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ABSTRACT

Addressed to parents, the guide considers children with communication disorders. Information provided covers the nature of such disorders, the function of sound in talking, and the development of speech through the first 7 years of childhood. Factors that may be involved if the child has trouble learning to speak are explained, including hearing, speech, and language handicaps. The parent's role is defined, and books and services are reviewed. (JD)

preface

The ability to communicate is one of man's most precious gifts. The silent world of the deaf—the isolation of the person who cannot make free, normal contact with his associates—are tremendous detriments to the quality of life.

Few people realize how many of their fellow humans have communication problems. The overall statistics are appalling: "about 8,500,000 Americans have either bilateral or unilateral hearing impairments of handicapping magnitude; another 2,000,000 have central communicative disorders; and 10,000,000 have speech disorders. We probably should assume modest overlap in these totals, but we must still recognize that approximately 20,000,000 persons in this country have communicative handicaps worthy of our concern."* The statistics for children are even more appalling, when one considers that for many the shrunken world extends over an entire lifetime. Twelve out of every 10,000 are totally deaf, and perhaps as many as 300 out of 10,000 have severe hearing impairments. Five hundred out of 10,000 have some type of speech disorder. As with the figure above covering all ages, 10 percent of the Nation's children suffer from some form of communicative disorder.

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* *Report of the Subcommittee on Human Communication and Its Disorders, National Advisory Neurological Diseases and Stroke Council, 1969.*

The National Institute of Neurological Diseases and Stroke was formed in 1951 as a component of the National Institutes of Health to conduct and support research on neurological and sensory disorders, including those of hearing, language, and speech functions. Today, the Institute conducts the largest of the Federal programs of research in communication disorders, including:

174 basic and clinical research projects at 82 U.S. medical centers;

Five multidisciplinary clinical research centers —at Princeton, Central Institute for the Deaf in St. Louis, the University of Chicago, the Kresge Hearing Research Institute of Ann Arbor, Michigan, and the University of Florida;

Three Human Communications out-patient clinics—at Stanford, the University of Pittsburgh, and Northwestern;

Four temporal bone banks for the long-term study of structural and pathological changes relating to functional disorders of hearing—at the University of Chicago, Johns Hopkins, the San Francisco Medical Center of the University of California, and Baylor University in Houston;

An Information Center for Hearing, Speech, and Disorders of Human Communication at Johns Hopkins to speed the interchange of scientific information between researchers; and

A long-term collaborative study of some 50,000 children which includes evaluating their hearing and speech.

Ancillary to its research program, the Institute issues publications describing its work, and providing information about neurological and sensory disease problems. This guide for parents is one of approximately 50 publications currently available. For a list of these publications write to:

Information Office, NINDS
National Institutes of Health
Bethesda, Maryland 20014

contents

the child in trouble

"Doctor, my little girl Celia is three-years-old, but she just doesn't seem to be learning to talk. She hardly ever says more than one word at a time. Is something wrong?"

"Nobody can understand what our Sara says, even though she's five. And she acts so strange. She doesn't hear the telephone bell ring, but she understands everything her grandmother says to her over the phone. Do you think she's emotionally disturbed?"

"Brian is three-and-a-half and he talks all the time. Sometimes I wish I could turn him off. But his two-year-old brother speaks better than he does. Brian throws temper tantrums and hits other children. Do you think he's showing his jealousy of his baby brother?"

"Our Chris—he's two now—has had his share of problems. He was born with a cleft palate and the surgeons have operated twice already. We thought everything would be all right, but even though Chris jabbers constantly, the only word we can understand is 'more.' And he snorts and snuffles so. What can we do?"

These parents feel bewildered and troubled. Celia and Sara and Brian and Chris act like normal, delightful children, except when it comes to talking. Then something seems to be out of kilter: the gears don't seem to mesh.

