CERTAIN CLINICAL ASPECTS OF CLEFTNESS

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J. E. C.

To
Emarie and Edwin
whose lives have been a
continuous inspiration to all
who know them.

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CHAPTER I

Historiography

Cleft palate, like other congenital malformations, has occurred in man since times immemorial. Anthropology has been able to reveal little in the way of man's early abnormalities and less of the first afflictions from which he suffered. Although some peculiar anomalies must have been found among the skeletal remains of primitive man, few or no data appear to be available. Future research will undoubtedly reveal more information in this area. The earliest record which has thus far been found of cleft palate was reported by Smith and Dawson, of London, in their work entitled "Egyptian Mummies" from which the following quotation is taken:

> Only one case of cleft palate and one of talipes (club foot) have come to light.[1]

Strangely enough Hippocrates, the great Greek physician of the fourth century B. C., did not mention the condition of harelip or cleft palate in any of his writings.

Celsus (Rurelius Cornelius) contributed much to medicine during the reign of Tiberius, who was emperor from 14 to 37 A. D. It is thought by some that he wrote about the operation for harelip, however this point is refuted by Dorrance.[2] There is extant, nevertheless, an essay by Celsus concerning the treatment

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[1] G. Elliott Smith and Warren R. Dawson, Egyptian Mummies, p. 157.

[2] George Morris Dorrance, The Operative Story of Cleft Palate, p. 1.

of mutilated lips.[3]

In the second century A. D. the physician Galen mentioned cleft lip to which he applied the term of "colobomatae".

Paulus Aegineta (625-690 A. D.) wrote of the abnormality. He was a well-known Greek eclectic and a compiler who flourished in Alexandria and remained there after the Arabian invasion in 640 A. D. Among his writings one finds a discussion of "split lip". From his Sixth Book, Section 26, one finds the following words under the subject "Maimed Parts":

> When the ears or lips have been mutilated, we restore them by first dissecting the skin below and afterwards bringing together the lips of the wounds; then removing the callous parts and afterwards sewing and glueing them together.

Certain Arabian physicians of the nineth and tenth centuries A. D. were aware of the problem of cleftness. Among their writings one finds reference to "fissura labiorum" meaning the acquired fissures of the lip. For this condition the Arabian physicians advised that the separated parts be sutured.

Roland Capelluti, of Parma and of the School of Salerno (XII Century), has been mentioned by Velpeau[5] as having observed

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[3]Alexander Lee, Celsus on Medicine, II p. 269.

[4]George Morris Dorrance, op. cit., p. 3.

[5]A. L. M. Velpeau, Nouveaux éléments de médecine opératorie, translated by P. S. Townsend, III 3, p. 383.

fissures of the palate.

In the sixteenth century the terminology began to develop. In 1556, Pierre Franco contributed the phrase "levre fendu de nativite" by which he hoped to describe the condition now known as congenital split lip. He also used the term "dents de lievre" by which he meant "hare teeth". There seems to be little doubt but that Franco was referring to clefts of the jaw and the projection of the teeth through the openings; such an abnormality would be a double split of the mandible with protruding incisor teeth appearing in the opening.

It is to Ambroise Paré (1510-1590) that the credit goes for the term "hare-lip", for it was he who coined the phrase "bec-de-lievre". It is strange that in none of the writings of Paré does one find mention of the cleft palate. He is sometimes given credit for treating cleft palate cases, but in reality he only used obturators to close a hole in the palate which had been caused by disease.

The first recorded cure of cleft palate by operation was made by a French dentist, Le Monier, in 1760. His method was to hold the edges of the cleft in position by the sutures and then freshen the surfaces of the palate by cauterizing them.[6] In 1816, von Graefe introduced the first surgical procedure (known as staphylorrhaphy) for the repair of clefts of the soft palate. The first successful staphylorrhaphy in

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[6]Harold Stearns Vaughan, Congenital Cleft Lip, p. 13.

America was performed by Stevens, of New York, in 1827.[7] In 1843 John M. Warren, a Boston physician, made the best contribution to the successful development of the operation. During the year he performed this surgery upon fourteen patients with satisfactory results in thirteen of the cases. Prior to the work of Warren, the operations were chiefly upon the soft palate and were concerned with single clefts. The early surgeons in this field would not experiment with the hard palate, as they believed that this area could be closed only with an obturator. Warren showed that the cleft of the hard palate could be brought together by dissecting up the soft tissues from the bone on each side of the cleft. The next step was to freshen the edges and then suture them together in the center. It is now generally spoken of as the "von Langenbeck Operation" even though von Langenbeck did not publish his detailed description of the procedure until 1861.[8]

Before the discovery of an anaesthetic, operations upon the palate were postponed until the patient was old enough to understand the nature and severity of the ordeal. The operation was extremely difficult and required the complete cooperation of the patient if the results were to be gratifying.

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[7] A. H. Stevens, "Staphyloraphe or Palate Suture Successfully Performed", North American Medical and Surgical Journal, III (1827), 233-236.

[8] Harold Stearns Vaughan, op. cit., p. 15.

It was not until about 1865 that anaesthesia came into general use of palate operations. Ashhurst,[9] writing in 1879, gave Warren the credit for advocating the advantage of an early operation if it might be undertaken at the age of three to four years with the child under an anaesthetic.

In the twentieth century, attention must be directed toward the outstanding work of such great American surgeons as Owens,[10] Brown,[11] and Shearer.[12] These men have struggled to perfect the techniques in order that cleft cases may have normalcy in appearance and speech.

It is unfortunate that speech training in rehabilitation does not have the historical heritage that the work in surgery has. Attempts at special training of school children with speech defects is said to have started in Pottsdam, Germany, in 1886. The movement soon spread throughout the entire country. At the close of the nineteenth century, Germany was still the leader in this experimental work. Correction for the speech-defective child

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[9]John Ashhurst, "Cleft Palate and Its Treatment," Medical Record, XVI (1879), 145.

[10]Neal Owens, "Complete Reconstruction of the Lip," Surgery, XV (1944), 196-206.

[11]James Barrett Brown, "Double Elongations of Partially Cleft Palates and Complete Clefts," Surgery, Gynecology and Obstetrics, LXIII (1936), 768-771.

[12]William Lete Shearer, "Cleft Palate and Cleft Lip," The Journal of the American Dental Association, XXII (1934), 1446-1454.

was introduced into the schools of some of our American cities about 1910. It is regretable that twenty years later, only eighty public school systems employed speech correctionists. Among the cities with a population of 100,000 and over who furnished data, fifteen started their speech corrective work in the years 1910-1919 and fifteen in the next decade. Of the cities 30,000 to 100,000, three began work in this area in 1917-1919 and twenty-seven since those years.[13] The remaining group in cities with a population under 30,000 started their special work in 1920 to 1927. Eighty-four cities in twenty-two States and the District of Columbia reported the employment of special teachers for speech-defective pupils in 1930.

It is quite evident that these few cannot adequately teach the thousands who are handicapped. Rogers[14] writes that many correctionists are forced to direct one hundred fifty speech-defective pupils each semester. Bunting and Hill state that there is evidence that cleft palate cases are becoming increasingly common.[15] Yet in 1930, The Children's Charter was drafted at the White House Conference On Child Health. A portion of Article 13 reads:

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[13]James Frederick Rogers, "The Speech Defective School Child", Bulletin of the Office of Education, United States Department of Interior, VII (1931), 6.

[14]Ibid, p. 8.

[15]Russell W. Bunting and Thomas J. Hill, Oral Pathology, p. 29.

> ... for every child who is ... physically handicapped ... such measures as will early discover and diagnose his handicap, provide him care and treatment, and so train him that he may become as asset to society rather than a liability. Expenses of these services should be borne publicly where they cannot be privately met.

With the limited finances and facilities of most state departments of health and with the scarcity of speech rehabilitation centers, the case of most cleft-palate patients is a lamentable one in 1946.

Etiology

Cleftness is the result of a failure, during the fetal stage, to unite the parts which make up the face. In the normal embryological process, all babies have cleft palate prior to the second month of gestation. Near the end of the eighth or ninth week of the life of the fetus, the parts should become perfectly united.

Numerous causes have been devised by investigators in an endeavor to learn of the prevention of cleftness. The one which appears to be the most convincing is heredity. The research upon this hereditary factor of cleftness by eminent surgeons and speech correctionists is imposing. Vaughan[16] writes:

> This is a well known predisposing factor; a large percentage of cases give a history of similar defect in the family. It is not uncommon to find one or the other parent with a cleft. Great differences in the ages of the parents are sometimes noticed.

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[16]Harold Stearns Vaughan, op. cit., p. 35.

Thoma[17] states:

> Heredity plays a considerable role in the transmission of this malformation. Saunders (1934) published a comprehensive paper on the subject. He found an hereditary factor in 44.5 per cent of the cases. Pérou (1930) reported syphilis among the parents in 35 per cent of his cases.

Orban[18] has written:

> Hare-lip is a hereditary malformation.

Stinchfield,[19] an outstanding speech correctionist of America, has said:

> Heredity certainly seems to play an important part in the incidence of palatal cleft.

However, the combined work of Gladstone and Wakeley[20] presents the opposing point of view:

> Divert inheritance of ante-natal deformities appear to be the exception rather than the rule. In 554 cases of hare-lip and cleft palate, we find only two in which it was recorded that the deformity was present in one of the parents.

Schröder, a Continental physician, has pointed out that in the last quarter of the nineteenth century and in the first quarter of the twentieth, the number of cases of cleft lip and palate for which a hereditary background could be safely demonstrated

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[17]Kurt H. Thoma, Oral Pathology, p. 263.

