A SURVEY OF SPEECH DEFECTS AND DISORDERS
IN TUCSON ELEMENTARY SCHOOLS

by

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A Thesis
submitted to the faculty of the
Department of Education
in partial fulfillment of
the requirements for the degree of
Master of Arts
in the Graduate College
University of Arizona

1943

Approved: [Signature]
Director of Thesis

May 4, 1943
A SCANNING OF PACHON DROPPED AND RECEIVED
IN SUCCESSION THROUGHOUT THE

By

Maurice A. Freeman

A Thesis
Submitted to the faculty of the
Department of Musicology
in partial fulfillment of the
requirements for the degree of
Masters of Music
in the College of Music
University of Arizona

[Signature]

UNIVERSITY OF ARIZONA
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>Speech As An Educational Problem</td>
<td>1</td>
</tr>
<tr>
<td>Statement of the Problem</td>
<td>5</td>
</tr>
<tr>
<td>II. METHOD OF PROCEDURE</td>
<td>7</td>
</tr>
<tr>
<td>Possible Methods</td>
<td>7</td>
</tr>
<tr>
<td>Procedure of This Study</td>
<td>11</td>
</tr>
<tr>
<td>Informal Interviews</td>
<td>11</td>
</tr>
<tr>
<td>Sampling</td>
<td>11</td>
</tr>
<tr>
<td>Articulation Test</td>
<td>12</td>
</tr>
<tr>
<td>Limitations</td>
<td>14</td>
</tr>
<tr>
<td>Inquiry Blanks</td>
<td>15</td>
</tr>
<tr>
<td>Reliability of the Procedure Used</td>
<td>16</td>
</tr>
<tr>
<td>III. DEFINITION AND CLASSIFICATION OF DEFECTS AND DISORDERS</td>
<td>17</td>
</tr>
<tr>
<td>Classification of Speech Defects and Disorders Used in This Study</td>
<td>23</td>
</tr>
<tr>
<td>Articulatory Defects and Disorders</td>
<td>25</td>
</tr>
<tr>
<td>Baby Talk</td>
<td>25</td>
</tr>
<tr>
<td>Lisping</td>
<td>30</td>
</tr>
<tr>
<td>Chapter</td>
<td>Page</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>V. Chillation</td>
<td>30</td>
</tr>
<tr>
<td>Cluttering</td>
<td>31</td>
</tr>
<tr>
<td>Rhythmic Disorders</td>
<td>31</td>
</tr>
<tr>
<td>Phonatory Defects</td>
<td>34</td>
</tr>
<tr>
<td>Foreign Dialectical Difficulties</td>
<td>35</td>
</tr>
<tr>
<td>Other Difficulties</td>
<td>38</td>
</tr>
<tr>
<td>IV. RESULTS OF THE INQUIRY BLANKS</td>
<td>39</td>
</tr>
<tr>
<td>Arrangement of Data from Inquiry Blanks</td>
<td>39</td>
</tr>
<tr>
<td>Number of Children with Speech Defects</td>
<td>40</td>
</tr>
<tr>
<td>Comparison by Sex of Children with Speech Defects</td>
<td>41</td>
</tr>
<tr>
<td>Frequency of Various Types of Speech Defects</td>
<td>42</td>
</tr>
<tr>
<td>Economic Status of Family and Occupation of Parents of Children with Defective Speech</td>
<td>47</td>
</tr>
<tr>
<td>Nationality of Speech Defectives</td>
<td>49</td>
</tr>
<tr>
<td>Foreign Dialectical Difficulties</td>
<td>51</td>
</tr>
<tr>
<td>Distribution of Defectives by School</td>
<td>52</td>
</tr>
<tr>
<td>Retardation</td>
<td>55</td>
</tr>
<tr>
<td>Relationship of Speech Defects and Physical Defects</td>
<td>60</td>
</tr>
</tbody>
</table>
V. RESULTS OF THE INFORMAL INTERVIEWS

Children Examined

Number of Children with Defective Speech

Types of Defects and Disorders Noted

VI. SUMMARY AND CONCLUSIONS

VII. RECOMMENDATIONS

BIBLIOGRAPHY

APPENDIX: Inquiry Blank
TABLES

<table>
<thead>
<tr>
<th>Number</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>IMPORTANT SPEECH SURVEYS MADE IN THE UNITED STATES</td>
</tr>
<tr>
<td>2</td>
<td>CLASSIFICATIONS OF SPEECH DEFECTS USED IN FIVE STUDIES</td>
</tr>
<tr>
<td>3</td>
<td>TOTAL NUMBER OF NOTICEABLE AND SERIOUS DEFECTS AND DISORDERS AMONG BOYS AND GIRLS IN TUCSON ELEMENTARY SCHOOLS</td>
</tr>
<tr>
<td>4</td>
<td>FREQUENCY OF THE VARIOUS TYPES OF SPEECH DEFECTS AND DISORDERS NOTED ON THE INQUIRY BLANK</td>
</tr>
<tr>
<td>5</td>
<td>PERCENTAGE OF FREQUENCY OF VARIOUS TYPES OF NOTICEABLE AND SERIOUS ARTICULATORY AND PHONATORY DIFFICULTIES</td>
</tr>
<tr>
<td>6</td>
<td>ECONOMIC STATUS OF FAMILIES OF CHILDREN WITH SPEECH DEFECTS</td>
</tr>
<tr>
<td>7</td>
<td>DISTRIBUTION OF SPEECH DEFECTIVES BY SEX AND NATIONALITY</td>
</tr>
<tr>
<td>8</td>
<td>DISTRIBUTION OF SPEECH DEFECTIVES IN TUCSON ELEMENTARY SCHOOLS BY SCHOOLS</td>
</tr>
<tr>
<td>9</td>
<td>AGE-GRADE TABLE FOR GIRLS WITH SPEECH DEFECTS AND DISORDERS</td>
</tr>
<tr>
<td>10</td>
<td>AGE-GRADE TABLE FOR BOYS WITH SPEECH DEFECTS AND DISORDERS</td>
</tr>
<tr>
<td>11</td>
<td>AGE-GRADE TABLE FOR BOYS AND GIRLS WITH SPEECH DEFECTS AND DISORDERS</td>
</tr>
<tr>
<td>12</td>
<td>CHILDREN OF TUCSON ELEMENTARY SCHOOLS EXAMINED IN THE INFORMAL INTERVIEWS, BY SCHOOL AND BY GRADE</td>
</tr>
<tr>
<td>Number</td>
<td>Page</td>
</tr>
<tr>
<td>--------</td>
<td>------</td>
</tr>
<tr>
<td>XIII. CHILDREN OF TUCSON ELEMENTARY SCHOOLS EXAMINED IN THE INFORMAL INTERVIEWS, BY NATIONALITY</td>
<td>62</td>
</tr>
<tr>
<td>XIV. NUMBER OF CHILDREN WITH DEFECTIVE SPEECH NOTED IN THE INFORMAL INTERVIEWS</td>
<td>64</td>
</tr>
<tr>
<td>XV. NUMBER OF CHILDREN WITH DEFECTIVE SPEECH NOTED INCLUDING THOSE WITH FOREIGN DIALECTICAL DIFFICULTIES ONLY</td>
<td>64</td>
</tr>
<tr>
<td>XVI. TYPES OF SPEECH DEFECTS AND DISORDERS NOTED IN THE INFORMAL INTERVIEWS</td>
<td>65</td>
</tr>
</tbody>
</table>
INTRODUCTION

Speech As An Educational Problem

"Though we teach the child in all other branches of knowledge our teaching will fall short ... if we send him forth into the world handicapped with a speech defect."

In order to appreciate the importance of speech one need only realize that it comprises 98% of all communication. One may get along very well in many situations without being very fluent in public utterance, but when it comes to everyday vocal communications; those who cannot produce the conventional sounds of a word are handicapped in direct proportion to their defectiveness. No matter what social or business career one may select, speech will always be essential. One may even succeed without a thorough knowledge of written language by employing the services of a secretary. But rare indeed are those who succeed without the ability to speak intelligibly. As Baker and Roehm say in Spoken English and How to Teach it,

"Vital communication between human beings comes largely through spoken language. One's power is in proportion to one's control of the lines of communication. Whoever aspires to

2. Cable, W. Arthur, A Program of Speech Education in a Democracy, p. 22.
Business has recognized the need for good speech. For example, the Bell Telephone Company in New York City hires speech specialists to train the telephone girls to speak distinctly and with proper placement of the voice. A man is often hired or refused for a job, not on the basis of his training, but rather on the basis of the impression made by his speech during the interview with a prospective employer.

"Adults, as well as children, talk so much more than they write, and their culture or lack of it is so often judged by the English they speak, that the ability to speak well becomes a prime aim of every elementary school curriculum." 4

This is true if our schools are to equip children for future life as citizens in society. And that is the major purpose of our schools, as stated at the Atlanta Convention of the National Education Association by the United States Commissioner of Education: "Our major problem is to develop a school system designed to enable individuals to adjust themselves to the social environment in an intelligent manner."

The importance of speech as a means of communication in

ordinary business and social life, then, creates a need for speech education at all grade levels -- so that each child may be permitted to develop to the extent of his capability. For years the schools have been recognizing this need and attempting to meet it by the general attempts on the part of teachers to improve the child's ability to converse and otherwise speak in normal situations, and by including work in "oral English" in the English curriculum. The stress, however, has been on written English in our schools to such an extent that there has been little time for anything else. Many children are growing to adulthood today with speech so defective as to hinder ordinary contact with others. Although surveys have shown various figures to represent the number of individuals with defective speech in this country, we can all agree that there is a very large number so handicapped. In 1931 about 1,000,000 children between the ages of five and eighteen were so defective in their ability to speak as to be in need of remedial treatment and training, according to the report of the White House Conference on Child Health and Protection. The average percentage of speech defectives in the school population of 48 of the larger cities of the United States was estimated to be 6.9%. This estimate, incidentally, did not include the number of defective-speaking children between five and eighteen who were not attending school.

The proportion of our school population suffering from
speech so defective as to be in need of remedial treatment is appalling. Yet

"... there is no group of children whose handicaps, when understood, can be remedied more completely than those having speech defects. Although in a small percentage of the cases highly specialized surgical aid is required, the great majority of them need only teachers who know their psychology and who have mastered the techniques of removing the errors submitted."

One must agree with Van Riper that, with such vast numbers of the speech-handicapped needing help and needing help immediately -- especially when such help is possible -- some agency must take the responsibility.

"The real responsibility must fall upon the public schools. Speech-correction teachers and supervisors must be trained, and must cooperate with the parents and other teachers in remedial work. And very effective therapy can be accomplished by the intelligent primary and intermediate teacher, who should be educated not only in actual speech retraining but also in the methods for prevention of speech defects and in the understanding of handicapped children."

"Speech correction is a phase of education that has been long neglected in American public schools. The school has depended upon college and university clinics to take care of the speech corrective program, and in most cases, these clinics have been able to reach a very small percentage of the children who needed speech correction. The trend is to place the responsibility for remedial speech upon the public schools."

The most effective time for speech retraining, as all authorities agree, is in the first few years of a child's school life. Each year of defective speech which is added to a child's existence lessens the probability of his overcoming the handicap and developing a normal personality.

Statement of the Problem

School administrators have come to realize that it is the duty of the school not only to provide opportunities for speech training and speech improvement for children with normal speech, but also to provide a program of correction, of re-education, for those suffering from speech defects.