If you are one of these parents you are right to be concerned. Talking, oral communication, is the most difficult skill a child can master: he needs all the help he can get. Perhaps nothing is wrong, but you want to be sure. And so you go to your doctor who may refer you to a specialist in communication disorders.

The sooner you do this, the better. The old idea of "Wait and see, maybe he'll grow out of it," is simply bad advice. By the time they are four, many children are using a vocabulary of 1000 words and they understand another 2000 to 3000. They are speaking conversational-style English correctly and intelligibly, using past tense, future tense, plurals, prepositions, conjunctions. The child in trouble will have a lot of catching up to do before he can hope to compete with these children in school. Learning to talk has a peak season between the ages of two and five. Never again will a child be as ready, as flexible, as quick to learn language. Thus the best advice, the proven truth, is that the earlier you can find the child in trouble, the better your chances of helping him.

But how do children learn to talk? Who can tell if they are having difficulty? This booklet offers some guides.

what is a communication disorder?

Until a child learns to express his ideas and his wants in words, so that other people can understand him, he is not able to take his place in the human family. A communication disorder is any special difficulty he has in learning to communicate aloud, in words. Three functions are involved: speech, hearing, and language.

SPEECH is a way of using the breath and certain muscles to make sounds in very precise patterns which other people understand as words. Speech can be heard.

HEARING is the child's first and main connection with the talking world. Through the ear and the nerves which carry sound signals to the brain, a baby learns to listen. First he becomes aware that sound exists, then that certain sounds mean something, and finally that when he makes sounds which resemble the sounds he hears, other people will understand him.

LANGUAGE is the link between hearing and speech. Language means understanding sounds as words, thinking in words, clothing ideas in words. Language is silent.

The child with a communication disorder can have difficulty in any or all of these three areas. If he cannot *speak* and make sounds clearly enough for other people

to understand him, he will not only have trouble expressing his ideas, but he will also be slow to learn meanings because he cannot ask such questions as: "What's that, Mommy?"

If he cannot *hear* well, he will have a hard time distinguishing the difference between sounds, understanding what they mean, and learning to say them himself.

If he cannot master *language*, spoken sounds won't mean much to him. He will find it hard to match sounds with meanings, and hard to find words for his own thoughts.

Such children are not hopeless. But someone has to figure out just where the problem lies so that each child can get that extra boost to help him learn.

how is sound involved in talking?

Whenever you converse with someone you receive and produce sound. In order to understand what can be involved in a communication disorder, it helps to know a little about sound itself and how it is processed; about the ear which takes sound in and the speech organs which send sound out.

Sound is produced whenever something starts a chain reaction of particles bumping against each other. Strike the head of a drum and you start it vibrating, moving in and out. Molecules of air surround the drum. As the drumhead bulges out, it shoves against the nearest air molecules. They in turn move out and bump their neighbors, then move back toward the drumhead. These neighbor molecules bump their neighbors in turn and so the chain of bumps continues out into space.

No individual molecule moves back and forth very far from its original position, but the bumping action itself shoots out from the drumhead travelling at about 1000 feet per second. This moving disturbance is called a *sound wave*.

The faster the drumhead vibrates, the more frequently each air molecule gets and gives a bump, and the higher the *frequency* of the sound. Frequency is measured in cycles, or number of vibrations, per second (cps). A high-pitched sound has a higher frequency than a low-pitched sound. Middle C on the piano has a frequency of about 250 cps; the highest