[18]Balint Orban, Oral Histology and Embryology, p. 31.

[19]Sara Stinchfield, Speech Disorders, p. 60.

[20]R. J. Gladstone and C. P. Wakeley, "Inheritance of Cleft Palate", British Dental Journal, XLIV (1923), 122.

TABLE I

SCHRÖDER'S [21] TABULATION OF THE HEREDITARY FACTOR AS A CAUSE OF CLEFTNESS

INVESTIGATOR	DATE	NUMBER OF CASES	PER CENT OF CASES SHOWING HEREDITY
Fritsche	1878	...	20.0
Stobwasser	...	...	5.7
Gotthelf	1885	...	7.0
Müller	1886	270	12.0
Haymann	1903	244	20.0
Haug	1904	555	12.0
Birkenfeld	1926	385	20.0
Eicker	...	69	24.0
Coenen	1931	180	20.0
Saunders	1934	392	44.5
Schröder	1935	75	42.7

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[21] C. H. Schröder, Untersuchungen über die Vererbung der Hasenscharte und Gaumensplate mit besonderer Berücksichtigung des Erbgangs, Arch. f. Klin. Chir., CLXXXII (1935), 299.

was much lower than the number reported by investigators since 1925. This fact is well shown in a tabulation of the data in Table I. No doubt the marked increase in recent years is partially due to the better methods of recording statistical materials. One might assume that many of the earlier data were compiled from memory while the later reports were taken from medical files.

Doctor Charles Mayo believes, and has said:

> There is a great principle involved in the causation of birth deformities, and it is one which should explain various types of deformities. As one observes birth defects or anomalies, it is apparent that many of them are normal conditions in some lower type of life, e.g., hare-lip, cleft palate, fissure defects, etc.
> Experimentally, changes in the salts in which the eggs of several of the lower forms of life are developed, lead to a certain percentage of anomalies. This is undoubtedly the reason why a high type of fish like the salmon, probably in an evolutionary state, leaves salt water to lay eggs in fresh water. Anomaly in the human embryo occur in variation of fluid, especially excessive quantity of hydramnion. It is most probable that the cause of embryonic deformities is due to changes in the salts of the amniotic fluid in which the egg is developed, just as it has been proved to be in the lower types of life.[22]

This thesis was affirmed by the experimental work of McClendon, Stoddard and others as reviewed by Dorrance.[23]

He states:

> Research on the larvae of anamniota indicates that injury or poisons acting on the growing larva will produce effects which vary according to the period of growth and the intensity of the injury inflicted, or poison administered.

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[22]William Lete Shearer, op. cit., p. 301.

[23]George Morris Dorrance, op. cit., p. 359.

All writers appear to be in accord with the fact that the changes in the chemical composition of the fluid in which the fetus develops will affect growth. Alterations of development have been effected by the use of various chemicals such as the salts of lithium, magnesium and extracts of certain of the ductless glands. Bunting and Hall[24] support this idea, also. Teagarden[25] believes in the theory of arrested development, yet she does not give its cause.

The concept is further developed by Miller[26] when he writes:

> When both the thyroid and growth hormone of the anterior pituitary are deficient during intrauterine life (either due to deficiency in the mother of the developing fetus) developmental defects may be seen, the extent of which will vary with the degree of deficiency. This results in the familiar cleft palate, cleft uvula, hare-lip, or, in mild cases, simply in a highly arched palate or indented posterior border of the nostrils.

Brophy[27] believes that congenital cleft palate has a "predisposing cause" and an "exciting cause". The former is hereditary while the latter is mechanical--the application of force in the embryo. The bones, having failed to unite at the correct developmental stage, have great pressure placed against them by the mandible which acts as a wedge forcing them further apart and thus widening the opening

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[24]Russell T. Bunting and Thomas J. Hill, op. cit., p. 32.

[25]Florence Teagarden, Child Psychology for Professional Workers, p. 45.

[26]Samuel Charles Miller, Oral Diagnosis and Treatment Planning, p. 419.

[27]T. W. Brophy, Oral Surgery, P. 237.

between them. Moreover, the pressure of the tongue and the flexed position of the head contribute to the force which is exerted by the lower jaw. During this period of development, the tongue is larger than it is at birth. Shearer[28] concurs with Brophy.

Stinchfield[29] states that unsuccessful attempts at abortions have also been given by some writers as a possible cause of cleftness. A contraceptive measure which fails may interrupt the normal development of the fetus with the result that the palatal processes will not fuse.

Shearer lists a number of other causes which may or may not contribute to the defect; in most instances he suggests additional research before too much credence can be given to each of the theories. Faulty metabolism, supernumerary teeth, uterine inflammation and "intervening mucosa in tooth formation" are possibilities. Prenatal impressions have been suggested by some writers, but most of the authorities look upon such ideas as charlatanry.

Hence, it would appear that heredity is a great factor in the etiology of cleftness, but since parents are so reluctant to give their true history it is often difficult to trace. The work of Schröder would lead one to believe that inheritance is of foremost importance as a cause.

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[28] William Lete Shearer, op. cit., p. 1451.

[29] Sara Stinchfield, op. cit., p. 59.

Frew[30] found with few exceptions that prospective mothers who did unusually heavy work for one in that condition had mal-formed children. The writer has found three such cases in the Wyoming clinic. There can be little doubt but that nutrition is an important factor in the etiology.

Incidence

> Among the white race the defect (cleftness) occurs without regard to geographical or tribal destinctions; it is rare among negroes.[31]

A number of interesting facts may be found in regard to the prevalence of cleftness. According to Lyons there is a high incidence among the Finns whereas it is almost unknown with the aboriginal Pacific islanders. During World War I it was noteworthy that Vermont had the highest incidence of cleftness of any state for men who were drafted, one in each 645 examined.

There is evidence that clefts are becoming increasingly common. Saunders, in Holland, noted a marked increase in a recent study which covered a forty year span. The data compiled by Probelius in 1865 showed a much lower incidence (1 in 1,538) than the average of the European data presented since 1920 (1 in 1,014).[32] The material in Table II gives

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[30]William Lete Shearer, op. cit., p. 1447.

[31]Harold Stearns Vaughan, op. cit., p. 36.

[32]Kurt H. Thome, op. cit., p. 259.

evidence of the variety of statistics.

In 1930, a classification was made of 3,017 children who were speech-defective and who were enrolled in the Philadelphia schools. Only two cases of cleftness appeared. In another survey of 16,213 cases of speech-defect by the Department of Speech Improvement of New York City in 1928-1929, organic defects made up 5 per cent (this included cleft palate, hypertrophied tonsils, etc.)[33]

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[33]James Frederick Rogers, op. cit., p. 7.

TABLE II

THOMA'S[34] TABLE OF INCIDENCE FOR CLEFTNESS

RACE OR NATION	FREQUENCY	INVESTIGATOR	DATE
Negro Race	1 in 1,788	Davis	1932
Germany	1 in 900	Grenser	1864
	1 in 1,000	Günther	1931
France	1 in 1,022	Créde	1890
	1 in 942	Pérou	1930
England	1 in 1,800	Rose	1891
Sweden	1 in 960	McEackern	...
United States	1 in 800	Cooper	1945
	1 in 915	Davis	1932
	1 in 1,200	Vaughan	1940
	1 in 2,000	Lyons	1930

[34] Kurt H. Thoma, op. cit., p. 259.

Intelligence

Is the cleft palate child below average in intelligence? This question is not answerable as data on a large group are not available. A high incidence in cleft palate is found among the feeble-minded but this group may be offset by the number of cleft palate children with superior intelligence. Very often a cleft palate child appears stupid because of his inability to make himself understood and also because of his general unwillingness to make an attempt at speech. It is logical to believe that the chronic respiratory infections that most cases have, would deplete the vitality to such an extent that mental as well as physical endeavors would be met with disinterest.

Parker[35] states:

> It is certainly very unusual to find a child grossly defective in speech and normal in intelligence.

Travis[36] agrees, with:

> A great many patients with organic disorders of articulation are mentally defective as well.

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[35] H. T. Parker, Defects of Speech in School Children, p. 69.

[36] Lee Edward Travis, Speech Pathology, p. 205.

Dorrance[37] writes:

> It is not unusual to meet a cleft palate individual with a mentality below par.

It is thought by some that anomalies of the brain accompany anomalies of the palate. Many believe that the speech centers are not all together normal in most cleft palate patients. Yet in direct opposition to this theory, each year one finds cases with high degrees of intelligence presenting themselves for surgery.

The St. Paul Experiment proved to be a revealing one in regard to intelligence. Binet tests were given to all the speech defective children in the St. Paul schools. Statistics show that this number was about one per cent of the school population. The results showed that such children were neither duller nor brighter than other children. The median I. Q. for 402 pupils was 97.7.[38]

Sex

All of the researches available concur in one point--that the male is the more subject to these deformities. Miller, quoted by Padgett,[39] found in 270 cases of cleftness a distribution of

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[37]George Morris Dorrance, op. cit., p. 441.

[38]Margaret Lima, "Speech Defects in School Children," Mental Hygiene, II (1927), 785.

[39]Earl C. Padgett, Surgical Diseases of the Mouth and Jaws, p. 237.

170 boys and 100 girls. In a series of 724 cases of lip and palate clefts, there were 409 boys and 315 girls. In a series of 166 cases of cleft lip only, there were 102 boys and 64 girls. Thoma[40] agrees, and states further:

> The hare-lip is more common in males than females and occurs three times as often on the left as on the right side.

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[40] Kurt H. Thoma, op. cit., p. 263.

CHAPTER II

The purpose of the Study

The purpose of this study is to compile certain data in regard to cleftness and to show how the first ten cases enrolled in the Wyoming Cleft Palate Clinic measure, in a comparative manner, with the previous research.