There are three aspects involved in a program of speech correction: (1) Survey of the number and seriousness of cases of defective speech in the system; and, of course, classification of these cases. Cost makes it necessary to educate children in groups. We must classify them according to their major needs if we are to work out methods of instruction which will be adapted to those needs. (2) Diagnosis of the individual cases, to determine their causes; and (3) Therapy, the actual program by which those needing help are treated.

This study involves the first of these aspects, as pertains to children in Tucson, Arizona. It is an attempt to determine the number and types of speech defects and disorders in Tucson Elementary Schools. It is hoped that some
estimate of the nature and extent of the problem of defective speech may be obtained, so that an intelligent and objective answer can be made to the question, "Is work in speech correction one of the educational needs of the elementary grades of the Tucson School System?" It will also be the basis of an attempt to obtain a general classification of the defects and disorders which exist among Tucson elementary school children. The classification will be on the basis of symptoms of the defects and disorders only, for that is all that is necessary to determine the extent of the problem involved.

This study should add to the body of information now being gathered through similar studies throughout the country; it will provide additional data for comparing speech defects and speech defectives in various states. Also, such studies serve to provide additional data for speech-correction teachers who, knowing which speech defects are most common, will know which aspects warrant the greatest emphasis.

If the results of this study indicate that there is a need for a speech-correction program in Tucson, it is hoped that it will serve to call the attention of school authorities to an educational problem. Whether or not such a program is needed, and whether or not it is effected, the investigation may serve to call specific cases, which can be helped, to the attention of classroom teachers.
CHAPTER II
METHOD OF PROCEDURE

Possible Methods

Surveys of speech-handicapped children in the United States have been carried on from 1895, when Hartwell surveyed the problem of stutterers in the Boston Public Schools, to the present time. They have been invaluable in indicating to educators and to the public the ubiquity of speech-handicapped children. Some of the more important speech surveys that have been made, together with pertinent data, are presented in the table on the following page.

The observer who attempts to make a comparison of the incidence and seriousness of speech defects in one locality with those of another, however, finds considerable difficulty. The method of gathering data, the standard of what constitutes a speech defect, and the classification of defects vary with each study. No two studies seem to be identical as to method.

While there is a wide variation in methods employed, the surveys group themselves into three major types. The first of these is the questionnaire method, in which blanks

### TABLE I

IMPORTANT SPEECH SURVEYS MADE IN THE UNITED STATES

<table>
<thead>
<tr>
<th>Date</th>
<th>Place</th>
<th>Person in Charge</th>
<th>Number of Speech-Handicapped</th>
</tr>
</thead>
<tbody>
<tr>
<td>1893</td>
<td>Boston, Massachusetts</td>
<td>Hartwell</td>
<td>.78% stutterers</td>
</tr>
<tr>
<td>1904</td>
<td>Six American Cities*</td>
<td>Conradi</td>
<td>2.46% defectives</td>
</tr>
<tr>
<td>1911</td>
<td>New York City</td>
<td>Belgart</td>
<td>2.00%</td>
</tr>
<tr>
<td>1911</td>
<td>Principal Italian Cities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1916</td>
<td>Saint Louis, Missouri</td>
<td>Wallin</td>
<td>25.00%</td>
</tr>
<tr>
<td>1921</td>
<td>Milwaukee, Grand Rapids</td>
<td>Blanton &amp; Camp</td>
<td>2.64% stutterers</td>
</tr>
<tr>
<td>1926</td>
<td>South Dakota</td>
<td>Root</td>
<td>8600 defectives</td>
</tr>
<tr>
<td>1929</td>
<td>Oregon</td>
<td>Wells</td>
<td>16320 defectives</td>
</tr>
<tr>
<td>1931</td>
<td>Countrywide</td>
<td>White House Conference</td>
<td>6.90% (5-15 yr.)</td>
</tr>
<tr>
<td>1932</td>
<td>Tasmania Street Schools</td>
<td>Parker</td>
<td>2371</td>
</tr>
<tr>
<td>1938</td>
<td>Des Moines Public Schools</td>
<td>Garhart</td>
<td>291</td>
</tr>
<tr>
<td>1939</td>
<td>Illinois High Schools</td>
<td>Klop</td>
<td>20.60% (estimate)</td>
</tr>
<tr>
<td>1939</td>
<td>Mankato, Minn. Grade School</td>
<td>Zines</td>
<td>17.00%</td>
</tr>
</tbody>
</table>

*Kansas City, Missouri; Milwaukee, Wisconsin; Cleveland, Ohio; Louisville, Kentucky; Albany, New York; Springfield, Massachusetts.

concerning individuals with speech defects are filled in by school administrators and classroom teachers. Having daily contact with the pupils, the teachers are likely to know about certain defects which might not be apparent to even the trained observer in the short period of an interview. However, teachers without training in speech education and correction often have not had the background for accurate interpretation of a defect. Even though conditions are improved by inclusion on the questionnaire blank of definitions of defects; the standard of what constitutes a defect varies with each individual marking the blanks. Because of the lack of background in speech correction on the part of most regular classroom teachers, and the multiple standard, "this is the weakest method from the standpoint of accuracy of information, both in regard to the nature of the defect and the number of cases demonstrating it... It is a crude measure of the speech difficulties of the group." 3

In general, however, the variations mentioned are permissible if the results obtained are properly evaluated. If the sampling has been adequate, the data will still reveal those defects which lay examiners will recognize. Such information will at least indicate the most pressing speech rehabilitation needs within the population being studied. It indicates the findings of average teachers rather than of highly specialized and presumably more critical speech

experts. Thus, whatever student needs are revealed seem more real and immediate to teachers and administrators.

A second method is the informal interview of children by a trained observer. It may involve a single investigator, or many, but the reliability of results, within reasonable limits, will be proportionate to the number making the survey, because of the maintenance of a single or of a multiple standard. Since the investigator is trained in the techniques of speech testing, information is likely to be more accurate. The interviews themselves vary widely as to type with each study. For example, Ione Potter in Portales, New Mexico interviewed groups of 10 to 12 children. She induced them to converse freely on any subject, and noted which seemed to have normal voices and speech. Those which seemed to have normal voices and speech were then interviewed individually, but the same technique was employed. In other studies, all children were interviewed individually and more or less specific tests were administered.

Diagnostic aspects are included in the third major type. A greater attempt is made to discover the relation of speech development to age, intelligence, etc., and to make an analysis of the particular speech sounds most commonly found to be defective.

4. Potter, Ione, op. cit.
Procedure in This Study

In determining the method to be employed in this survey, the writer considered the procedures of various similar studies. Keeping in mind the objectives of this study stated previously -- to determine whether there is enough defective speech among school children in Tucson to warrant a speech-correction program on the elementary-school level, and to classify the speech defects noted -- the writer eliminated the third major aspect, that of diagnosis; she combined the other two, believing the most reliable and objective data would thus be obtained.

Informal Interviews

The writer conducted informal interviews with a sampling of the Tucson School System, administering an articulation test, with simultaneous noting of other types of defects. The children were all speech ideals found in the English language in the presence of the investigator. 

Sampling

There are limitations to any sampling, but the writer believes the one used gives a fairly accurate estimate of the situation. It involved approximately 250 children, in the 1st, 4th, and 8th grades: 1st, 4th, and 8th grades in Roskruge School, 1st and 4th grades in Carillo and Sam Hughes Schools. These particular grades were chosen in an effort to estimate the number with defects in the beginning, middle, and end of the elementary-school period. The
schools used in the sampling were chosen at the suggestion of Mr. Robert W. Morrow, Superintendent of Tucson Schools. Reskruge School includes "Mexican" and "American", low-income and average-or-upper-income groups, in about the proportion found in the total enrollment of Tucson Elementary Schools. Carillo School includes the extreme low-income group, predominantly Mexican school population, while Sam Hughes School includes children from well-to-do white families almost entirely.

Articulation Test

An adaptation of the Genevieve Arnold Articulation and Sound Recognition Test, published by the Expression Company, 16 Harecourt Street, Boston, Massachusetts, was used. No attempt was made to keep a record of individual articulation errors made. Rather, the articulation test was administered to insure the child's use of all speech sounds found in the English language in the presence of the investigator. Where she was not satisfied, the writer engaged in conversation with the child until she had determined whether his speech should be classified as defective.

In testing an individual's articulation, it is essential that he become so interested in what he is saying that he forgets he is being tested on how he says it; otherwise, he will talk about the other sounds of articulation sound.

5. The term "American" is used in this study to refer to children other than the Spanish-speaking Americans. These latter are referred to as "Mexicans".
self-consciousness and embarrassment may cause him to falter, hesitate, and produce sounds which he would not normally use in conversation. The Genevieve Arnold Test consists of two letters which are of interest to most children, and include key words by which the investigator checks on the articulation of a given sound or sound combination. Adaptations had to be made to suit the word choice to the vocabulary of children of this area. For example, many Tucson children, because of the climate, have never had occasion to use either rubber or overshoe. The writer substituted rabbit and machine so that the children might use words with which they were familiar, and still have an opportunity to use the medial (b) in rubber in the word rabbit, and the medial (ʃ) in overshoe in machine.

This test proved very helpful in getting and maintaining the interest of the children interviewed. To avoid faulty articulation caused by poor reading ability, the writer used pictures of the key words on the first grade level. The children liked these bright pictures and usually commented on at least one, so that carrying on additional conversation, when necessary, was far from difficult. The reference to pets made in the letters proved especially helpful among the Mexican children, who were willing to tell about their pets when any other topic of conversation seemed to elicit only yes or no responses to questions.

The following are samples of the type of explanations
made before each class prior to the individual interviews, as a means of decreasing the amount of time required for each case;

\textbf{1st grade:}

"I have a new game for you to play. A little boy named Billy, who lives in New York, wrote a letter to his cousin Jean in Tucson. He could not spell very well. He cut out a picture for every word he could not spell and put them in his letter. The game is to see if we can read the letter together. I will read what he wrote, and you can look at the pictures and tell me what words he could not spell. We will have to play this game one at a time, so I will be in room \textbf{1} and your teacher will tell you when you may come play the game with me."

\textbf{8th grade:}

"Your principal has given me permission to have you take a test, in which you will read some material to me. I want to take as little time as possible, so three of you will please come with me now to room \textbf{2}. When one returns, will the next one please come immediately to room \textbf{2}. You will be given a chance to read the material over silently before you read it aloud to me."

\textbf{Limitations}

It is true that this method of individual informal interviews provided for no check on the decision of the investigator. However, she has been working in the field of speech testing and the recognition of speech defects and disorders under Professor W. Arthur Cable, Head of the Department of Speech at the University of Arizona, for the past year. It is to be hoped that she can be called a
trained investigator. Her hearing ranked well above average according to the Seashore Tests of Hearing Ability. As she alone conducted the survey, there was but a single standard applied to all cases in this phase of the study.

