pn)	(i) (e) (a) (o) (u) (ai) (au) (ea) (ei) (eo) (eou) (ia) (ie) (oi) (ou) (y) (eu)	(m) (mm) (mn) (chm) (gm) (lm) (mb) (me) (mh)	(i) (e) (a) (o) (u) (ai) (au) (ea) (ei) (eo) (eou) (ia) (ie) (oi) (ou) (y) (eu)	(s) (c) (sc) (ss) (ce) (ps) (sch) (se)

46. iridescence IrIdEsEns



IredEsens



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*Taken from The Working Brain (Luria, 1973).
**Taken from Day & Wedell (1972).

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GENERAL AREAS OF SPECIALIZATION: Developmental Clinical Psychology and Clinical Neuropsychology

SUBSPECIALTY AREAS: Psychological assessment of children; neuropsychological assessment of brain-injured individuals and children with learning disabilities; remediation of children with learning disabilities; play therapy; adolescent individual and group therapy; teacher and parent counselling

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School psychometrist and psychoeducational counsellor, Metropolitan Separate School Board, Toronto (inner city elementary schools, three years, Scarborough and Agincourt elementary schools, one year, secondary schools, one year)

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Neuroanatomy, Neurological Diagnosis, and Neuropsychological Assessment (University of Windsor, 1975)

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