Related Studies

In 1942, a study was begun at Pennsylvania State College in speech rehabilitation. The enrollment consisted of ten cases of stuttering, two of defective articulation, one case of cleft palate speech, and one hard of hearing case. The cases ranged in age from fifteen to twenty-eight years. This study, by Backus and Dunn,[1] evolved from the results experienced in a general speech clinic of university students. According to the writers, there were two aims which governed the development of the six-weeks program: to obtain the maximum amount of speech improvement and of social adequacy. The pupils attended the clinic for six hours a day and for five days each week. The daily schedule consisted of an hour each of individual instruction, club meeting,

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[1] Ollie L. Backus and Harriet M. Dunn, "Experiments in the Synthesis of Clinical Methods Into A Program of Rehabilitation," Journal of Speech Disorders, IX (1944), p. 1-18.

relaxation period, group speech class, discussion groups in which problems of mental hygiene were presented, and speaking projects outside the clinic.

In their concluding comments, Backus and Dunn state:

> This is a preliminary report and should in no way be considered the one and only answer to problems involving clinical practice. The presentation is made at this time, however, in the hope that the information will be useful. The results obtained so far offer convincing evidence that synthesis of numerous techniques into a clinical program produces a result far greater than the mere sum of the parts. We believe that the result can truly be called rehabilitation.[2]

A bulletin was published by the State Department of Education, Wisconsin, in 1944, which was concerned with the problem of cleftness. The pamphlet was written by Dr. Charlotte G. Wells,[3] assistant professor of speech at Mount Holyoke College, Massachusetts. During the summers of 1943 and 1944, she worked with some cleft cases, however neither the number of patients nor the nature of the experiment was given. The bulletin is designed as a handbook to assist teachers and parents in helping with the speech training of cleft palate children. The approach is elementary and non-professional.

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[2]Ollie L. Backus and Harriet M. Dunn, op. cit., p. 17.

[3]Charlotte G. Wells, "A Teacher-Parent Guide to Speech Training for Cleft Palate Children," Bulletin of the Department of Public Instruction, Bureau for Handicapped Children, Series 1500 1-45 (1944), p. 1-42.

Founding the Wyoming Clinic

In the winter of 1943, the director of public health for Wyoming came to the State University asking that a clinic be operated the following summer for children with cleftness. After the administrative procedures were cleared through the proper channels, the clinic was ready to receive applications for enrollment.

Five cases of cleftness appeared for the first session; eleven came for the term in 1945. These children were told of the clinic by the welfare workers of the state, the traveling physio-therapist, and by state representatives of Special Education and Health Departments. The State of Wyoming, through its various agencies, does remarkably well in keeping informed about the presence of such anomalies as cleftness. As soon as a handicapped child is born and registered, state authorities begin immediately to make plans for necessary surgery, special education and adequate medical attention. If the parents of the child are unable to finance it, the state assumes the burden.

The clinic was to be for post-operative cases only. From five to nine operations are often required to close the fissure. If children come for speech re-education before they have had all of their surgery performed, it is necessary to learn new compensations for the impaired sounds after the final operation. If no plan of speech re-habilitation is offered to such cases, the speech will be as nasal as it was prior to the operations. Most surgeons realize that the success of their operations is partially

measured by the improvement in the speech of the cleft palate patient. Hence it is not surprising to learn that most doctors will agree with Green[4] when he says:

> The surgeon should feel a further responsibility, in cases in which speech training is indicated, to refer the patient to a competent clinician for such training as early as possible.

Housing

The county welfare workers accepted the responsibility of housing and caring for the children while they were not in the clinic. The children were placed in private homes in order that the enviroment would be much less institutional. Not more than two were allotted to one family; all of the relative expenses were paid by the state. The case workers endeavored to find homes into which the patient could be easily assimilated and could be made to feel a part of the new family group. The majority of the children came to the clinic alone; all of them were met at the train or bus and taken to their new homes. As most of them had been away from their own parents much of the time, because of the long periods of hospitalization, they adjusted readily. Conferences were held with the "foster-mothers" to assist them with attitudes toward the patient, the type of food

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[4]James S. Green, "Speech and Voice Disorders Due to Oral and Laryngeal Defects," American Academy of Ophthalmology and Ololaryngology, XIV (March-April, 1945), p. 212.

needed and the supervision which should be given. Without exception, the foster-home plan worked wonderfully well as a normal plan of living.

Recreation

All of the children in the clinic had supervised recreation during their stay. The University Preparatory School, located in the building just adjacent to the clinic, offered art, music, swimming and supervised games to the children daily. Picnics, strolls on the campus and group activities helped with the problem of social adjustment to the group.

Preliminary Testing

Each child was required to have a medical clearance-slip from him home doctor. This was necessary in order to avoid an epidemic of some children's disease before thephysical examination could be given at the clinic. During the first week each individual was given the Schoolfield Speech Test, the Binet Intelligence Test, the Travis-Rasmus Test for Sound Descrimination, a laterality test, and a test of motor dexterity. After the child had adjusted Himself to the routine of his new enviroment, a complete physical examination was given to him at the infirmary by the university physician. Every parent was informed of the results of all of these tests.

Group Results of the Testing

Each of the cases mentioned in this study was given a name with the same first initial as that of the Christian name of the patient. The code numbers were taken from the files of the Wyoming Speech Clinic. Personal scores may be found in Chapter III. Sound predictions cannot be made upon the data compiled from ten studies, but tendencies are shown here which are indicative of what further research may reveal.

The following comparative results are evidence of a trend which may be of value in future investigations. The St. Paul Experiment (p. 17.) gave a median I. Q. of 97.7 for 402 speech defective children. This study reveals a median I. Q. of 98.8 (Table III), suggesting that the intelligence of cleft palate children is about the same as that of the general caption "speech defective" children and that both of them compare favorably with normal youngsters.

The researches of Müller, Padgett, Thoma and many others show (p. 17) that the male is more subject to these anomalies than is the female. In this study, 70 per cent of the cases were found among the boys.

Vaughan (p. 8.) mentions that the age of the mother at conception and the differences in the ages of the parents may be important factors in etiology. This study shown that 27.3 years (Table IV) was the median age for the mothers when the cleft palate children were born. In 1943, the vital statistics records show that the age of the mothers at which there was the

TABLE III

COMPARATIVE TABLE SHOWING INTELLIGENCE QUOTIENT

	Case	I.Q.
1.	Jane	128
2.	Mary	116
3.	Jim	115
4.	Ward	112
5.	Ann	108
6.	Ray	96
7.	Louis	84
8.	Tom	80
9.	Jerry	78
10.	Harry	72

Average I.Q. 98.8

TABLE IV

COMPARATIVE TABLE SHOWING THE AGE OF THE MOTHER WHEN THE CLEFT-PALATE CHILD WAS BORN

	Case	Age in years of mother at birth of child
1.	Louis	38
2.	Harry	32
3.	Jerry	32
4.	Ray	31
5.	Mary	30
6.	Ward	30
7.	Jane	26
8.	Jim	26
9.	Tom	25
10.	Ann	23

Average: 27.3 years

highest incidence of birth in Wyoming was somewhere between twenty and twenty-four years. During 1943, in Wyoming there were 6,822 children born, 2,989 being males and 2,833 females.[5] Mothers between the ages of twenty and twenty-four gave birth to 2,005 children, 1,036 being males and 969 females. The latter group represents about one-third of the children.

According to the Robert M. Woodbury Tables of Weigh-Height-Age,[6] the cleft palate cases were all underweight (Table V) with a median of 7.8 pounds. These tables are approved by the Children's Bureau of the United States Department of Interior.

The median age of the group was 9.7 years. The median systolic blood pressure (resting) was 107.2 (Table VI) in millimeters of mercury. Normal pressure is about 100 for the average child.[7] Normal pulse (resting) is about 85 strokes for this age,[8] while the cleft palate group (Table VII) had a median of 72. Hence, one sees that with this group of cases, there was a tendency for the blood pressure to be super-normal and the pulse sub-normal.

A number of other interesting data was revealed. About seventy per cent of the cases were right-handed. There were twenty per cent with genatalia deformaties. Defective hearing was found with thirty per cent, while defective vision appeared in forty

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[5]Halbert L. Dunn, Vital Statistics, II, p. 81.

[6]Jean Bogert, Nutrition and Physical Fitness, p. 559.

[7]Carl J. Wiggers, Physiology, Health and Disease, p. 656.

[8]Ibid, p. 515.

TABLE V

COMPARATIVE TABLE SHOWING THE NUMBER OF POUNDS UNDERWEIGHT THE CLEFT CASES WERE[1]

	Case	Pounds Underweight
1.	Harry	20
2.	Tom	18
3.	Jim	7
4.	Mary	7
5.	Jane	6
6.	Ray	6
7.	Ward	5
8.	Jerry	4
9.	Louis	3
10.	Ann	2

Average: 7.8 pounds

[1] Scaled to
The Robert M. Woodbury Tables
Children's Bureau
United States Department of Interior

TABLE VI

COMPARATIVE TABLE SHOWING RESTING BLOOD PRESSURE (SYSTOLIC)

	Case	In millimeters of mercury
1.	Jane	120
2.	Ward	110
3.	Ann	110
4.	Harry	110
5.	Jerry	110
6.	Tom	110
7.	Jim	102
8.	Ray	100
9.	Louis	100
10.	Mary	100

Average: 107.2

TABLE VII

COMPARATIVE TABLE SHOWING RESTING PULSE OF CLEFT CASES

	Case	Strokes
1.	Louis	88
2.	Mary	80
3.	Ann	80
4.	Jerry	72
5.	Jane	72
6.	Ward	70
7.	Tom	70
8.	Jim	68
9.	Ray	64
10.	Harry	56

Average: 72 strokes per minute

per cent of the cases. Temperature charts were kept the first term of the clinic. There was marked tendency for the cleft palate child to run about one degree sub-normal in temperature. Further research should be done with this factor.