Inquiry Blanks

In addition, Inquiry Blanks, a copy of which appears in the appendix, were made. Mr. Robert W. Morrow, City School Superintendent, the principals of the various Tucson elementary and junior high schools, and the classroom teachers cooperated splendidly when the request was made that teachers make out one of these blanks for each child they noticed had a speech defect. It is true that the varied backgrounds of the teachers and the multiple standards necessarily applied as a criterion of defective speech are limitations; yet a fairly accurate picture of the incidence and import of speech deficiency in Tucson Elementary Schools, as it appeared to Tucson teachers, was obtained. Teachers recorded blanks for those children who had difficulties they had noticed in daily classroom contacts. While they may have overlooked cases the trained observer would have noted, the results indicate the number considered to be defective by laymen; therefore, the number any educator, regardless of his professional speech correction background or lack of it, would consider in need of help. As was mentioned before, the teachers' attitude in filling of the Inquiry Blanks was
very commendable. Several schools devoted an entire teachers' meeting to a discussion of speech defects and disorders in general and to the standard to be used in making the reports. To the writer's knowledge, three city school teachers approached members of the Speech Department faculty for advice in an attempt to make the information they gave as accurate as possible.

Reliability of the Procedure Used

Perhaps the combination of survey methods used will serve as a check on the results of this study, the wider survey of the Inquiry Blank method off-setting the limitations of the sampling used in the Informal Interviews, and the single standard of a trained observer counterbalancing the multiple standard of the group who may not have worked particularly in the field of speech correction.
In other words, speech defects were considered to be

"... those abnormalities which per se limit the possibilities of children and adults to realize to the utmost their potential power for uniting in the activities of the world." 2

A speech disorder is a deviation from normal speech that has an organic cause. It includes the cause and audible end result; a defect is only the result. A speech defect may exist without a disorder, but all disorders entail defects.

2. Rogers, John Frederick, op. cit., p. 5.
Americans evidence a peculiar attitude toward speech. "Our American attitude has been, and in many circles still is, a combination of touchy-sensitivity regarding our own speech and intolerance toward that of other parts of the country. It is best not to hint to a New Englander that New England nasality is of a peculiarly painful variety, even in a country which specializes in nasal tones; nor to a Southerner that the language spoken in his part of the country is influenced by negro speech habits, nor to a New Yorker that Fifth Avenue pronunciation may be affected by First, Second, Third, Fourth, Sixth, Seventh, Eighth, Ninth, and Tenth Avenues; nor to a person living between the Hudson River and the Coast Range north of the Mason and Dixon line, that inversion tends to make his voice harsh. Yet a New Yorker laughs without fear or demur at the Southern diphthongs, and the Middle Westerner, at the Bostonian 'ideal' of it." 4

With so many dialects in the country, it is little wonder that there are controversies over the nature of good speech and normal speech. Miss M. E. DeWitt, however, referring to it as the kind of speech which every school owes every child, gives a definition which seems generally acceptable:

"Standard speech is merely that form which has aptly been described as free from localisms, provincialisms and vulgarisms. It is that form of a spoken language which passes educated, contemporary, international muster..." 5

Pintner, Eisenson, and Stanton give the following characterization of what constitutes normal speech:

"Normal speech must be audible and intelligible to the hearer. The voice must not only be adequate in intensity, but not unpleasant to hear. The speaker should be able to produce speech easily and readily according to the exigencies of the speaking situation... Normal speech varies with the speaker: it should be appropriate to the mental and chronological age of the individual." 6

They add that the converse of any of these aspects will constitute abnormal or defective speech. This, essentially, was the standard used by the writer in determining whether or not a child's speech was defective.

This, in general, has been the definition accepted by those who have conducted the various surveys of defective speech. One of the greatest hindrances to an effective comparison of the results of the many surveys, however, is the wide variety of classifications of defects which have been used. There seems to have been absolutely no basis for classification, as an analysis of the table on the following page will indicate.

The selection of this particular group of studies was made at random. That is, no attempt was made to select studies which would indicate a wide divergence. Another five would probably show a like disagreement. The five studies which were used are of interest because of their relation to the present one. Smiley Blanton's study was an early one, having been conducted in 1916. The report of

<table>
<thead>
<tr>
<th>Blanton</th>
<th>White House Conference</th>
<th>Burdin</th>
<th>Potter</th>
<th>Ansberry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral inactivity</td>
<td>Articulatory, on structural basis</td>
<td>Articulatory, paralytic</td>
<td>Oral inactivity</td>
<td>Sound substitution</td>
</tr>
<tr>
<td>Letter-sound substitution</td>
<td>Sound substitution</td>
<td>Indistinct speech</td>
<td>Lisping</td>
<td>Omission of sounds</td>
</tr>
<tr>
<td>Delayed speech</td>
<td>Vocal disorders, on functional basis</td>
<td>Voice disorders, on structural basis</td>
<td>Baby talk</td>
<td>Sounds interposed</td>
</tr>
<tr>
<td></td>
<td>Aphasic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stuttering</td>
<td>Stuttering</td>
<td>Stammering</td>
<td>Stuttering</td>
<td>Stuttering</td>
</tr>
<tr>
<td></td>
<td>Dialectal</td>
<td>Foreign accent</td>
<td>Cluttering</td>
<td></td>
</tr>
<tr>
<td>Hard-of-hearing</td>
<td>Cleft palate</td>
<td>Other</td>
<td>Special difficulty</td>
<td>Foreign accent</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TABLE II**

CLASSIFICATIONS OF SPEECH DEFECTS USED IN FIVE STUDIES
the White House Conference on Child Health and Protection in 1931 attempted to indicate the scope of the problem on a national scale. The questionnaire method was employed by Burdin, while Potter's study is an example of the informal interview method. Dr. Merle Ansberry's classification is of interest because his study was made in Arizona. The findings, of course, can not be considered conclusive; on the basis of a complete examination of two elementary schools in Tempe and a more sketchy examination of ten schools in Phoenix, he attempted to estimate the incidence of defective speech in Arizona.

Although these classifications vary widely, they have certain elements in common. For example, each recognizes articulatory disorders of speech, although the terminology varies and is not mutually inclusive. Voice (or phonatory) disorders are touched upon in all studies except Blanton's, even though only certain aspects, such as nasality, huskiness and "monotone" were recognized by Dr. Ansberry. All listed stuttering or stammering (rhythmic disorders). Blanton's is the only classification which does not include

a reference to foreign dialectical difficulties.

Analyzing the classifications of speech defects and disorders used in other studies for their points of agreement, and attempting to approach the subject on a logical basis, the writer organized the classification which appears on page 23. Recognizing articulatory, rhythmic, phonatory, and foreign dialectical difficulties, which were touched upon by other studies, this classification can be compared with them with a fair degree of accuracy. This classification, incidentally, was used for both the Inquiry Blank marked by Tucson teachers and the Individual Informal Interviews of the writer.

As was previously mentioned, this study is a survey of symptoms of speech defects and disorders only, because this provides the information required by the nature of the problem. No attempt has been made to determine the causes of the abnormal speech noted; loss of hearing, for example, has not been included. Psychogenic defects have been omitted for the same reason. Possibly the speech defects of some of the children are the direct result of mal-adjustment; the symptom of the difficulty, the defect itself, is recorded.

Some authorities regard language deviations such as inarticulateness; absence of ideas; incoherent speech, meaningless repetition, excessive loquacity, invented language, deficient vocabulary, mispronunciation, and poor grammatical
### CLASSIFICATION OF SPEECH DEFECTS AND DISORDERS

**Noticeable**  **Serious**

#### I. Articulatory

<table>
<thead>
<tr>
<th>Noticeable</th>
<th>Serious</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baby Talk</td>
<td></td>
</tr>
<tr>
<td>Lisping</td>
<td></td>
</tr>
<tr>
<td>Lalling</td>
<td></td>
</tr>
<tr>
<td>Cluttering</td>
<td></td>
</tr>
</tbody>
</table>

#### II. Rhythmic

<table>
<thead>
<tr>
<th>Noticeable</th>
<th>Serious</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stuttering</td>
<td></td>
</tr>
</tbody>
</table>

#### III. Phonatory

<table>
<thead>
<tr>
<th>Noticeable</th>
<th>Serious</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pitch</td>
<td></td>
</tr>
<tr>
<td>Too high</td>
<td></td>
</tr>
<tr>
<td>Too low</td>
<td></td>
</tr>
<tr>
<td>Monotone</td>
<td></td>
</tr>
<tr>
<td>Non-communicative pattern</td>
<td></td>
</tr>
<tr>
<td>Narrow range</td>
<td></td>
</tr>
<tr>
<td>Intensity</td>
<td></td>
</tr>
<tr>
<td>Too loud</td>
<td></td>
</tr>
<tr>
<td>Too weak</td>
<td></td>
</tr>
<tr>
<td>Voiceless</td>
<td></td>
</tr>
<tr>
<td>Quality</td>
<td></td>
</tr>
<tr>
<td>Nasal</td>
<td></td>
</tr>
<tr>
<td>Hoarse</td>
<td></td>
</tr>
<tr>
<td>Thin</td>
<td></td>
</tr>
<tr>
<td>Guttural</td>
<td></td>
</tr>
<tr>
<td>Shrill</td>
<td></td>
</tr>
<tr>
<td>Breathy</td>
<td></td>
</tr>
</tbody>
</table>

#### IV. Foreign Dialectical

For Classification of Inquiry Blanks and definitions given teachers, see Appendix I.
forms as speech defects. They have not been included in the classification of this study. It would be difficult to judge an individual's abilities in these respects objectively in the period of time allotted to the survey interview. Definite conclusions regarding these aspects could be reached only after repeated, extensive interviews or constant contact with each child. Also, the writer questions the logic of calling these errors speech defects, believing them to be, rather, misuse of the English language or indications of either deficient intelligence or a lack of training.

W. Arthur Cable includes yet another type of speech defect in his classification -- a faulty visual instrument. According to him, the person whose posture is poor or whose gestures are inappropriate, is not normal in his ability to speak. The poor use of the body in speech may distract the listener from what a person is saying to such an extent that his speech is ineffective.

While agreeing with Professor Cable that the visual aspects of speech are important, and that abnormalities in the use of the body in connection with speech might well be considered to be defects in that they hinder effective speech, the writer did not consider it wise to include them in the classification used for this study. Only constant

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contact with each child would warrant the formation of definite conclusions with respect to this type of defect. In addition, they are not a hindrance to communication over the telephone or the radio; the problem of this study is to determine the incidence of speech deficiency which is great enough to hinder all communication.

Accurate interpretation of the findings of this study will depend upon a thorough understanding of the terminology used. Therefore, each of the types of speech defects or disorders used in their classification in this study will be discussed.

Articulatory Defects and Disorders

Articulation is the mechanics of speech production. It constitutes the stoppages and constrictions of the breath stream by the lips, teeth, tongue, etc. in the formation of sounds, both with and without phonation. Most consonants are formed by articulation. Articulatory defects, then, are defects in sound production.

Baby Talk

Speech is a learned function. Although the average parent, when questioned, will say that his child learned to talk at about the age of one, the student of speech knows that the child is learning to speak from the time he begins life, and lets out a yell to announce his arrival. When he sucks and swallows, smiles, or even when he breathes, he is
learning to speak -- for he is developing control of the mechanisms used in speech.

There are, of course, individual differences; yet there are definite stages in the development of speech. The normal child will ordinarily have progressed to the point that he is beginning to speak by the time he is thirty months old.

The birth cry is the very first vocalization of any individual, and is purely reflexive. By the second or third week the baby's crying is differentiated to denote particular types of discomfort. The child has begun to use his vocalization to make demands upon his environment, although these demands are more or less reflexive.