There was only one instance of premature birth. The average number of siblings was 2.3 children. There was only one instance where the cleft palate child was the only child in the family and, with but one exception, the cleft palate child was the last pregnancy of the mother.

Methods

When one visits a hospital corridor allocated to cases of cleftness, he senses what the oral surgeon has long recognized--these cases are not for the surgeon alone. By the time the patient has reached five years of age, he knows the taunts of his playmates and the curiosity of those who pass him upon the street. He senses the bewilderment of his parents who seem to be unable to reconcile the affliction and who have the "why-did-this-have-to-happen-to-me" attitude. He notices that he is different from his brothers and sisters in other respects, also. His respiratory system seems to have chronic infections; often there are disorders of the middle-ear. His teeth are stunted and malformed. The world looks upon him as being a "queer child".

The personality of such a child presents a challenge to any clinician. Here is one in whom a sense of security must be developed. He must learn to take an objective attitude toward

his problem and develop a certain poise to meet critical emotional situations. He must build a confidence within himself and develop an assurance that he can make his speech intelligible. These are some of the goals that the surgeon leaves to the clinician. "From the patient's standpoint," writes Dr. George M. Dorrance, "any operation on the palate is judged by the improvement or lack of improvement in his speech."[9]

The specific methods which the clinician uses will depend upon the age, intelligence quotient, motor dexterity, emotional stability and the adaptability of the cleft palate patient. The goal for the clinician is the best speech of which the patient is capable.

Small children profit by the oral reading of stories by the clinician. Creative dramatics gives an opportunity to utilize the content in conversational form. A period of ear training, accompanied by simple pictures, gives the child the opportunity to understand clearly what he is to do before he is asked to try it. After such training, the child should be able to identify such sounds as are used in the Travis-Rasmus Test of Sound Descrimination.

The breathing of the cleft palate child is usually spasmodic and non-rhythmical. The breath stream seems to be difused in the pharynx; the child appears to have little control of the column of air as it is directed into the oral and nasal cavities.

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[9]George M. Dorrance, "The Push-Back Operation in Cleft Palate Surgery," Annals of Surgery, CI (1935), p. 445.

Koepp-Baker[10] writes:

> Because of the absence of a solid wall between the nose and mouth cavities in such cases, all speech sounds are resounded in the nose and mouth simultaneously, and hence, all sounds become nasal as well as oral. Since it is also impossible to completely shut off the mouth cavity for the production of the plosive sounds, these sounds, too, are either completely absent from the speech of the cleft palate patient, or badly defective. Often the patient attempts to compensate for this by contracting the facial muscels about the nostrils in an effort to close the nasal passages so that some semblance of the plosive sounds may be achieved.

The clinician must develop exercises for each case so that the patient may build up the pressure from the diaphram and then send upward a steady, slow breath-stream of air which may be used as power and material for speech. The child will profit from many types of exercises for palatal control. He will enjoy blowing light-weight balloons, soap bubbles, ping-pong balls across a table, pinwheels, or paper flags. If he can do these things easily, he should practice more difficult exercises such as blowing through a tube against airpressure, playing a small harmonica or a "tonette". Any exercise involving blowing produces a high elevation of the palate and a tight bunching together of the walls of the nasopharynx. Swallowing and yawning (sometimes stopping mid-way in the procedure) give the child the "muscle tone" of throat closure. Older children are often interested in seeing if a cold mirror held under the nose remains unclouded as they inhale and exhale quickly. Vocal exercises which contain no "m", "n" or "ng" sounds are effective in checking the progress.

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[10]Herbert Koepp-Baker, A Handbook of Clinical Speech, p. 238.

When the child learns how he may control his breathing and the closure of his throat, he is ready to work with exercises to develop lip and tongue agility. If the tongue is normal, he learns to exaggerate such movements as those used in pointing, dotting first the palate and then the lips, bulging the blade, raising or lowering the back of the tongue, the blade or the tip. It is best to begin the articulation drills with the labial consonants. The child needs to realize that much of his success in making his speech intellibible will depend upon the use he makes of his tongue, jaw and lips.

A battery of lip exercises needs to be developed for cleft cases in order that they may learn to utilize the muscles which they have protected so long. It is only natural that they should avoid movement of that portion of the face upon which the surgery has just been performed. Thus a habit is established during the convalescent period which is difficult to overcome.

Mal-occlusion of the jaw makes it almost impossible for some cleft cases to block air; as a result, most of them have sigmatism. Compensatory movements of the tongue, lips and cheeks must be learned to accomodate the lack of teeth of the mal-formation of them.

The clinician cannot overlook the problems of motivation, psychological re-adjustment and social integration. With the advancement in surgery, the clinician will have vastly improved conditions with which to work. The speech correctionist can hope that all post-operative cases will be free from nasality but such cannot be true; however, the methods of instruction

used will help the patient to intelligibility. Progress is slow, but perhaps the results are more rewarding than in any other single branch of speech correction.

Teacher Training

> In all national school systems, provision has been made for the careful training and selection of teachers.... The Prussian government early realized that the success of their public schools depended more on the quality of the teachers than on any other single factor. Hecker has established a private seminary for training teachers as early as 1738. Under Frederick the Great it became the Royal Teachers Seminary with a government subsidy, and by 1800 there were a dozen of these "pedagogical seminars". In 1809, as a result of Pestalozzian influence, a Teachers Seminary was organized at Leipzig, the first to be established as an integral part of the state school system.[11]

Early in the twentieth century, the spirit of scientific experimentation began to push its way into the thinking of educators. The scientific determinist insisted that all educational problems be approached in a scientific manner and that all the investigations must be made in the scientific spirit and by employment of the scientific method. The objectified study of the child led to many developments which made the school systems adjust more carefully to the needs of the individual pupil. It was during this period that specific rooms were designated for problem cases and that special classes were established for those who were defective in speech.

An important phase of the Wyoming experiment with cleftness was concerned with teacher-training. Fourteen university students were enrolled in the first class and twenty-six in the second one

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[11]Elmer Harrison Wilds, The Foundations of Modern Education, p. 441.

that was offered. The clinician spent three periods a week lecturing on historiography, etiology, therapy, mental hygiene and social intergration for the speech defective. Each student worked four hours a week in the clinic as required procedure; many spent most of their free periods observing, assisting and instructing. One laboratory hour was spent by the student observing a demonstration class by the clinician with the group; another hour was spent observing the clinician working with a special case; another period was spent directing social activities or creative dramatics while the fourth period might be spent as the student wished. By the middle of the term, the students were doing supervised teaching. Clock hours spent by the student in the clinic were kept on time-cards in the clinician's office.

When special problems arose, the class period was sometimes used as a conference room to learn the re-actions of all the students to the difficulty. Emphasis was always placed upon the concept that the result was much more important than the method by which the outcome was achieved. The approach was always one of adjusting and working with the "whole child".

A few simple principles emerged from a conference with a primary teacher one day:

1. Pause and smile.
2. Good posture--erect and relaxed.
3. Watch the point of eye-contact with child.
4. Be heard easily.
5. Pronounce words distinctly and correctly.

6. Watch voice quality.

7. Be spontaneous and enthusiastic.

These tersely stated points make up a part of the speech teacher's psycho-theraphy with children. Gifford[12] has written:

> All teachers who do speech correction work should have, besides a knowledge of the physiology of the organs of speech, a knowledge of speech drill and a thorough training in behavioristic psychology and the psychology of emotions.

Rogers made a survey in 1931, in regard to the success of teachers who worked with students who had cleft palates. In the public school systems of fifty-four cities where cleft palate cases were taught, fifteen reported that the work was accomplished with "fair" results.[13] Nineteen cities reported that the results from the instruction were "good", while nine reported that the cases "improved". The remaining group of cities made no report in regard to the success of the teaching. If more teacher-training were offered in this special area, one would be safe in predicting that the statistics would read differently.

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[12]Mabel Gifford, Speech Defects and Disorders, p. 24.

[13]James Frederick Rogers, op. cit., p. 8.

CHAPTER III

The following case studies are presented to show the true "gestalt" of each patient. The inheritance, the developmental history, the personal background, the educational progress and the social integration are all important factors in the speech personality. Emphasis in clinical work must be placed upon helping the patient to live as normally as he is capable of living. Individual defects must be treated individually. Allen[1] has written:

> Therapy is concerned with a process and must give full recognition to the essential participation of the patient in the process.

In all treatment, the personality of the child must be given due consideration. Remedies must be directed at causes. Treatment for a defect must be progressive and must be developed in stages, if the clinician wishes to meet with any success.

The case of Jerry

The case of Jerry (code number, Z-1, from the Wyoming Clinic files) is one of unfortunate background, low mentality and social insecurity. He was born November 25, 1935, in Des Moines, Iowa. The mother who was thirty-two years old at the time, had no medical attention during pregnancy and was attended, during the birth of Jerry, by a student from the Still College of Osteopathy. The husband had deserted the mother, making it

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[1]Frederick Allen, Psycho-therapy with Children, p. 46.

necessary for her to find employment as a house-maid where she did much lifting and other such heavy work. This is objective evidence for the Frew theory mentioned earlier.

At birth the anomaly of complete cleft of the soft palate and one-half of the hard palate was evident, but surgical repair was not effected until much later. The developmental history of the child was sub-normal. He was five years of age before he was able either to dress himself or to say simple words. He has always been right-handed. During the entire time at the clinic he ran a super-normal temperature which averaged 99.2 degrees. His illnesses included whooping cough, pheumonia (three times--at two months, five years and seven years of age), measles, German measles, mumps, enlarged gland, earaches and frequent colds. On May 22, 1942, he had his cleftness corrected by operation in Denver, Colorado. In 1943 a tonsillectomy was performed; in 1944 an operation for hernia; and on January 31, 1945, he had a large mass of adenoid and lymphoid tissue removed from the region of the Eustachian tube. His hearing is still defective. The examining doctor at the infirmary recommended that an endocrinologist be consulted in regard to a genetalia abnormality.

Jerry's mentality is sub-normal; the psychology department of the university placed his I.Q. as 78, but an earlier test had given it as low as 64. He was sent to a kindergarten at the age of f ve and entered the first grade the following year where he has remained. Each year he has been placed in the first grade and each year the teachers have been unable to cope with him because of the discipline he requires, hence each year he is asked

to leave school. The mother will not recognize that Jerry is mentally as well as physiologically handicapped and thus needs special training. She continues to say that he does his work well in school and that the teachers do not understand him nor have they any patience with his problems. The county welfare worker has stated that he is not yet a community problem as his mother is able to keep him with her most of the time even though she is working in various homes at house-work.

Many marital problems between Jerry's parents have created for him a background of social maladjustment and insecurity. The father married again and took the two eldest children to rear. While he had them with him, the eighteen year old girl was committed to the state home for delinquent girls because of prostitution and the sixteen year old boy was arrested twice for petty larceny and once for stealing an automobile. The father, later, sent the two children to live with Jerry and his mother. The four of them then shared a one-room house. Jerry often went with his older brother while the mother was working. It is needless to mention the behavior problems which followed for Jerry.

The Schoolfield test revealed that the sounds which caused the most difficulty were "c", "h", "s", "g", "r", "t", "ch", "th" voiced, "th" unvoiced, the "k" and "j". A number of sound substitutions were made such as "k for t", "w for r", "k for p", "f for j". With final retesting, he had mastered "ch", "st", "w", "t", "h", "l", "s", "f", and "j". There were other sounds of which he was fully aware, yet he would produce them only

when speaking quite slowly or when someone was near to remind him to use the correct method. When the technique can become habitual, then it becomes unobtrusive and may be assimilated as a part of free conversation.

As to prognosis, with much understanding and patience on the part of the clinician, Jerry should master most of the sounds which he finds difficult. Because of his low mentality, his attention span is too short for much retention. Repeatedly he demonstrated that he could make the sounds, yet the following day he could not remember them. Jerry thrives emotionally upon attention and sympathy; he needs companionship among children his own age to build his self-confidence. He has a tendency toward laxness and indifference unless prompted and often much firmness had to be exercised. Since he is unable to read or write now, his ability to speak intelligibly is even more necessary in order that he may find a place for himself in society.

The case of Jim

The case of Jim (code number, Y-2, from the Wyoming Clinic files) has been one of great interest. He was born December 24, 1936. The mother, who was twenty-six years old at the time, was in poor health during the entire pregnancy and had "very little medical care" according to her statement. When the mother was asked to give information relative to the patient's problem, she said: "I was in very poor health and worked hard. The doctor said there was a lack of something, and it failed to meet." Again, one sees the Frew theory objectified.

There was a complete cleft of the hard palate at birth and hare-lip. At the age of eighteen months, his first operation was performed upon the lip; very little scar tissue remains. Four successive surgeries were then performed upon his palate, one every twelve months. In June 1944, the sixth operation was performed at the Shrine Hospital of Salt Lake City, Utah, to close a small opening at the junction of the hard and soft palate. His illnesses include measles, mumps and rickets. Jim's resting pulse (68) and his systolic blood pressure (102) are both sub-normal. Jim is right-handed. He was about ten pounds underweight; hearing and vision were normal.

Jim has above average mentality; his I.Q. has been placed at 115. He enrolled in school in September 1943, and has attended regularly since. He has an academic average of 90 in his school work. He is extremely cooperative and is interested in all that will make his speech normal.

Jim has very strong fears and prejudices. He has an intense hatred for his father. An incident will illustrate this. The clinician was in the office alone when Jim came in to chat. As it was the first week of the correction work, the clinician thought that the boy was lonely. The conversation started:

Jim: "Do you have any little boys?"
Clinician: "No, Jimmie, I have none."
Jim: "Well, I wish you were my daddy!"
Clinician: "Why, Jimmie, you remember all the good things that your father has done for you."
Jim: "Well, I would like to know what they are--he beats my sisters and me--and he won't give mama any money when he has some--and then he ran away and left us and I hate him, I HATE HIM!"

Of course, such scenes should be avoided according to certain psychological theories, but it serves to show how emotionally disturbed some youngsters become. The clinician thought that there might have been an unfortunate experience at home, just prior to the boy's leaving, which had grown to unreasonable proportions in the boy's thinking. The county case-worker in Jim's home town later said that the father would often take the little boy to all the bars, so that when the father was too intoxicated to find his way home, the lad might lead him! All of the children begged the mother to leave the father. Sometime later, he joined the maritime service but failed to support the family. He received a dishonorable discharge. The mother was able to secure some financial backing from a men's service group that had helped to finance the operations upon Jim's palate. With this limited capital, she opened a small cafe where Jim washed dishes and often served the customers. He overcame any embarrassment that he might have had about his speech. By personality, Jim is very pleasant, aggressive, friendly and communicative. He has always enjoyed associations with older people, possibly because they were more sympathetic but predominately because he is an "old" little boy.

In his first Schoolfield test, the "th", "s", "z", "st", and "j" sounds were poor in both initial and medial positions. His final "f", "dl", "tl", "s", "st", and "j" sounds were faulty. Jim was most cooperative in every exercise that he attempted; he was gratified with the resulting improvement. He was most interested in learning to play the "tonette", which was for the purpose of directing air into the oral cavity rather than the

nasal tract. Numerous exercises were given Jim to lift the soft palate and thus close the naso-pharynx. Final testing revealed that the "s", "j" and "th" sounds were still impaired. The pitch of his voice was quite high and the nasality pronounced.

The prognosis for Jim is encouraging. Because of his intelligence and his strong desire to overcome his handicap, his progress is rapid and his retention excellent. Although his speech will possibly always have a certain degree of nasality, he will have intelligibility and an excellent chance of a well-integrated life.

The case of Jane

The case of Jane (code number, X-3, from the Wyoming Clinic files) is possibly the most difficult from the point of impairment. She was born July 14, 1934. The mother was twenty-six years of age at the time and the father thirty. The mother was under medical attention during the pregnancy. The type of delivery was breech. The anomaly at birth was a complete cleft of the palate and hare-lips, both upper and lower. The first operation was performed upon her lower lip when she was one month old. Subsequent operations were performed in 1934, 1935, 1937, and 1943. At the present, the cleft palate is partially repaired, the lower hare-lip is closed but a fissure still exists on the upper lip. Second degree scar tissue is found upon both lips. Her illnesses include whooping cough, chicken pox, influenza, measles, mumps and earache. The Snellen Type vision tests give a 20-20, 20-100 deficiency which is corrected with glasses.

Jane has had orthodontia for several years. The musculature of her tongue is unresponsive as well as that of her upper lip. Jane gives the appearance of one who is exceptionally healthy; other than sight and cleftness, her physical condition is excellent.

The Binet scale places her I.Q. at 128. Upon meeting Jane, one immediately senses her superior mentality. She was enrolled in kindergarten at the age of five and is now in the sixth grade. Her academic scores place her in the upper-most quartile. Her own innate ability combined with a good home environment and an understanding associate have already enabled her to overcome many of the speech habits commonly found among cleft palate children.

Her mother died when Jane was two years old. At first her father was quite attentive to the child and was willing to do everything that was possible for her progress. The father remarried. Now Jane has two half-brothers. At the present, the father finds it difficult to give money and time to Jane's handicap because of his other children and the attention which he feels is due his wife. The patient does not receive the care she should, mainly because the step-mother is interested in her own children at the expense of Jane's complete recovery.

Jane has two maternal aunts who take an interest in her and supply the good home environment and understanding family relationships which ordinarily come from the father and mother. Her exceptionally high mental development leads her to rationalize the problem and make adjustments. Jane is strikingly capable and extremely independent.

The speech diagnostic test showed that she needed help with "m", "w", "f", "th" unvoiced, "t", "fl", "sl", "sp", "scr", "spr", "str", "tr", "s", "sk", "sm", "sn", "sp", "st", "fs", "ls", "ts", "sts", "qu", "squ", "x (ks)" and "x (gs)". Exercises were given her in relaxation, breathing, movements for lip, tongue and soft palate agility. There is a high percentage of nasality in her speech. Jane has learned to soften her pitch and thus reduce the strident quality of her conversation. Final testing showed that her "f", "th", "spl", "scr", "sk", "sp", "sts", "squ", and "x" sounds were still impaired. Drill sheets were constructed for her in these sounds which she may practice at her home. She understands the mechanics of what she is doing and can now employ methods of self-correction.

Jane is well-integrated socially; she likes people. She accepts speech correction kindly and displays initiative with whatever drill she attempts until she finds satisfaction with the sound produced. When all of her surgery is consumated and she has had time for speech rehabilitation to become habitual, the prognosis for Jane will be satisfying.