The next period of speech development is marked by vocal play, or "babbling". The child repeatedly produces, evidently for sheer pleasure, a large number of sounds without apparent meaning. Ordinarily these sounds appear in the child's "babbling vocabulary" in the following order:

1. a or o (vowels)
2. b or p (labial consonants)
3. g or k (gutturals)
4. j or th (dentals)
5. n or ng (nasals)

It is interesting to note, however, that the sounds babbled by the child are not limited to those used in any given
language. Later the child will differentiate among sounds, discarding the sounds he does not use in his native tongue; but at this stage of learning to speak the child is an internationalist. The selection of the sounds he will use in speech is largely determined by imitation as he grows older.

Having passed the babbling stage, the normal child will begin to use his vocalization for a purpose. Hitherto, his cries have been different when he suffered one type of discomfort or another. Now the differentiation seems to be intentional, with social control as his purpose, rather than reflexive. Having learned, through imitation of those around him, the use of inflections in controlling others, the child is ready to learn what is known as true speech. True speech involves intentional use of certain sound patterns and anticipation of a definite response. The child will first use single words which will express a complete thought. For example, "Water," may mean "I want some water." Gradually he learns grammatical construction. With an increased vocabulary, his speech becomes that of an adult.

One can readily see from the above discussion that the age of an individual and his level of speech development are closely related because of the presence of other determining factors which accompany the process of growing up. These determinants which influence language development include: the child's motor ability, his intelligence, and the economic status of his family.
Berry and Elsenson tell us that the age level at which a child may be expected to become proficient in the sounds used in English are as follows:

- 3½: p b h m w
- 4½: a t i ñ k j ñ
- 5½: r
- 6½: v t s l s
- 7½: s z r
- Beyond: ? d ñ

Normal children, those who are neither defective nor accelerated intellectually and physically, and who receive an adequate amount of linguistic stimulation, generally begin to use conventional language during the second half of the second year. But the use of language is characterized by an array of errors and faults which, for an older child or an adult, would constitute definite speech defects. These speech inadequacies -- speech defects in the adult sense only -- continue for some time. At the age of two, for example, the child is very likely to lisp. Guttural sounds, which are produced with the back of the tongue and the soft palate, are likely to be faulty in their production ("dood" for "good"). Another characteristic speech error of small children is the transposition of sounds within a word.

Berry and Eisenson tell us that...

"...It is by no means the same group of sounds which are distorted or lost in all cases of infantile perseveration. In some extreme cases all words end with a glottal stop. Almost any substitution may be expected. Generally the visible sounds (sounds, the formation of which with the lips can be seen) take the place of the invisible.

Most frequent shifts are:

- w for l
- j for r
- P for t
- ? for t
- ? for t
- v for g
- t for s
- s for t

"The types of errors just considered give us no cause for real concern if they appear while a child is learning to speak. They should, however, disappear rapidly as the child approaches school age. By the time a normal child is ready for school, infant inaccuracies should have entirely disappeared. * His speech should be clear and easy to understand. Persistence of infantilisms at school age becomes a matter of real concern for the parent, the teacher, and the child."

The Baby Talker, then, is the individual, not a baby, who reverts to or retains the speech of his infancy. Baby Talk is used in the classification of this study to refer to infantilisms in sound production. It is analogous to "infantile perseveration" in the classifications of some

15. Berry and Eisenson, op. cit., p. 89.

* Parentheses and underscoring my own.
other investigations, and includes sound substitutions, omissions, additions, and distortions.

**Lisping**

On the inquiry blank used in this study the following explanation of the term, "lisping" appears: substitution of "th" or other sounds for "s" and "z" sounds. The latter two sounds often cause considerable difficulty, for they demand great precision in movement, balance and pressure. The tongue must be elevated, cupped and sharply grooved along the median raphe (longitudinal line of union of the halves of the tongue). The upper and lower jaws must nearly meet. Teeth out of line may make proper expulsion of the breath stream for the correct production of these sounds impossible. The lisp is one of the most easily recognized of speech defects.

**Lallation**

Some writers use the term, "lallation" in a narrow sense, meaning the substitution of "w" sound for "r". In this study the term has been used in its broader sense, to refer to the defective production of "r", "l", "g", "k", or "t" sounds, caused often by inactivity of tongue or jaws, and referred to in some studies as oral inactivity or indistinct speech.
Cluttering

"A clutterer is a child who stumbles and repeats words and phrases, slurs and omits sounds and syllables while going at top speed... Hearing, especially for high frequencies, may be below normal. Auditory memory generally is weak. If the child is asked to break down the word into its component sounds he rarely can do it well. To repeat a single word in a sentence he has just said often is impossible for him. He has a very hazy moto-kinesthetic concept of individual words. It is as if a general blur made indistinct all topographical lines; 'a common grayness' covers everything. The body may be as clumsy as the tongue although this is not invariably true. So many involvements (psychic) appear that it is difficult to distinguish between causal and resulting reactions. Undue nervous tensions, strange compulsions, social habits, anxieties, vague fears of disapproval: these are psychic involvements that appear with some regularity." 17

Because it is often characterized by slurred or omitted syllables and consonants, speech sounds distorted by too rapid a rate of speech, many authorities classify cluttering as a rhythmic disorder. The writer, however, thought it wise to include it among articulatory defects and disorders. (Cluttering, like many others, may be either a defect or a disorder.) The slurred or omitted sounds are the symptoms of the speech defect; the rhythmic difficulty of speech is the cause.

Rhythmic Disorders

Stuttering was defined on the inquiry blank as repetitions and prolongations of words, syllables, and sounds or
mouth postures, which produce interruptions and breaks in the rhythm of speech. The terms stuttering and stammering are used interchangeably by many people. Burdin uses the term stammering in his classification — giving the following definition: "a faulty and interrupted manner of speaking, with difficulty in enunciating and joining syllables together." Others differentiate between them, referring to stuttering as hesitations or repetitions of sounds and stammering as the same aspects in relation to words. The writer has considered the difficulty as being essentially the same, whether affecting sounds, syllables, or words, and has used the term stuttering to indicate these disorders in the rhythm of speech.

The causes of stuttering are definitely disputed by authorities in the field. A recent article in the Quarterly Journal of Speech, in fact, listed some 100 theories of the causes of stuttering. Since this is a study of symptoms, a discussion of these theories would be irrelevant. It is evident, however, that the nature of the difficulty known as stuttering cannot be thoroughly determined when there is such a great variety of theories concerning its cause.

There are certain things about stuttering on which most authorities agree, however. One is that the onset of stuttering usually occurs during one of three life periods, when

the child learns to talk, when he enters school, and when he enters adolescence. Stuttering, then, seems to be to some degree affected by emotional strain. Also, all investigators find that the percent of stutterers is much greater among boys than girls, although the percent itself will vary with the study. Stutterers differ from other children in many biological respects, too. But these aspects are irrelevant to this study. We are interested in the stuttering — as a symptom of difficulty which is existing in our Tucson schools.

There are two definite stages in stuttering. In the primary stage the only observable reactions are either rapid, easy repetitions or short, effortless prolongations. The stutterers are not aware of this. The child is not aware of their appearance, and considers them a part of his way of communicating. Stutterers in this stage present a general similarity of symptoms, a similarity which is not found in adult stutterers. It is this primary stage that is normally characterized as "noticeable" stuttering.

As soon as the child recognizes the unpleasant aspect of his speech he begins to fear stuttering. Behavior indicative of this awareness appears. Stuttering now becomes what is recognized by anyone as "serious". The stutterer develops a characteristic spasm pattern. When devices are used frequently in response to expectation of difficulty or the actual experience of block, they cease to be voluntary
and become habitual reactions to the block. These reactions to the block of stuttering have become so closely integrated with the stuttering block that most people consider them to be the actual stuttering phenomenon. Indeed, they do comprise the greater part of the speech handicap and abnormality. The natures of these reactions vary, but they tend to handicap the sufferer to a marked extent and are therefore rather easily recognized as constituting what is known as stuttering.

Phonatory Defects

Phonatory difficulties are those which are habitual deviations from the production of voice which is natural to the individual's age and stage of maturity. The speech of a young boy with a "girlish" voice, for example, is not necessarily defective. Yet the boy in late adolescence who speaks with a voice that is definitely effeminate has a real handicap to overcome. Any chronic vocal deviation from the normal for an individual's age and stage of development is defective speech. Such unpleasant voice may be caused merely by habit, or it may have an organic cause—but the symptom of abnormal vocal pitch, quality, or intensity constitutes a definite handicap. It is believed that the sub-heads used in the classification of phonatory difficulties in this study are self-explanatory.
**Foreign Dialectical Difficulties**

Since the United States is still the melting pot of the world, a country where large numbers of its citizens converse in other tongues, and where many children still enter its schools without speaking a word of the English language, the problems of bilingualism and foreign dialect are great. They are problems for the school and for the individual so handicapped.

Research studies indicate that bilingual children are handicapped in the verbal intelligence tests, in reading, and in most of the other school subjects. If the individual has learned his reading and writing skills in some foreign language, he tends to use the foreign sounds whenever he reads, since the associations between vocal and printed or written symbols have already been formed. Many of the sounds used in both languages appear in English words in positions which are unfamiliar. If the individual lives in a home or environment where little or no English is spoken, much difficulty inevitably occurs. It will be remembered that the child in the babbling stage of speech development learns to produce the sounds of every language; but it is his environment during the early years of his life which determines the sounds the child comes to use habitually. When these bilingual children reach adulthood, if their speech betrays their foreign origin or social environment, they are commonly handicapped in the majority of the
ordinary occupations.

"All or nearly all of the foreign-born
would like to pronounce English as Native-
Americans do, but they despair of this, believing
a foreign accent will always betray them. This
need not be. If the habit in the foreign tongue
which gives rise to faulty pronunciation in
English ... is fully analyzed, it is possible to
overcome it completely." 19

The use of the term Foreign Dialectical in the classi-
fication of this study is a deviation from the oft-repeated
purpose of noting only the symptoms of speech defects. For-
eign dialect may well be the cause of speech defects of an
articulatory or phonatory nature, or -- through bringing
about a feeling of insecurity -- of a rhythmic nature.
Therefore, the term was included in the hope of securing a
rough estimate of the number of speech defects noted
which might have direct relation to the bilingual problem in
our Tucson schools. "Mexican" children make up such a large
portion of our school population that it would be of inter-
est to secure such information. Also, most other surveys of
speech defects have included reference to foreign dialecti-
cal difficulties. If data can be secured, it will be of
interest to compare the situation here, where we have many
"Mexican" children, with that revealed in other studies.

The influence of foreign dialect upon speech in

Training, Part I - "Our Language", Supplement A, Novem-
ber 1935.
creating a defect can easily be recognized by the person with training in that respect. Many of the omissions, additions, distortions, and substitutions of sounds which constitute articulatory defects are the direct result of a difference in the sound vocabulary acquired in early life. The speech correction text by Borden and Bruss gives a summary of English sounds not found in Spanish as follows:

- wh as in why
- ng as in thing
- j as in joke
- oo as in hook
- z as in zero
- a as in paw
- sh as in sheep
- i as in pit
- zh as in azure

Van Riper tells us that

"Generally speaking, there are few consistent substitutions characteristic of the individuals of any one nationality who are attempting to learn English." 20

Yet Tucson teachers will tell one that there are certain sound substitutions that seem to be common errors of all Mexican children, such as:

- mees for miss
- chew for shoe
- vegetable - vegetable

It is usually more difficult for the child who has learned the foreign language first to learn to distinguish

characteristics of duration, diphthongization, nasality, and force which differ in Spanish and English.