The case of Ray

The case of Ray (code number, W-4, from the Wyoming Clinic files) is one wherein the patient has learned many compensatory movements to make his own speech appear more normal. Ray was born April 22, 1937. His mother was thirty-one years of age at his birth; there are two other siblings, both being older sisters. At birth the anomaly was found to be hare-lip of the upper lip

and a cleft palate. Surgery was performed at the Shrine Hospital in Salt Lake City, Utah. Whooping cough and measles were his only child illnesses. The surgery upon his upper lip was most successful; very little scar tissue remains and practically none of the musculature is severed. Ray has learned to use his lips in a manner that is in keeping with normal speech. His appearance is not marred by the operation.

Ray has an I.Q. of 96 according to the Binet scale. When these data were compiled, he was in the second grade. The teacher reported that he was not self-conscious about his speech. She had made no attempt to help him overcome his tendency toward nasality. She mentioned that he did quite well in school and that he read much better than did the average pupil of his age. The laterality tests showed a definite tendency toward right-handedness. The manual dexterity tests gave evidence of the splendid control that he had over the large muscular movements of the body.

The Schoolfield test revealed that the "th" sound was the only one that was impaired. When the retesting was made at the end of the term, the assistant found that "p", "b", "sh", and "th" were faulty! The clinician was alarmed over the apparent retrogression of the case's speech. The clinician made the next test to learn that all of the sounds were correctly made, including the "th" one. The assistant had failed to establish rapport with Ray, hence the discrepancy. Ray thought it great sport!

Several medical points should be mentioned. Ray's whole

nasal structure appeared to be widened and flattened through the entire length. There was a hardened wax obstruction at the left tympanium. Poor convergence of the eyes was noted with color perception, but not with ordinary vision which was 20-20 by the Snellen Type test. Ray has mal-occlusion; the upper incisor teeth were widely spaced and were at such an angle as to produce an over-bite. Systolic blood pressure (100) and resting pulse (64) were both sub-normal. Rales were apparent in the chest. Reflexes were all normal.

Ray has a pleasant personality. He is usually cooperative, yet sometimes is quite determined and opinionated. He is willing to follow a task through to outcome if he knows the purpose and the underlying reasons for the task. Although he is aware of the need for improving his speech, there may be some question as to the transference into social situations.

Since Ray can make all the necessary sounds, the duty of those who work with him will be to implant the speech habit to automatism.

The case of Louis

The case of Louis (code number, V-5, from the Wyoming Clinic files) is one of negativism. Louis was born June 12, 1939. At the time of his birth, the mother was thirty-eight years of age and the father was fifty-nine. There are two siblings, a brother twenty-one and a sister twenty-four. Hare-lip and cleft-palate were congenital. When Louis was six weeks old, the repair work upon his lip was effected. His palate was re-

built when he was eighteen months old. Thus far he has had tonsilitis, whooping cough and the mumps. His developmental history was normal; he could hold his head erect at two months, crawled at six months, walked at ten months, fed himself at one year and was able to dress himself at the age of three. Several childhood problems have presented themselves such as excessive nervousness, nightmares, enuresis, undue shyness and peculiar food habits.

A Binet test established his I.Q. at 84, but the psychologist recommended additional testing when the child is older as rapport was difficult to secure. At the age of five, he was enrolled in kindergarten, but the teachers had trouble in getting the boy's cooperation and admitted that Louis was something of a problem. Negativism is apparent in any group situation. The Metropolitan Reading Readiness test was given to him May 16, 1945. His score was 17, which gave him a PR of 1.

The university physician was unable to get any oral response from him during his physical examination. He responded to sights and sounds only by a change of posture; there was a change of expression to thermic stimulations. His resting pulse (88) was a bit higher than normalcy, but his systolic blood pressure was correct for one his age.

With this case it was thought wise not to use the Schoolfield test. At first he refused to talk with anyone, but in about two weeks he was quite willing to repeat words after the clinician. As his attention span was so short, all types of

motivation were needed to secure his cooperation. His speech exercises needed to be varied and to include much motor activity. At the outset, most of his speech work originated with the naming of objects in pictures or objects with which he played. Toward the end of the term, he delighted in showing guests in the clinic the things he had learned to say and do.

There were so many tensions in the youngster, that it was often necessary to lay him on a couch and give the Jacobson Relaxation[2] before the speech work could begin. The labial sounds of "p", "b" and "m" were used as the beginning for development of the lip muscles, followed by the labiodental sounds of "v" and "f" and then the dental sounds of "t", "d" and "n". He had protected the scar tissue upon his lip until he had established a habit of lip immobility. Stimulation must be strong before he would make an effort to pronounce any of the sounds requiring labial movement.

Physically he seems to be average, but emotionally he is not developed as well as the normal child of his age. He is not interested in group activities among his peers. According to the kindergarten teacher, he has temper tantrums and such a short span of attention that he will never remain long with a task. Part of his anti-sociability could be attributed to the fact that he lived upon a farm for a number of years and had no chance to play with children his age.

Two years ago his father died and Louis went to live with

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[2]Edmund Jacobson, You Must Relax, pp. 1-160.

his elder sister. The mother took a job in a restaurant as waitress and is able to see the child about twice a month. The married sister has two children, ages four and six, with whom Louis will play. The two children often ridicule his speech, but he gives no outward appearance of its bothering him.

Possibly Louis will not show much improvement until he can develop a consciousness of his defect and a desire to improve his speech. It took some time to gain Louis' confidence and to arouse any desire in him to talk. He has gained slight control over the use of his tongue. Much social adjustment is needed, as well as personality expansion. The characteristic nasality and breatheness of cleft palate speech is present with Louis.

The case of Ann

The case of Ann (code number, U-6, from the Wyoming Clinic files) is one of normal development. Her mother was twenty-three and her father twenty-six when Ann was born. All of the conditions during pregnancy were "good" according to the attending physician. The one sibling in the family is a brother five years older than Ann. The condition of cleft palate anomaly was present at birth. When Ann was three years old, the first operation was performed. The following year the second surgery was effected. The last operation was not successful; the family was told that the child should be a little older before it should be attempted again. In 1945, it was recommended that the operation be performed, but the father felt that he could not finance

it at the time. Now, there is a small opening in Ann's palate about the size of a dime.

She has had the customary children's diseases of measles, chicken pox and mumps. Other than the palatal impairment, she is as near physically perfect as any child who has ever attended the clinic.

In 1944, the Otis Quick Scoring Mental Ability Test, Alpha Form A, was given to Ann. Her I.Q. was said to be 108. She has done well in her school work. Her teacher was so desirous of helping her that she came to take the correction course in teacher-training in order that she might be of more assistance to Ann. Her teacher reports that she seems a bit shy, but that she has always talked freely in class.

Emotionally, intellectually and physically, Ann compares favorably with other children of her age. She is attractive and pleasant, talks freely and shows no outward appearance of a speech defect. Possibly she shows signs of having had too much attention at home, which tends to encourage "baby talk" and lack of responsibility. She is capable of improving her speech much more than she has, but due to indulgences, her initiative is not strong. Special drill was given to correct sigmatism. Ann is able to make all of the requisite sounds. The articulation test showed that she had made improvement with the following initial phones: "wh", "pr", "d", "spl", "dw", "f", "br", "qu", "bl", "cl" and "g". In medial position she pronounced "bl", "th", "cl", "t", "gl", "l", "spl", "zh", "b", and "k" with more clearness. In final positions, the "dl", "zl", "lz", "sk", "sts", and "ths"

sounds were much better defined.

The tongue depressor was used frequently to help formulate certain sounds such as that of "k". Ann seemed to respond well to moto-kinaesthetics as a method of therapy. She evidenced great improvement in speech when properly motivated and guided. She should not be allowed to substitute "tome" for "come" or "do" for "go" as she was permitted to do while at home.

A favorable prognosis for Ann may be made with assurance. She has been reared in a pleasant home atmosphere among a well balanced family, emotionally speaking. She has adequate intelligence and a good biological inheritance. With a sound program of speech rehabilitation she should be able to overcome her difficulty and make the normal adjustment to life.

The case of Tom

The case of Tom (code number, T-7, from the Wyoming Clinic files) is one of anomaly due to supernumerary teeth and a birth difficulty. He was born October 26, 1928. The mother was twenty-five years of age at the time of Tom's birth. During the entire pregnancy the mother was quite ill, but the last four months she carried the child, she was unable to be ambulatory. The child was born prematurely at seven and one-half months. Tom's birth weight was five pounds; the doctor gave the parents little hope for the child due to the severity of rickets. For the first three months Tom was treated with ultra-violet ray. Scarcely any food agreed with him during the first year. He was in his third year before he was able to walk or to say any words

which might be recognized.

His first dentition was normal, but when his second teeth appeared there was a huge tusk which emerged from the hard palate and protruded toward the uvula at a forty-five degree angle. The tusk was removed, but a non-congenital cleft resulted. The fissure has partially filled, over a period of years, but a narrow slit is still in evidence. His early illnesses included mumps, measles, whooping cough and chicken pox. In 1932, he had an adenotomy and a tonsillectomy. There is one sibling.

The university physician found that his vision was 20-300, 20-200 according to the Snellen Type test. Great confusion was shown in color perception. The turbinates were enlarged and were so sensitized that Tom had an irritating stimulation from them constantly. He was eighteen pounds underweight. His resting pulse rate was 70, while his resting blood pressure (systolic) was 110. There is an asymmetry of the skull. Tom writes awkwardly and with the left hand. All of the reflexes were negative.

Tom had the worst case of mal-occlusion that the clinician had ever seen. All of his upper teeth were thrust forward due to the pressure which had been exerted by the tusk. The mother has just such a tusk extending forward from the upper gum which makes it impossible for her to close her lip over it. As Tom's upper teeth spring forward so abruptly, there is much space between the incisors, which thus makes it impossible for him to block air normally. Part of his nervousness is revealed by excessive nail-biting.

However, his worst speech handicap is his inability to use the musculature of the tongue. The cleft gives nasality but it should not keep him from intelligibility. When a tongue depressor was used to place the tongue in the correct position for the sound, Tom could make the sound well. When the tongue depressor was removed, he was unable to get his tongue in the position by movement of the muscles. It is possible that some of the speech centers in Brocca's area never developed or have suffered a paralysis.

A Hemnon Nelson Intelligence Test was given to him by the psychologist; an I.Q. of 80 was established. A battery of vocational interest tests were given to Tom, but his only aptitude appeared to be in the area of "semi-skilled labor". His mother feels that the tests are not measuring correctly and that Tom should be a chemist or an accountant.

When Tom first appeared at the clinic, one could not understand his pronunciation of his name nor his home town even though he was seventeen years of age. The initial Schoolfield test revealed that practically every sound was unitelligible. All of his muscular coordinations were poor, even such large motor movements as walking were non-rhythmical. Orthodontia will help with his appearance and with mastication, but his speech is more hindered by his nasality and his lack of kinaesthesis than by his defective teeth.

Tom is cooperative and remains with a dull task with a child-like tenacity. He is determined that he will speak normally, which determination will be the greatest single factor

in his chance of success. Most of the therapy for Tom was by moto-kinaesthetics. After Tom had been in the cleft palate clinic one summer, he decided to remain for work with the clinician during the following winter. In the following year a vast amount of improvement was noticed not only by the clinician but also by his parents and his instructors. Emphasis was placed upon timing and the correct vowel and consonant formation. These sounds were never taught in isolation, but always in combinations which might be easily assimilated into conversational speech. Numerous tongue and lip exercises were developed for his specific needs. An endeavor was made to break down his anti-social tendencies. Unfortunately, he cannot participate in sports.

So long as he speaks slowly, his speech is intelligible. He understands how to make the sounds, but getting his tongue in the correct position is often a matter of chance because of his inability to control the musculature.

The case of Ward

The case of Ward (code number, S-8, from the Wyoming Clinic files) is that of the youngest patient that has attended the clinic. Ward was born February 22, 1938. At birth there was the anomaly of hare-lip and cleft palate. The mother, who was thirty years of age at the time of his birth, was unmarried. In August 1942, Ward's surgery was performed in Denver, Colorado. The lip and palate were both repaired in the one operation. Other than a genetalia abnormality, Ward was in excellent health.

The psychologist found that his mental age was 6.2 years while his C.A. was 5.5 years, resulting I.Q. being 111. According to his mother, Ward had been exposed to none of the ordinary children's diseases. The attitude of the mother was one of complete indifference to the boy, his handicap or correction. The local welfare agencies had made all of the arrangements for his surgery and speech training. The mother even refused to provide transportation for Ward to and from the clinic!

The Schoolfield test showed that the sounds of "wh", "bl", "g", "t", "f", "v", "ch", "p", "n", and "ck" were defective. However, some of these sounds do not appear in the speech of a normal child until he is some three years older than Ward. His most frequent error was a substitution of "sh" for "s". Relaxation work had to be given to Ward each day before the speech correction might begin.

Ward appeared to have an undue amount of tensions for one so young. One morning he yawned several times during the group work. Just before lunch period the clinician said to him:

Clinician: "You must get to bed earlier tonight, Ward. You have been sleepy all morning."

Ward: "Couldn't sleep last night. Mama came home awful late last night and then had a fight with some woman in our front room. Mama threw her suitcase on the porch and yelled at her never to come back--I got scared and then couldn't sleep."

And here a five year old child has the basis for a fear complex and for feelings of financial and social insecurity. It reminds one of a line from that great play by van Druten, I REMEMBER MAMA, when the central character says: "It iss not goot

fur letle vons to feel afraid."

By nature, Ward was retiring and quiet. He spoke in a low voice and gave the appearance that he was constantly afraid of punishment. Recently, the mother has married; it is to be hoped that the child may experience some normal home life.

As Ward was unable to read, his progress was not so marked as it will be in a few years. By speaking in a low voice he has lessened his nasality. He was particularly interested in the speech games and activities of motor skill. He was always able to get the sound correctly after repeating it a few times. His tempo is usually too rapid for clear enunciation. By the end of the term he could made all of the sounds necessary for normal speech. Age will establish them.

The case of Mary

The case of Mary (code number, R-9, from the Wyoming Clinic files) was one of rapid progress. She was born September 8, 1936. The anomaly was a cleft palate and a double harelip. Her mother was thirty years of age; this was the fifth pregnancy. She worked hard upon a ranch cooking for a large crew of cowboys. She states that she was worried about financial security, did not wish the child, and that "the Lord punished her by sending her Mary". The mother is a member of some religious sect which places credence in such ideas.

Mary has had four operations at the Mayo Clinic. At the age of two and one-half months, the lip repair was started. Two weeks later the other lip had its surgery. At eighteen months,

the closure was made upon the palate. In 1943, the last operation was effected to even the upper lip. Now, most of the muscles on the upper lip do not respond readily. The scar tissue upon this lip is prominent.

The university physician found myopia in the left eye; a mucoid discharge from the right nostril; mal-occlusion; normal reflexes, normal blood pressure and pulse. She was subject to hemorrhage of the nose.

An Otis Quick Scoring Mental Ability Test, Alpha Form A, administered July 17, 1945, gave an I.Q. of 116. Her teachers have reported that she does well in school. Her parents made arrangements to send her to a school away from home in order that she might have special corrective work in speech.

When the Schoolfield test was first given, Mary failed with 56 sounds. Six weeks later, the sounds she missed were initial "d", "w", "fl", "shr", "thr", and "du"; medial sounds were "cl", "dr", "scr", "sk", and the final sounds "th", "sts", "bz", "thz", "sh", and "gz". Learning to say forty sounds in so short a time speaks well for her progress! She needs careful ear training. It was recommended that she learn to play a wind instrument of her choice, rather than the piano, if both cannot be continued. The former would help her to develop the labial muscles.

It would seem that the great desire in her life is to learn to whistle!

The case of Harry

The case of Harry (code number, Q-10, from the Wyoming Clinic

files) is one wherein the clinic was of little help. He was born March 3, 1930. Harry was the fourth child of an Italian couple. The mother, who does not speak English, was thirty-two years of age at the time of Harry's birth. There are three sisters older than Harry. The father speaks some English and gave the case-worker the impression that he was quite interested in his family. There have been several problems in connection with the health of the children so that no one of them appears to get an undue amount of attention. All of them looked as if they were malnutrition cases. Harry was born without a palate. He was operated upon at the Mayo Clinic when twenty months of age and again at four years of age. Secondary plastic repair of the cleft palate was performed at St. Joseph's Hospital in Denver, Colorado, on June 15, 1939. After four more operations had been completed, two in Denver and two in Salt Lake City, the closure could not be made. The last surgeon said that an obturator would be necessary as the fissure could not be closed in any other way.

A Binet Intelligence test set his I.Q. at 72. His progress in school has been retarded further by his inability to read. Part of his reading difficulty may be a form of alexia. The clinician asked him to read the sentence, "Do you live in a big house?" to which Harry said: "Do you live in a large home?" Later, the sentence, "The man lived with his wife in a cottage," was read as "The man lived with a woman in the house."

None of the dentition on the left side of the lower teeth-ridge ever appeared. Several of his upper teeth-buds must have been destroyed also. This absence of teeth has made it necessary

to teach him compensatory movements to pronounce the sounds "s" and "th". The muscle tone in the tongue is poor, causing it to be very flexible and difficult to control. When Harry came to the clinic he spoke with his tongue extended between his teeth in the formation of all sounds.

Harry is a likeable youngster--friendly and affectionate. Although he does not seem to realize the importance of speech correction, he is willing to work upon his handicap and to repeat exercises patiently. He tries to imitate, but apparently he can make no transference into his own speech. The one exception is his ability to pronounce words without a pause after the first consonant. When Harry came to the clinic he pronounced "to" to sound like "t-o" and "put" as if he were saying "p-ut". Except for an occasional new word, he has overcome this habit.

Harry is a monotone. Much time was spent upon pitch and inflection, but he cannot apply what he has learned to his oral reading and conversation. The Schoolfield test revealed that practically all of the sounds were impaired and the retesting at the end of the term showed little improvement.

When the term was over and Harry had returned to his home, the case-worker wrote to the clinician asking if it would be wise for Harry to return to the campus that winter and attend the training school where he might do more speech work. If the clinician could justify the expense to the state for Harry's support, then the case-worker would send the boy to Laramie where Harry said he was happiest. The clinician could not justify the expenditure for it was doubtful if the boy's chances of success in

life could be increased even 10 per cent. Certainly the money could not be approved upon the basis of the happiness that the clinic affords the feebleminded.

It occurred to the clinician that this was a case beyond surgical help or speech rehabilitation.

SUMMARY

The Wyoming Experiment in Cleftness has revealed many areas in which further research should be conducted. Part of the purpose of the work was to compile the available material and to use the data comparatively.

When one reflects upon the clinical aspects of cleftness, the medical view-point, both historical and surgical, becomes of great importance. The world has known cleftness for millenniums, but the forward strides in overcoming it have been made in the twentieth century. Future experimentation may reveal the true cause; now, it would appear that the anomaly is a composite of etiological factors. The studies in regard to incidence, intelligence and sex of cleft patients have been of great help to the speech correctionist.

The Wyoming Clinic was established as a service organization for the handicapped and as a teacher-training unit for those who wished to work within this area in the public schools. The demonstration classes were open to all who wished to observe. The clinic provided a laboratory for the supervised teaching program. It afforded a situation wherein the student might see the theories, which had been presented by lecture and discussion, utilized as a working tool.