"The English pronunciation of the Spanish-speaking child has a staccato quality. In other languages positions are held and most transitions (all in Romance-Slav languages) are made in silence. Most Mexican children have difficulty in maintaining the vowel sound and position as long as is necessary to develop the glide characteristic of English." 21

It is these aspects of articulatory and phonatory defects which have been classified as foreign dialectical difficulties.

Other Difficulties

The writer believes the classification of speech defects used is inclusive. Realizing that teachers marking the inquiry blank might not consider them to include a type to cover a particular difficulty noted, the writer included yet another sub-head: "any other speech defect or disorder". She asked that it be named or described, in order to facilitate its classification. It was believed that cleft-palates or hare-lips might be noted here. Although such organic malformations are the cause of speech defects, rather than the symptoms, it was realized that many teachers would prefer recording them as "cleft-palate speech" or the like; rather than risk the difficulty of further analysis.

CHAPTER IV

RESULTS OF THE INQUIRY BLANKS

A survey of any kind in a system as large as the elementary school system of Tucson would be impossible without the assistance of the educational personnel. In this instance the superintendent explained the purpose and nature of the survey being attempted to the principals of the various elementary and junior high schools, presenting the inquiry blanks to them for examination. The principals gave the same explanation and instructions to their teachers. It was the splendid cooperation of all concerned -- administrators and teachers alike -- that made possible the availability of the data discussed in this chapter. These data indicate the incidence of speech defects and disorders in the Tucson Elementary Schools, as noted by Tucson teachers. The term Tucson Elementary Schools, as used in this paper, refers to grades 1 to 8, inclusive.

Arrangement of Data from Inquiry Blanks

In order that the reader may more easily follow the discussion, the writer has organized the information given on the inquiry blanks under the following headings:
Tabulation of the information given on the inquiry blanks indicates that 240 of the 9284 children in Tucson Elementary Schools have speech defects that are at least noticeable enough to have attracted the attention of their teachers, who in general had no special interest in speech correction. In other words, the inquiry blanks indicate that at least 2.46 percent of the Tucson elementary school pupils are suffering from defective speech. This information is presented in tabular form, and in greater detail, in Table III on the following page.

It will be noted that whether one considers the boys,
the girls, or the total, approximately one third of those checked on the inquiry blanks as having a speech defect were classified as serious cases, and that 91 children were said to be suffering from at least one serious defect or disorder.

TABLE III

TOTAL NUMBER OF NOTICEABLE AND SERIOUS DEFECTS AND DISORDERS AMONG BOYS AND GIRLS IN TUCSON ELEMENTARY SCHOOLS

<table>
<thead>
<tr>
<th></th>
<th>One Defect</th>
<th>More Than One Defect</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Noticeable</td>
<td>Serious Total</td>
<td>Noticeable</td>
</tr>
<tr>
<td>Boys</td>
<td>45</td>
<td>18 63</td>
<td>44</td>
</tr>
<tr>
<td>Girls</td>
<td>23</td>
<td>6 29</td>
<td>37</td>
</tr>
<tr>
<td>Total</td>
<td>68</td>
<td>24 92</td>
<td>81</td>
</tr>
</tbody>
</table>

Comparison by Sex of Children with Speech Defects

Of the 240 pupils indicated by Tucson teachers as defective in speech, 148 are boys and 92 are girls, showing that there is a greater incidence of speech defects among the boys than among the girls in our elementary schools --
a ratio of 1.6 to 1. This fact is further substantiated when the actual defects recorded are analyzed. Of the 579 defects recorded, 414, or 71.5 percent, were possessed by boys, and 165, or 28.5 percent, by girls.

Only one school, University Heights, reported a greater number of girls with defective speech. (See Table VIII.) Carillo, Davis, and Drachman schools reported equal numbers of boys and girls with such difficulty, while Ochoa and Safford schools reported the greatest preponderance of boys over girls; the former indicating they had 13 boys to 4 girls, the latter listing 17 boys and 8 girls.

Frequency of Various Types of Speech Defects

The child with defective speech does not always have a single type of defect, perhaps because of the range of influence of causal factors. This is true in the Tucson Elementary Schools, as is indicated by the reports on the inquiry blanks. Ninety-two children, or approximately one third of those reported to have defective speech, were said to have but one type of defect. The other two-thirds were indicated to have more than one type of defect. At times all the defects noted were classed as noticeable, while at others they were all called serious. Still other children were said to have more than one defect, part of which were serious and part noticeable.

Now let us examine more closely the defects and dis-
orders reported on the inquiry blanks, to determine the relative frequency of each type of defect in the classification. The incidence of each type of defect is tabulated in Table IV, and the percentages of the three major classifications are shown in Table V.

It is interesting to note the proportions of the three major classifications, articulatory, rhythmic, and phonatory; they are not the same in the noticeable and serious speech defects recorded. Phonatory difficulties comprise a little over half of the noticeable defects, but drop to a little over one third of the total number of serious defects. While rhythmic difficulties account for only about 10 percent of the noticeable ones, they increase to 19 percent of the serious ones. The proportion of the total of speech defects represented by articulatory difficulties rises from approximately 38 percent of the noticeable to approximately 47 percent of the serious ones.

Although one would ordinarily expect the major classifications of defects to appear in approximately the same proportion among noticeable and serious cases, the variation noted in this tabulation is not surprising. Since those making the classification of the defects, for the greater part, had little or no training and experience in speech work, the standards applied were not identical. Naturally, the more pronounced a defect is -- that is, the more serious a case it is -- the more easily it is properly classified,
by even a lay person. Articulatory defects, unless they are serious, are often over-looked, which possibly accounts for the increased proportion of this type of defect among the serious cases. The lay individual often underestimates the seriousness of phonatory difficulties, and for this reason will many times list as noticeable even those which are in fact serious. Perhaps this accounts for the fact that phonatory difficulties comprise a little over one half of the noticeable defects listed, and this proportion decreases for the serious cases. Cases of stuttering in the primary stage (which is characterized by prolongations, repetitions, and hesitations of speech which may not be recognized by the child as "different") — that is, noticeable rhythmic defects, are more easily overlooked than serious ones. This is because a case of stuttering is considered serious when the child has recognized that his speech is different and has attempted to compensate of "cover up" by adopting mouth postures or speech patterns which soon become habitual. Therefore, the increase of rhythmic defects from approximately 10 percent of the noticeable cases to 19 percent of the serious cases is understandable.

Van Riper tells us that the relative frequency of the various types of speech defects is still a matter of some dispute but that it is probably safe to say that approxi-

1. Van Riper, C., op. cit., p. 54.
TABLE IV

FREQUENCY OF THE VARIOUS TYPES OF SPEECH DEFECTS AND DISORDERS NOTED ON THE INQUIRY BLANK

<table>
<thead>
<tr>
<th>Type of Defect</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Articulatory</td>
<td>25</td>
<td>53</td>
<td>61</td>
</tr>
<tr>
<td>Baby Talk</td>
<td>17</td>
<td>9</td>
<td>27</td>
</tr>
<tr>
<td>Lisping</td>
<td>25</td>
<td>9</td>
<td>16</td>
</tr>
<tr>
<td>Lallation</td>
<td>27</td>
<td>23</td>
<td>24</td>
</tr>
<tr>
<td>Cluttering</td>
<td>26</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>Rhythmic</td>
<td>24</td>
<td>20</td>
<td>16</td>
</tr>
<tr>
<td>Stuttering</td>
<td>24</td>
<td>20</td>
<td>16</td>
</tr>
<tr>
<td>Phonatory</td>
<td>113</td>
<td>40</td>
<td>105</td>
</tr>
<tr>
<td>Pitch</td>
<td>(43)</td>
<td>(19)</td>
<td>(54)</td>
</tr>
<tr>
<td>Too high</td>
<td>9</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>Too low</td>
<td>7</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Monotone</td>
<td>14</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Non-communicative pattern</td>
<td>2</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Narrow range</td>
<td>11</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Intensity</td>
<td>(37)</td>
<td>(10)</td>
<td>(28)</td>
</tr>
<tr>
<td>Too loud</td>
<td>13</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Too weak</td>
<td>25</td>
<td>6</td>
<td>23</td>
</tr>
<tr>
<td>Voiceless</td>
<td>1</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Quality</td>
<td>(33)</td>
<td>(11)</td>
<td>(42)</td>
</tr>
<tr>
<td>Nasal</td>
<td>7</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Hoarse</td>
<td>4</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Thin</td>
<td>6</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>Guttural</td>
<td>6</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Shril</td>
<td>3</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Breathy</td>
<td>7</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>252</td>
<td>113</td>
<td>162</td>
</tr>
</tbody>
</table>
mately 50 percent of the serious cases will be articulatory ones, and that the rest of the cases will be about evenly divided between rhythmic and phonatory difficulties. He adds that the preponderance of the articulatory defects is even more marked when the large number of cases of oral inaccuracy is included. Of course, deviations from the norm described are to be expected because of the particular locality investigated, and the different composition of the school population. It is apparent that the incidence of serious defects indicated by the inquiry blanks used in this study follows in general the trends of the norm on a national scale. Serious articulatory cases represent almost one-half of the total. The proportion of rhythmic and phonatory difficulties, however, differs somewhat -- in this study comprising, respectively, 19 percent and 35 percent of the total.

### TABLE V

PERCENTAGE OF FREQUENCY OF VARIOUS TYPES OF NOTICEABLE AND SERIOUS ARTICULATORY AND PHONATORY DIFFICULTIES

<table>
<thead>
<tr>
<th></th>
<th>Noticeable</th>
<th>Serious</th>
</tr>
</thead>
<tbody>
<tr>
<td>Articulatory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baby Talk</td>
<td>15.6%</td>
<td>7.6%</td>
</tr>
<tr>
<td>Lisping</td>
<td>17.94%</td>
<td>17.10%</td>
</tr>
<tr>
<td>Lallation</td>
<td>26.29%</td>
<td>21.53%</td>
</tr>
<tr>
<td>Cluttering</td>
<td>32.89%</td>
<td>28.12%</td>
</tr>
<tr>
<td>Phonatory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pitch</td>
<td>21.8%</td>
<td>5.8%</td>
</tr>
<tr>
<td>Intensity</td>
<td>35.32%</td>
<td>41.39%</td>
</tr>
<tr>
<td>Quality</td>
<td>29.61%</td>
<td>31.03%</td>
</tr>
<tr>
<td></td>
<td>34.40%</td>
<td>27.59%</td>
</tr>
</tbody>
</table>
Of the articulatory difficulties the proportion of the different types is about the same in the 156 noticeable and the 76 serious cases. Lallation comprises slightly under one third of the total; lisping and cluttering rank approximately the same -- a little under 25 percent -- while baby talk accounts for only 17 or 18 percent.

Rhythmic difficulties were listed under a single classification, stuttering. It should be noted that the number of noticeable cases recorded by Tucson teachers is greater than the number of serious ones.

The three major types of phonatory difficulties -- pitch, intensity, and quality -- comprise approximately equal proportions of the cases noted.

Economic Status of Family and Occupation of Parents of Children with Defective Speech

Although questions regarding the economic status of the family and the occupation of the parents of the children with defective speech were included on the inquiry blank, the data are not complete. Perhaps the teachers did not all have this information available; or it may have been that they did not consider it of sufficient importance to include. The information received, while not complete, is sufficient to indicate trends, for this information was omitted on only 19 blanks. The economic status of the families of children with speech defects was indicated to be as shown in Table VI.
TABLE VI

ECONOMIC STATUS OF FAMILIES OF CHILDREN WITH SPEECH DEFECTS

<table>
<thead>
<tr>
<th>Economic Status</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well-to-do or better</td>
<td>5</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Comfortable</td>
<td>16</td>
<td>14</td>
<td>30</td>
</tr>
<tr>
<td>Average</td>
<td>56</td>
<td>33</td>
<td>99</td>
</tr>
<tr>
<td>Poor</td>
<td>45</td>
<td>27</td>
<td>72</td>
</tr>
<tr>
<td>Very Poor</td>
<td>8</td>
<td>7</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>130</td>
<td>81</td>
<td>211</td>
</tr>
</tbody>
</table>

Writers in the field of speech correction state that speech defects are no respecters of wealth or position. They occur among all groups of people. However, the incidence seems to be greater among those children who come from homes in the lower income strata. This probably is because of the influence of environment on the development of speech. Lower intelligence, physical deficiencies, illness, tend to be more prevalent in this group. Often in these homes there is a lack of motivation for the child learning to talk, for parents are too busy earning a living or just do not care. Many times there are poor speech standards for the child to imitate. Examination of Table VI shows that the children in this study follow the trend of others in the nation in this respect. Teachers consider the families of only 15.83 percent of the children with defects to be what could be called comfortable or well-to-do or better. The rest, 84.17 percent, are average or less and 39.37 percent are poor or very poor.
The occupations of parents of children with defects or disorders of speech varied extremely. Not all parents were included in the report, and the occupations reported were often difficult to classify. Roughly, however, they were as follows: Unemployment or state aid, 16.2 percent; common labor, 59.3 percent; skilled labor, 13.3 percent; business, 9 percent; and professional, 2.2 percent. In other words, unemployment and common labor comprise 75.6 percent of the occupations represented by parents of the children listed as defective in speech, while skilled labor, business, and professional work combine for the other one-fourth.

Nationality of Speech Defectives

Table VII shows the nationality of the children with defective speech. It shows that 33 1/3 percent of the children with such difficulty are "American". Negroes and this group together comprise 36.24 percent of the total. These probably represent the number who suffer from a speech defect even though they have not had the added handicap of learning another language while young, for they in all probability learned English as the native and only language. The remaining 153, who might be classified as the foreign-language group, constitute 63.75 percent of the defective in speech. The majority of these are "Mexican", but 12; or 5 percent, include the following nationalities: Chinese, Italian, Syrian, Portuguese, as well as seven Indians of four
different tribes. The fact that 141, or 58.75 percent, of the group are "Mexicans" is to be expected when we consider the large number of Mexican children in our schools who learn to speak Spanish as the native tongue, and must learn English when they come to school. Even those who learned to speak English in the home have the difficulties of bilingualism to combat.

TABLE VII
DISTRIBUTION OF SPEECH DEFECTIVES BY SEX AND NATIONALITY

<table>
<thead>
<tr>
<th>Nationality</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>American</td>
<td>53</td>
<td>27</td>
<td>80</td>
</tr>
<tr>
<td>Mexican</td>
<td>82</td>
<td>59</td>
<td>141</td>
</tr>
<tr>
<td>Negro</td>
<td>4</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Chinese</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Papago Indian</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Yaqui Indian</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Hopi Indian</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Maya Indian</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Italian</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Syrian</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Portugese</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>148</strong></td>
<td><strong>92</strong></td>
<td><strong>240</strong></td>
</tr>
</tbody>
</table>
Classification of the children with defective speech by nationality, then, indicates that slightly under two-thirds of our children with defective speech are children who have the handicap of bilingualism added to the other factors which might bring about defective speech.

Foreign Dialectical Difficulties

The problem of foreign dialect as a causal factor of speech defects was discussed in Chapter III. It was pointed out that the actual symptoms of defects of an articulatory, rhythmic, or phonatory nature which have been caused by foreign dialect would be noted on the inquiry blanks, even if the teacher did not recognize the cause. The heading, Foreign Dialectical, was added in the hope of estimating the importance of this factor as a cause of speech defects in our schools since there is such a large number of "Mexican" children in our school population.

The writer found that the standard used for this classification was extreme in variation. Some teachers disregarded it completely, noting only the symptoms. Others attempted to estimate, separately, the number of children who had foreign dialectical difficulties great enough to constitute a handicap in the business and social world. Still others gave the writer the number of Spanish-speaking children in the school. For this reason, the data on the inquiry blanks in this respect were inconclusive.
Mexican children, however, represent between 25 and 50 percent of the school population of Tucson Elementary Schools. No data are available, but it seems logical to assume that most of these "Mexican" children had learned to speak Spanish before English was encountered, and that the foreign dialect is an important factor in causing speech defects in Tucson. This assumption is substantiated by the fact that, as shown in the table on page 50, children from the foreign-language group comprise two-thirds of the total number classified as defective in speech.

Distribution of Defectives by Schools

The distribution of children with speech defects or disorders by schools is shown on Table VIII. The 240 children with speech defects or disorders comprise 2.46 percent of the total school population of 9,284, but the percentage varies with each school. The percentage of defectives in the schools varies from 13.53 percent reported by El Rio School to .18 percent at Safford Junior High School. One school reports between 6 percent and 7 percent; one reports between 4 percent and 5 percent; one reports between 3 percent and 4 percent and the rest report between 1 percent and 3 percent.

The wide variation among schools has two possible ex-

2. Mrs. Strom, Secretary to Mr. Robert W. Morrow, Tucson City School Superintendent; Interview, April 23, 1943.
planations, both of which probably operated. The first is that the schools, being located in different parts of town, naturally include somewhat different national and economic groups as predominant elements in the school population. Roughly speaking, children in the Davis, El Rio, Carillo, and Ochoa Schools are almost entirely "Mexican"; about half of the Safford school children are "Mexican", while they represent about one-third of the school population of Roskruge and Roosevelt Schools. Dunbar School is, of course, entirely Negro. The rest of the schools are predominantly "American". In general, the economic status of the families represented in the schools varies in direct proportion to the percentage of "Mexican" children in the school population.

Since defective speech has been shown to be in direct proportion to the presence of an additional language and to lower economic groups, it seems safe to assume that the schools with a predominant "Mexican", low-income school population will have a greater incidence of defective speech. This, of course, is excluding the possibility of different attacks on the problem in the various schools entering as a factor which might operate to decrease defective speech. It is impossible, however, to estimate the effect of the possibly different teaching techniques as a factor in the varia-

3. Mrs. Strom, Secretary of Mr. Robert W. Morrow, Tucson City School Superintendent; Interview, April 25, 1943.
tion in percentage of cases reported.

The second possible explanation of the wide variation of percentage of defective speech reported is the fact that a multiple standard of what constitutes defective speech was used. However, in most schools full teachers' meetings were devoted to a discussion of the general problem of defective speech in the school and the standard to be used in completing the inquiry blanks of this study. But, as stated in Chapter II, in spite of these efforts to make the standards as like as possible, there was naturally some difference.

While it is true that El Rio School is in a district where the school population comes primarily from poorer Mexican families, and one might expect a larger percentage of speech defects and disorders, that alone cannot account for the great difference indicated by Table VIII. For example, Ochoa, Davis, and Carillo Schools have the same general type of school population, and would normally be expected to have approximately the same incidence of defective speech. It is believed, however, that the marking of the inquiry blanks was a little more careful at the El Rio School than in some other schools. The principal took a particular interest in the survey, and the faculty of El Rio School were especially careful in their marking of the inquiry blanks.
### TABLE VIII

**DISTRIBUTION OF SPEECH DEFECTIVES IN TUCSON ELEMENTARY SCHOOLS BY SCHOOLS**

<table>
<thead>
<tr>
<th>Schools</th>
<th>Enrollment</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>El Rio</td>
<td>475</td>
<td>33</td>
<td>51</td>
<td>64</td>
<td>13.53</td>
</tr>
<tr>
<td>Safford</td>
<td>599</td>
<td>17</td>
<td>8</td>
<td>25</td>
<td>6.26</td>
</tr>
<tr>
<td>Ochoa</td>
<td>559</td>
<td>13</td>
<td>4</td>
<td>17</td>
<td>4.76</td>
</tr>
<tr>
<td>Blenman</td>
<td>333</td>
<td>6</td>
<td>5</td>
<td>11</td>
<td>3.30</td>
</tr>
<tr>
<td>Carillo</td>
<td>543</td>
<td>8</td>
<td>8</td>
<td>16</td>
<td>2.84</td>
</tr>
<tr>
<td>Miles</td>
<td>419</td>
<td>8</td>
<td>8</td>
<td>16</td>
<td>2.38</td>
</tr>
<tr>
<td>Elizabeth Borton</td>
<td>217</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>2.30</td>
</tr>
<tr>
<td>Menlo Park</td>
<td>220</td>
<td>3</td>
<td>2</td>
<td>5</td>
<td>2.27</td>
</tr>
<tr>
<td>Davis</td>
<td>584</td>
<td>6</td>
<td>6</td>
<td>12</td>
<td>2.21</td>
</tr>
<tr>
<td>Sam Hughes</td>
<td>577</td>
<td>10</td>
<td>2</td>
<td>12</td>
<td>2.08</td>
</tr>
<tr>
<td>*Wakefield Junior High</td>
<td>247</td>
<td>5</td>
<td>2</td>
<td>5</td>
<td>2.03</td>
</tr>
<tr>
<td>University Heights</td>
<td>454</td>
<td>3</td>
<td>6</td>
<td>9</td>
<td>1.98</td>
</tr>
<tr>
<td>Drachman</td>
<td>627</td>
<td>6</td>
<td>6</td>
<td>12</td>
<td>1.91</td>
</tr>
<tr>
<td>Government Heights</td>
<td>516</td>
<td>3</td>
<td>5</td>
<td>8</td>
<td>1.35</td>
</tr>
<tr>
<td>Davidson</td>
<td>233</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>1.20</td>
</tr>
<tr>
<td>Dunbar</td>
<td>525</td>
<td>4</td>
<td>3</td>
<td>7</td>
<td>1.19</td>
</tr>
<tr>
<td>*Mansfield Junior High</td>
<td>423</td>
<td>5</td>
<td>0</td>
<td>5</td>
<td>1.18</td>
</tr>
<tr>
<td>Roskrug</td>
<td>349</td>
<td>4</td>
<td>0</td>
<td>4</td>
<td>1.03</td>
</tr>
<tr>
<td>Mission View</td>
<td>501</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>0.99</td>
</tr>
<tr>
<td>Roosevelt</td>
<td>256</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0.77</td>
</tr>
<tr>
<td>*Roskrug Junior High</td>
<td>471</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0.45</td>
</tr>
<tr>
<td>*Safford Junior High</td>
<td>548</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0.18</td>
</tr>
</tbody>
</table>

**Total** : 2284 : 142 : 92 : 240 : 2.46

*7th and 8th grades only

Retardation

Smiley Blanton tells us that

"since the intellect and the emotions of the child develop largely through speech, a speech defect will tend to slow up the development of the mental life." 4

4. Blanton, Smiley, OP. Cit.
A glance at the age-grade tables on the following pages shows that a large number of the children reported by their teachers as deficient in speech are also "overage". Of the 240 children listed, 55 boys and 21 girls -- a total of 76, or nearly one-third -- are "overage". This number includes the 12 children in the Crippled-Children's room of Safford Elementary School. They were placed in this special class because they were unable to compete with normal children, so they may be presumed to be retarded. Only 4 of the children, all boys, are "underage". It would be interesting to know how many of the "normal" children are doing average or superior work.