However, such aims were on the periphery in comparison with the work accomplished for the cleft palate patients. The latter represented the core of the study. Most clinicians state that it takes about two years to make a lasting change in one's speech. In six weeks time the clinician can only hope to set a

pattern which will be repeated by the patient and encouraged by the parent. Follow-up letters of encouragement and additional exercises are a part of the motivation factor. The clinic is now established as a permanent feature of the university summer session; the patients may return as many times as they wish. The ten case-studies presented were somewhat detailed accounts of the entire background of each individual and the factors affecting his speech personality. They were the first ten patients who enrolled in the Wyoming Speech Clinic.

So, the case of cleftness is not a hopeless one. With successful surgery, a program of re-education of parental attitudes, sound speech re-habilitation and adequate training in mental hygiene, the cleft palate patient of normal intelligence can make splendid adjustment to twentieth century living.

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APPENDIX

Forms used in the Wyoming Clinic

SPEECH CLINIC QUESTIONNAIRE

University of Wyoming

Date_____

Name of patient_____ Sex_____

Address_____

Date of birth_____

Present Speech Problem_____

Source of information for questionnaire_____

By whom referred to speech clinic_____

Interviewer_____

Birth History

1. Age of mother at beginning of pregnancy_____Age of father_____
2. No. of months of pregnancy_____What pregnancy was this child____ (1st, 2nd)
3. Conditions during pregnancy (working, health, shocks, medical care, etc.)

_____

_____

_____

4. Name of physician_____Address_____
5. Type of delivery: feet first__head first___breech___Caesarean_____
6. Did delivery necessitate the use of instruments?_____
7. Were there any injuries?_____if so, where?_____
8. Conditions of baby at birth: Blue____Weight_____breathing_____

   nursing_____convulsions_____other facts_____

   _____

Developmental History

9. Type of feeding_____weaned at_____any problems_____
10. Was the child's rate of growth seemingly normal?_____

    If not, why not?_____
11. Age at which: Held head up_____First tooth_____Full set of teeth___

    Full set of second teeth_____First sat alone_____Crawled_____

    Walked_____Fed self_____Dressed self_____

    Other information with regards to the child's development_____

    _____
12. Handedness:

    Which hand does the child use?_____

    Has his handedness ever been changed?_____when?_____

Has the child ever written backwards?_____when?_____

Activities in which nonpreferred hand is used_____

Is the child ambidextrous?_____

13. Coordinations: Check the following items according to whether the child shows inferior, average, or superior skill:

Walking_____Eating_____Drinking_____Running_____

Dancing_____Skipping_____Jumping_____Throwing_____

Catching_____Drawing_____Kicking_____Sewing_____

Cutting_____Writing_____Gracefulness_____Working puzzles

_____

14. Educational data:

Schools attended and dates_____

_____

Present grade level_____

Previous special training_____

_____

_____Date_____

15. Childhood problems:

Indicate how often these problems occur by encircling the letter which most clearly describes it. O indicates often, S indicates seldom, and N indicates never.

1. Nervousness	O S N	14. Smoking	O S N
2. Sleeplessness	O S N	15. Tongue sucking	O S N
3. Nightmares	O S N	16. Hurting pets	O S N
4. Bed wetting	O S N	17. Setting fires	O S N
5. Playing with sex organs	O S N	18. Constipation	O S N
6. Walking in sleep	O S N	19. Thumb sucking	O S N
7. Shyness	O S N	20. Face twitching	O S N
8. Showing off	O S N	21. Fainting	O S N
9. Refusal to eat	O S N	22. Strong fears	O S N
10. Rudeness	O S N	23. Strong hates	O S N
11. Jealousy	O S N	24. Queer food habits	O S N
12. Selfishness	O S N	25. Temper tantrums	O S N
13. Lying	O S N	26. Whining	O S N
		27. Stealing	O S N
		28. Running away	O S N

16. Was the patient well the first few weeks of life_____

17. Was he ever abnormally: overweight_____Underweight_____How much_____

18. Oversize_____undersize_____at what age_____how long_____

19. Check diseases he has had, giving date, severity, and after effects:

Disease	Age	Severity	Disease	Age	Severity
(1) Tonsilitis			(15) Convulsions		
(2) Whooping cough			(16) Rickets		
(3) Pneumonia			(17) Enlarged glands		
(4) Scarlet fever			(18) Heart trouble		
(5) Typhoid fever			(19) Rheumatism		
(6) Tuberculosis			(20) Thyroid disturbances		
(7) Pleurisy			(21) Infantile paralysis		
(8) Chicken pox			(22) Dysentery		
(9) Influenza			(23) Croup		
(10) Diptheria			(24) Appendicitis		
(11) Measels			(25) Bronchitis		
(12) German measels			(26) Earache		
(13) Mumps			(27) Frequent colds		
(14) St. Vitus dance (chorea)			(28) High fever		
			(29) Any other		

20. Immunization: Small pox_____Diptheria_____Whooping cough_____
other_____Date_____

21. Has child ever been seriously injured or had a severe shock_____

State nature of injury or shock, age and effects_____

_____

22. Has child ever had an operation_____What_____When_____

23. Has he ever been in contact with a case of tuberculosis_____When_____

24. Present physical condition of the child

Present weight_____present height_____

Any physical deformities_____

25. Main findings of last physical examination:_____

_____

_____

_____

Dr._____address_____date_____

Family and Social History

27. Name of father_____ Age___ Address_____

(If dead, give age of death and cause of death)_____

Occupation_____ Nationality_____

Previous occupations_____

Health_____ Disposition_____

Any speech defects_____ Physical defects_____

Handedness_____ Religion_____

Education_____ Interests_____

28. Name of mother_____ Age___ Address_____

(If dead, give age of death and cause of death)_____

Occupation_____ Nationality_____

Previous occupations_____

Health_____ Disposition_____

Any speech defects_____ Physical defects_____

Handedness_____ Religion_____

Education_____ Interests_____

29. List any other adults living in home_____

30. Number of other children in home: Boys ages girls ages

older _____ _____ _____ _____

younger _____ _____ _____ _____

31. Attitude of patient toward parents_____

32. Attitude toward siblings_____

33. Attitude toward other children_____

34. Economic condition of family_____

35. Does the patient appear to be self-reliant_____

36. Does he belong to any special groups (clubs, Y.M.C.A., etc.)_____

_____

Family and Social History (continued)

37. How do other members of the family feel concerning patient's difficulty_____

_____

38. Does patient participate in group play_____

39. What kind of recreation does the child like_____

40. Patient's interests, hobbies, abilities_____

41. Patient's attitude toward school_____

42. Patient's attitude toward his defect_____

43. Patient's strong likes and dislikes_____

44. How does patient compensate_____

45. Disposition of patient_____

46. Are parents together in plan to help patient or is just one interested_____

_____

47. State information about home or family which you believe to be related to the patient's speech problem_____

_____

_____

Speech History

48. At what age did the child say simple words_____ Phrases_____

49. Was the child slow in learning to talk_____ In what way_____

50. At what age was the speech defect first noticed_____

51. What is the particular speech difficulty_____

52. Do you associate the speech difficulty with any severe illness or unusual occurance_____

53. What throat diseases or injuries has the child had_____

54. Is the child hard of hearing_____ Anyone in the family_____

55. Did the child ever have more speech than he has now_____

56. Has the child's speech shown any improvement recently_____

57. Has the child ever uttered words under strong emotion which he has not said since_____

58. Are his wants usually anticipated before he expresses them_____

59. Does the child use silence to gain attention_____

60. Was the child ever jealous of any other person_____ Who_____

61. What history of negativism is present_____

62. Were two languages spoken in the home_____

63. Was the child ever punished for speaking_____ When_____

64. Has there been unhappiness in the home due to death_____ Separation_____ give details_____

65. Check: threats; severe punishment; speech conflicts; competition for speech; impatience; attitudes of parents; attitude of other children_____

66. Is the child aware of his speech difficulty___ sensitive____ ashamed_____

67. Has patient previously been examined for speech difficulty_____ Where_____ Recommendations or treatment given_____ By whom_____ Results_____

COPY OF
THE FOLLOW-UP LETTER

January 19, 1945

Dear Jerry:

As the new year comes into being, I am wondering how you are progressing with your speech problems and if you have been following some of the practices and exercises that we setup for you last summer when you were with us on the campus of the University of Wyoming. To change speech habits takes a long time and one must not be discouraged when perfect speech does not come immediately. Hours and hours of sincere effort must be expended before the desired end may be attained, but I believe that you will stay with the problem and achieve the goal--intelligible speaking. If I may be of any help to you this winter, remember that is part of my purpose in being here.

Sincerely,

J. Edwin Culbertson
Clinician
University of Wyoming

JEC:lp

UNIVERSITY OF WYOMING SPEECH CLINIC

Name Age Grade Birthday

Laramie address

Home address

Family History

Father
Occupation

Mother
Age at birth of subject

Siblings

Economic status

Home conditions

Personal History

Birth history

Developmental history

Injuries

Diseases

Present physical condition

Coordinations

Operations Doctor Dates

Mental and educational development

Personal appearance

UNIVERSITY OF WYOMING SPEECH CLINIC

Speech test results

Exercises and drills (relaxation, breathing, tongue, soft palate, etc.)

General remarks (cooperation, improvement, etc.)

Prognosis

Recommendations

Student clinicians

Supervisor

Date

UNIVERSITY OF WYOMING
SPEECH CLINIC

----------Chart

Name----------

Age---------- Home----------

Week	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday

Supervision:

Instruction Hour----------

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