No data concerning the age at which these children started to school is available; therefore, it is not definite that this overageness among the children indicates retardation of progress. Yet the majority of children in Tucson do enter school at a normal age, so it seems safe to say that almost one-third of Tucson elementary school children with defective speech are retarded in school.

While we do not know that speech deficiency is the cause of the retardation indicated, they are concurrent. The consensus of findings of research workers seems to indicate that the defective in speech do not make as rapid progress in school as do children with normal speech. In Carrell's study the speech defectives were found to be inferior in school achievement to the general school population.
Root in a survey of speech defectives in South Dakota public schools found speech defectives to be six months retarded compared with average pupils without defects in speech. At Mount Holyoke College, Stinchfield found the girls needing corrective speech training failed in their school work despite high intelligence. It seems logical to assume there is a positive relation between the incidence of defective speech and of retardation in Tucson Elementary Schools.

Relationship of Speech and Physical Defects

It is interesting to note that all twelve of the children being taught in the "Crippled-Children's Room" at Safford Elementary School are suffering from serious speech defects. This bears out once again the statement of authorities in the field that there is a positive relationship between physical and speech defects.

RESULTS OF THE INFORMAL INTERVIEW

Chapter II, in which the Method of Procedure of this study was discussed, gave the writer's reasons for using both the inquiry blanks marked by Tucson teachers and a series of informal interviews with a sampling of Tucson elementary school children in this survey of speech defects and disorders. She felt that each method had its advantages, and that a combination of the two would serve as a check which would tend to make the study more nearly accurate. This chapter summarizes the results of the informal interviews, which were conducted in March and April of 1943. These data, too, are the result of the excellent cooperation and help received by the writer from Mr. Morrow, the principals, and the teachers in charge of the children interviewed.

Children Examined

The choice of a sampling of Tucson elementary school children was discussed in Chapter II. It is interesting to note the children examined as a result of this particular selection.

A total of 252 children -- 152 boys and 100 girls -- were examined. The ratio between boys and girls, then, was
three to two.

Table XII indicates the number of children examined, by school and by grade. It also shows the number of "Mexican", "American" and "Chinese" children in each school and grade. Nationality, however, is indicated more clearly in Table XIII.

The number population of Tucson Elementary

**TABLE XIII**

Children of Tucson Elementary Schools Examined in the Informal Interviews, by School and by Grade*

<table>
<thead>
<tr>
<th>School</th>
<th>1st Grade</th>
<th>4th Grade</th>
<th>8th Grade</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>M</td>
<td>C</td>
<td>A</td>
</tr>
<tr>
<td>Carillo</td>
<td>1</td>
<td>25</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Roskруге</td>
<td>35</td>
<td>15</td>
<td>---</td>
<td>52</td>
</tr>
<tr>
<td>Sam Hughes</td>
<td>28</td>
<td>---</td>
<td>---</td>
<td>28</td>
</tr>
<tr>
<td>Total</td>
<td>101</td>
<td>98</td>
<td>53</td>
<td>252</td>
</tr>
</tbody>
</table>

* A - American  M - Mexican  C - Chinese

Surna: The number of children examined by the school is given. The number of "Mexican", "American" and "Chinese" children in each school and grade is also shown.

**TABLE XIII**

Children of Tucson Elementary Schools Examined in the Informal Interviews, by Nationality

<table>
<thead>
<tr>
<th>Nationality</th>
<th>1st Grade</th>
<th>4th Grade</th>
<th>8th Grade</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>American</td>
<td>62</td>
<td>62</td>
<td>43</td>
<td>167</td>
</tr>
<tr>
<td>Mexican</td>
<td>38</td>
<td>36</td>
<td>10</td>
<td>84</td>
</tr>
<tr>
<td>Chinese</td>
<td>1</td>
<td>---</td>
<td>---</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>101</td>
<td>98</td>
<td>53</td>
<td>252</td>
</tr>
</tbody>
</table>

The number of children examined by the school is given. The number of "Mexican", "American" and "Chinese" children in each school and grade is also shown.
"Mexican" children comprised 84, or one-third of the children interviewed. This means that the sampling may have a slightly larger proportion of "Mexican" children than actually occurs in our Tucson Elementary Schools -- in which the "Mexican" population represents between 25 percent and 30 percent of the total.

Since the school population of Tucson Elementary Schools is 9284, the 252 children interviewed constituted 2.71 percent of the total enrollment. If the sampling was a fair one, as it appears to be, and if the writer was accurate in her analysis and classification, we may assume that the incidence of speech defects and disorders in Tucson Schools will be proportionate to the larger number of children, and thus estimate the extent and nature of the speech problem in Tucson.

Table XIV shows the number of children with defective speech noted by the investigator. It gives the number of "American" children and the number of "Mexican" children having noticeable and serious defects and the number of each group which has both, as well as the totals. Table XV gives the same data, with the number of children with foreign dialectical difficulties only included.

In Chapter VI of this study the findings of this survey, by both methods, are compared with other similar studies. These comparisons show that the percentages noted by each method, both the inquiry blanks and the informal
interviews, are much the same as those noted in other parts of the country when the same methods were employed.

TABLE XIV

NUMBER OF CHILDREN WITH DEFECTIVE SPEECH NOTED IN THE INFORMAL INTERVIEWS

<table>
<thead>
<tr>
<th>Group</th>
<th>Not.</th>
<th>Ser.</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>American</td>
<td>30</td>
<td>11</td>
<td>41</td>
</tr>
<tr>
<td>Mexican</td>
<td>15</td>
<td>5</td>
<td>18</td>
</tr>
<tr>
<td>Totals</td>
<td>45</td>
<td>16</td>
<td>59</td>
</tr>
</tbody>
</table>

Percent of Children Interviewed: 17.13%: 6.37%: 25.3%

TABLE XV

NUMBER OF CHILDREN WITH DEFECTIVE SPEECH, INCLUDING THOSE WITH FOREIGN DIALECTICAL DIFFICULTIES ONLY

<table>
<thead>
<tr>
<th>Group</th>
<th>Not.</th>
<th>Ser.</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>American</td>
<td>30</td>
<td>11</td>
<td>41</td>
</tr>
<tr>
<td>Mexican</td>
<td>13</td>
<td>5</td>
<td>18</td>
</tr>
<tr>
<td>Foreign Dialectical</td>
<td>15</td>
<td>2</td>
<td>17</td>
</tr>
<tr>
<td>Totals</td>
<td>58</td>
<td>18</td>
<td>76</td>
</tr>
</tbody>
</table>

Percent of Children Interviewed: 25.11%: 7.14%: 30.26%

Types of Defects and Disorders Noted

Now let us examine the types of defects and disorders noted by the writer in the informal interviews. Table XVI shows that of a total of 129 defects, if foreign dialectical difficulties are included, articulatory defects represent
### TABLE XVI

**TYPES OF SPEECH DEFECTS AND DISORDERS NOTED IN THE INFORMAL INTERVIEWS***

<table>
<thead>
<tr>
<th>Type</th>
<th>Mexican*</th>
<th>American*</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Articulatory</td>
<td>37 : 10 : 47</td>
<td>39 : 7 : 46</td>
<td>76 : 17 : 93</td>
</tr>
<tr>
<td>Lallation</td>
<td>2 : 1 : 3</td>
<td>5 : 1 : 6</td>
<td>7 : 2 : 9</td>
</tr>
<tr>
<td>Cluttering</td>
<td>1 : 1 : 2</td>
<td>4 : 0 : 4</td>
<td>5 : 1 : 6</td>
</tr>
<tr>
<td>Foreign Dialectical Only</td>
<td>26 : 5 : 31</td>
<td>-- : -- : --</td>
<td>26 : 5 : 31</td>
</tr>
<tr>
<td>Rhythmic</td>
<td>3 : 1 : 4</td>
<td>8 : 3 : 11</td>
<td>11 : 4 : 15</td>
</tr>
<tr>
<td>Totals</td>
<td>44 : 15 : 57</td>
<td>56 : 16 : 72</td>
<td>100 : 29 : 129</td>
</tr>
</tbody>
</table>

* A total of 252 children -- 84 Mexican and 167 American and 1 Chinese -- were examined. This table indicates the number who had defects or disorders that were noted by the writer.

N - Noticeable    S - Serious    T - Total of Noticeable and Serious defects and disorders.
72.89 percent. If these are not included, the articulatory defects constitute 48.06 percent of the total. Phonatory and rhythmic defects represent approximately the same proportions of the total, showing, respectively, 16.28 percent and 11.62 percent. The proportion of noticeable defects recorded is about the same as that of the totals, but the percentages of the serious defects are slightly different: 27.24 percent for phonatory defects, 13.8 percent for rhythmic difficulties, 17.24 percent for foreign dialectical difficulties — and 58.63 percent were articulatory if the last classification is included, 41.36 percent if it is not.

The writer noted a definite foreign-language influence in the speech of the majority of the "Mexican" children examined, although this was less noticeable in Roskruge, where the children were less likely to come into contact with constant use of Spanish outside the school. The speech of most of these children was characterized by foreign intonation, the substitution of (i) for (e) and of (tʃ) for (ʃ). One wonders that much of this was not noted by the classroom teachers, for many made comments upon the constant use of "Mees" and the like when conversing with the writer. However, they may not have considered this difficulty to be a defect. Also, constant contact with such deviations may have caused the teachers to regard them as normal. It must be remembered, though, that the fact that a standard is
normal does not mean that it is the desirable one. The fact that the majority of our "Mexican" children have speech that marks them as being of a foreign-language group does not mean that this is desirable. Rather, it means the school authorities are faced with a greater educational problem in attempting to help these children acquire normal speech.

As it happened, no organic deviations were noted by the writer among the children in the sampling itself. During the time spent in gathering the inquiry blanks, however, she came in contact with several cases which need immediate attention.

An estimate of 23.3 percent to 30.28 percent is a large portion of our total school population to have speech defects or disorders. Perhaps the writer has been a little exacting in her classification in the informal interviews. If the child made the same articulatory error three to four times during the examining period, it was checked as if it were chronic; and it may not have been. We all know that a cold and many other factors can cause the voice to be abnormal for a short period of time. The investigator, of course, had no standard by which to judge if phonatory abnormalities were chronic. As will be indicated in Chapter VI, however, the findings of the informal interviews are not incompatible with those of similar studies employing the informal interview method of survey.
CHAPTER VI

SUMMARY AND CONCLUSIONS

The results of the two methods employed in this survey of speech defects and disorders are at variance. Yet it seems apparent that the actual incidence of defective speech lies between the two figures. The indication of the inquiry blanks is that 2.46 percent of the school population are judged by their teachers to be defective in speech. As stated before, many cases may have been overlooked by the teachers because of a lack of the background necessary for accurate classification. The more serious a defect, the more readily it is recognized and classified by the lay observer. Minor defects are many times overlooked, and many serious defects are often classified as noticeable. Therefore, this probably constitutes a minimum estimate of the problem of speech defects in Tucson. On the other hand, the incidence of speech defects and disorders indicated by the findings of the informal interviews -- 23 percent to 30 percent -- would be a little high, if the investigator were too exacting. Colds and other factors may cause temporary speech defects; the investigator had no means by which to judge whether the abnormalities of speech she noted at the time of the interviews were chronic.

If only the minimum estimate is considered, the results
of this study indicate that there is a need for a speech correction program on the elementary school level in Tucson. In terms of proportion, 2.46 percent may sound like a small amount. But even this small percent of the total school population represents 240 children who have been reported by their teachers to be defective in speech. Nearly 100 children were reported to have defects or disorders serious enough to warrant immediate corrective measures.

It is interesting to compare the results of this study with the findings of the important speech surveys made in the United States which are listed in Table I, page 8. The inquiry blanks show an incidence of 2.46 percent — the exact percentage indicated by Conradi's survey of six American cities in 1911. This is comparable to the figure found by Wallin in St. Louis, Missouri, in 1921 and by Burdin in Indianapolis in 1937, who report, respectively, 2.8 percent and 2.94 percent. The questionnaire method was employed by all three.

Ione Potter investigated speech deficiency in the elementary and junior high schools of Portales, New Mexico. The school population of Portales is perhaps the most like

4. Potter, Ione, op. cit.
that of Tucson of any which have been reported upon in similar surveys. In addition, the informal interview method was employed by Miss Potter. She discovered that 24.6 percent of the children in the first nine grades have speech defects. This percentage is much the same as that indicated in Tucson Elementary Schools by the writer. The findings of the informal interviews, it will be remembered, indicated 23.3 percent defective speech, exclusive of those children with foreign dialectical difficulties only, and a percentage of 30.28 percent if they are included. The fact that a trained observer who used more or less the same method of survey in a school which had a population much like that of the Tucson system discovered a similar incidence of defective speech forms a basis for the conclusion that the writer has not been too exacting in her analysis of the speech situation in Tucson.

The White House Conference on Child Health and Protection of 1931 reported the national incidence of speech so defective as to demand remedial treatment to be 6.9 percent. The writer determined in the informal interviews that 6.37 percent of Tucson school children are in need of remedial treatment. If the number handicapped by what the writer classified as foreign dialectical difficulties only is included, the percentage needing remedial treatment is increased to 7.14 percent. The proportion of the total population of the nation who are handicapped by bilingualism is
small, and for that reason foreign dialectical difficulties are of only minor import to the nation as a whole. On the contrary, the fact that a large number of children in our schools come into contact with the Spanish language first—and have the bilingual handicap—creates a definite speech problem in Tucson.

It can be concluded, then, that the findings of this survey follow, in general, the trends indicated by similar studies and that the variations are attributable to the different locality and the consequently different school population.

More boys than girls suffer from speech defects, the ratio being approximately 1.6 to 1. Other surveys indicate a ratio of 1.5 or 3 to 1.

The proportion of articulatory, phonatory, and rhythmic difficulties indicated by both methods employed in this study are more or less comparable with those indicated by other studies. It will be noted that the serious defects tally more closely than the noticeable ones, perhaps because most previous surveys have been of serious cases only, or have made no differentiation between noticeable and serious defects.

Root found in his survey of schools of South Dakota

that the greatest percentage of defectives is in the first
grade and the least in the fourth year. Also, he noted an
increase in the 4th over the 3rd grade. This was the case
in the Tucson survey as well, the increase in the 4th grade
being largely due to an increase in the proportion of rhyth­
mic difficulties. This increase in the incidence of stutter­
ing in the intermediate grades has been noted, particularly
among boys, in other studies.

The main deviation of the findings of this study from
those of similar studies was in the proportion of foreign
dialectical difficulties. The inquiry blanks showed that
two-thirds of the defectives reported by Tucson teachers were
of the foreign-language group, and that approximately 60
percent of them were listed as "Mexicans". The writer con­
cluded from her informal interviews that the speech of the
majority of the "Mexican" children shows definite foreign
influences. This, of course, is less prevalent in the dis­
tricts where the school population is predominantly "Amer­
ican", and the child is not so likely to come into contact
with constant use of the Spanish language outside of the
school. Yet presence of foreign intonation, substitution of
( ) for ( ) and ( ) for ( ) was noted in most cases. If one
considers bilingualism to be a cause of defective speech,
this greater incidence of the foreign dialectical difficulty
is understandable in view of the fact that such a large por­
tion of our school population is "Mexican".
The findings of this study tend to substantiate the observation that children from homes in the lower economic strata and whose parents are common laborers or have no employment are more likely to suffer from speech defects and disorders than are those who are more fortunate in these respects.

Retardation in school was indicated for one-third of the children with defective speech, while only three were accelerated. We do not know definitely that the deficiency in speech is the cause of the retardation of these children. We do know that the two are concurrent. As studies of the relationship of retardation and the presence of speech defects have shown a direct relationship, it would seem that an educational problem is indicated.

The child who has a serious speech defect is handicapped -- as is the child who is blind, deaf, or crippled. Yet the majority of children with deficient speech are getting no help. Rogers tells us that the number of stuttering children in the United States is five times as many as the combined numbers of blind and deaf children. Van Riper says that of the one and a half million speech defectives of school age, less than 60,000 are receiving even perfunctory remedial treatment. He adds that 96 percent of the speech-handicapped individuals of school age go without

6. Rogers, John Frederick, *op. cit.*
any retraining, and far too many of these show a yearly increase in both the severity of the actual defect and in the abnormalities of personality which are built around it. The retardation in school of the child with a speech defect shows the handicap it is to his efforts even while he is a child. How much greater a handicap it is when he is an adult!

As has been pointed out previously, complete rehabilitation of most cases of defective speech is possible.

Although the cost of re-educating such a large number of defective children is often given as an argument against the provision for such remedial work, the White House Conference of 1931 reported the approximate yearly cost of re-educating each handicapped child: blind -- $500; deaf -- $264; crippled -- $500; feebleminded -- $500; speech defective -- $10. The yearly cost of providing retraining for a speech defective child is only $10. Although the total number needing treatment is large, the future economic gain in turning these children from economic misfits into self-sufficient adults would justify the financial expenditure, even if we do not consider the personal need of the defective himself.

It is the responsibility of the public schools not only to provide for speech training, but to help in the rehabili-

tation of the child handicapped by a defect. This study shows the need for a speech correction program in Tucson; it does not touch upon the possibilities of a definite program of speech improvement as an aid to the efficiency of the normal child.

To the writer's knowledge three teachers approached members of the faculty of the Department of Speech of the University of Arizona for advice in order to mark the inquiry blanks accurately. In her visits to the various schools the writer was constantly asked questions such as the following:

"Can you tell me just what this child's difficulty is?"

"Do you think this child's handicap can be overcome and that she can be taught to speak intelligibly?"

"Do you think the fact that this child was so seriously ill when he was learning to talk that his mother fulfilled his every desire before it was expressed was a cause of his present speech difficulty?"

"Can you give us some definite suggestions as to how to help these children?"

Such questions indicate that Tucson teachers recognize the problem of defective speech and many of its implications. They would like help in solving the problem and in retraining those children who are handicapped by defective speech.
The conclusions of this study, as given in the preceding chapter, point to one major fact: there is an immediate need for a speech correction program on the elementary school level in the Tucson school system.

Having noted what is being done in other states and in other school systems to meet a like need, and considering the needs and facilities of the Tucson system, the writer makes the following recommendations.

At least one person with training in speech correction should be placed in charge of a city elementary school correction program. The duties of this person would be both clinical and supervisory. It would be the responsibility of this individual to maintain a speech clinic in which the most serious cases -- those needing the help of a specialist -- would be treated. In addition, he would supervise the work of classroom teachers in caring for children needing rehabilitation. One of the conclusions of this study was that Tucson teachers recognize the problem created by deficient speech, and would like to do something about it. They need only the leadership of a person trained in the techniques, who is ready to give definite, concrete suggestions, to do much in the way of rehabilitation.
It would be desirable if all teachers in the Tucson system could take some college training in the recognition of speech defects and disorders, their classification, and the rudimentary techniques involved in correction. If that is not possible, the appointment of a speech supervisor such as the one described above is doubly important. Even if the teaching personnel were completely trained in corrective procedures, the supervisor would be advisable as an integrator. He is more necessary where the teachers want to do something but do not know what should be done.

Several children were noted, during the course of this survey, to have organic malformations severe enough to hinder normal speech permanently. Until the organic malformation is repaired, little rehabilitation is possible. It is recommended that school authorities bring these cases to the attention of the proper agencies, so that they can be cared for.

It is also recommended that further studies related to this one be made in Tucson. Some suggested problems are:

1. The causes of the speech defects noted among Tucson school children

2. Curriculum revision to include a definite, constructive course of study in speech for the elementary school

3. Possibilities of a speech improvement program in Tucson
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APPENDIX

INQUIRY BLANK

SURVEY OF SPEECH DEFECTS AND DISORDERS IN TUCSON ELEMENTARY SCHOOLS

Name ___________________________ Sex ______ Age ______ Grade ______

Nationality ________________ Other languages spoken in home ______

Definition: Speech is defective when it deviates so far from the speech of other people in the group that it calls attention to itself, interferes with communication, or causes its possessor to be maladjusted to his environment. A defect is noticeable if it has come to the teacher's attention.

Please check the speech defects or disorders noticeable in this child, indicating degree by placing checks in the proper column:

<table>
<thead>
<tr>
<th>Noticeable</th>
<th>Serious</th>
</tr>
</thead>
</table>

1. Articulatory
   - Baby Talk .. (Infantile speech prolonged into later life) .............
   - Lisp - (Substitution of "th" or other sounds for "s" and "z" sounds).
   - Lallation .. (Defective r, l, s, k, t, etc., largely due to inactivity of tongue)
   - Cluttering .. (Slurred or omitted syllables and consonants, speech sounds distorted by too rapid a rate of speech)

2. Rhythmic
   - Stuttering .. (Repetitions and prolongations of words, syllables, and sounds; or mouth postures, which produce interruptions and breaks in the rhythm of speech)

---
3. Phonatory.

**Pitch**
- Too high
- Too low
- Monotone
- Non-Communicative pitch pattern
- Narrow range

**Intensity**
- Too loud
- Too weak
- Voiceless

**Quality**
- Nasal
- Hoarse
- Thin
- Guttural
- Shrill
- Breathy

4. Foreign Dialectical .. (Faulty production of vowel and consonant sounds due to a habit-forming experience with a language other than English)

5. Any other speech defect or disorder

(Please name or describe)

Please indicate any structural abnormalities affecting the child's speech

Other physical handicaps

Is the child a "problem child"?  
Yes  No

Please check any of the following which the child characteristically exhibits.  Easily discouraged  Quarrelsome  Day-dreams  Tends to stay by self  Is a bully  Bluster  Oversensitive

What is the classroom attitude of the child?  Antagonistic  Normal  Indifferent

What is the reaction of fellow-students to the speech defect?  
Ridicule  Amusement  Sympathy  None  Other

Parent's occupations

Economic status of family:  Well-to-do or better  Comfortable  Average  Poor  Very Poor

Name of Teacher

School

Date