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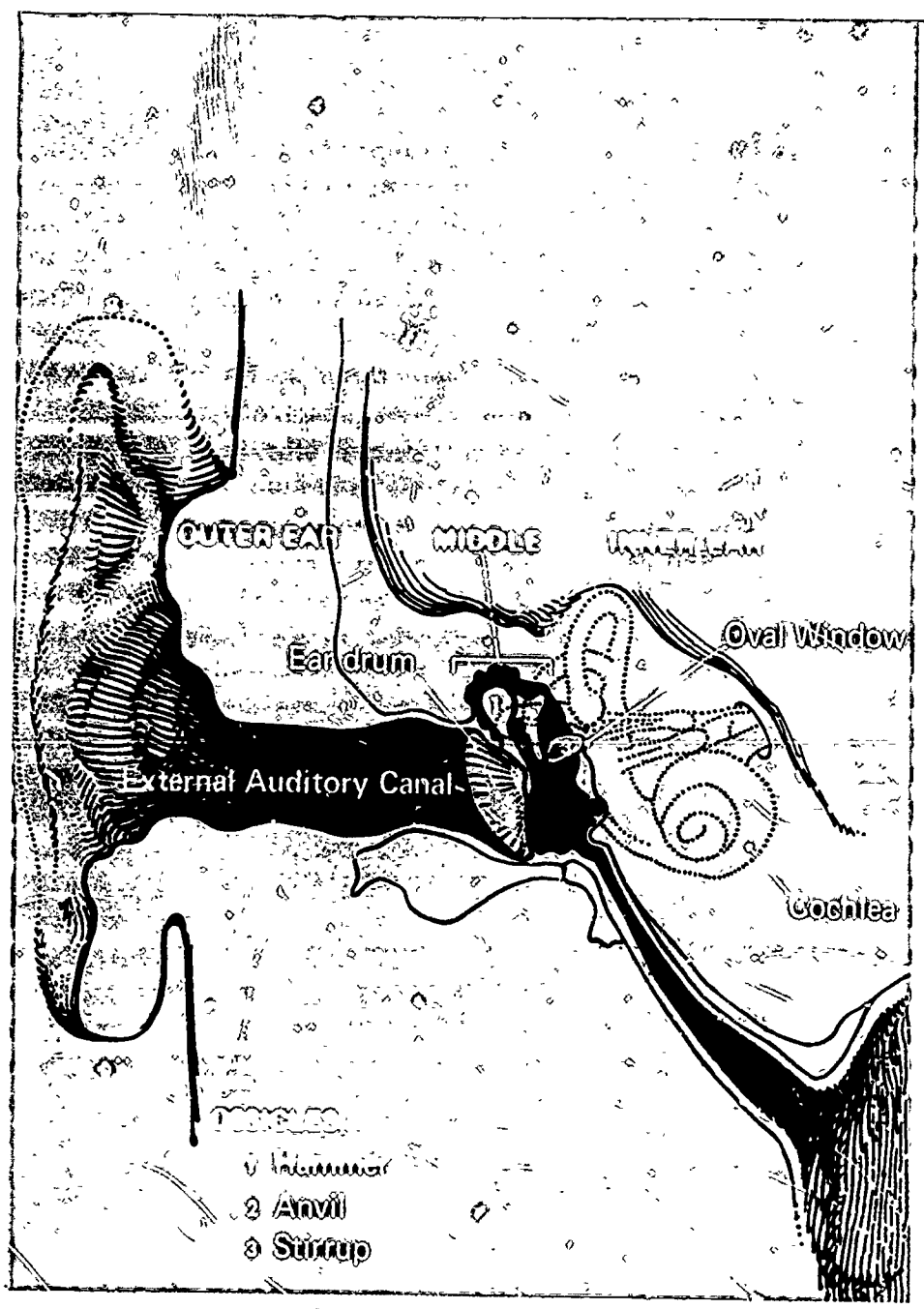


note on the piano, also a C, has a frequency of about 4000 cps. The harder you strike the drumhead, the greater the *intensity* of the sound produced. The greater the intensity, the louder the sound seems.

Simple sounds of a single frequency are rare. Most sounds, like speech sounds, have several different frequencies. Certain physical phenomena complicate sounds. *Reflection* occurs when a moving sound wave bumps against some barrier, like a wall, and is reflected in another direction. Another phenomenon, *resonance*, occurs as sound is passed through a column of air. The shorter the length of the air column, the higher the resonance and the higher the pitch of the sound.

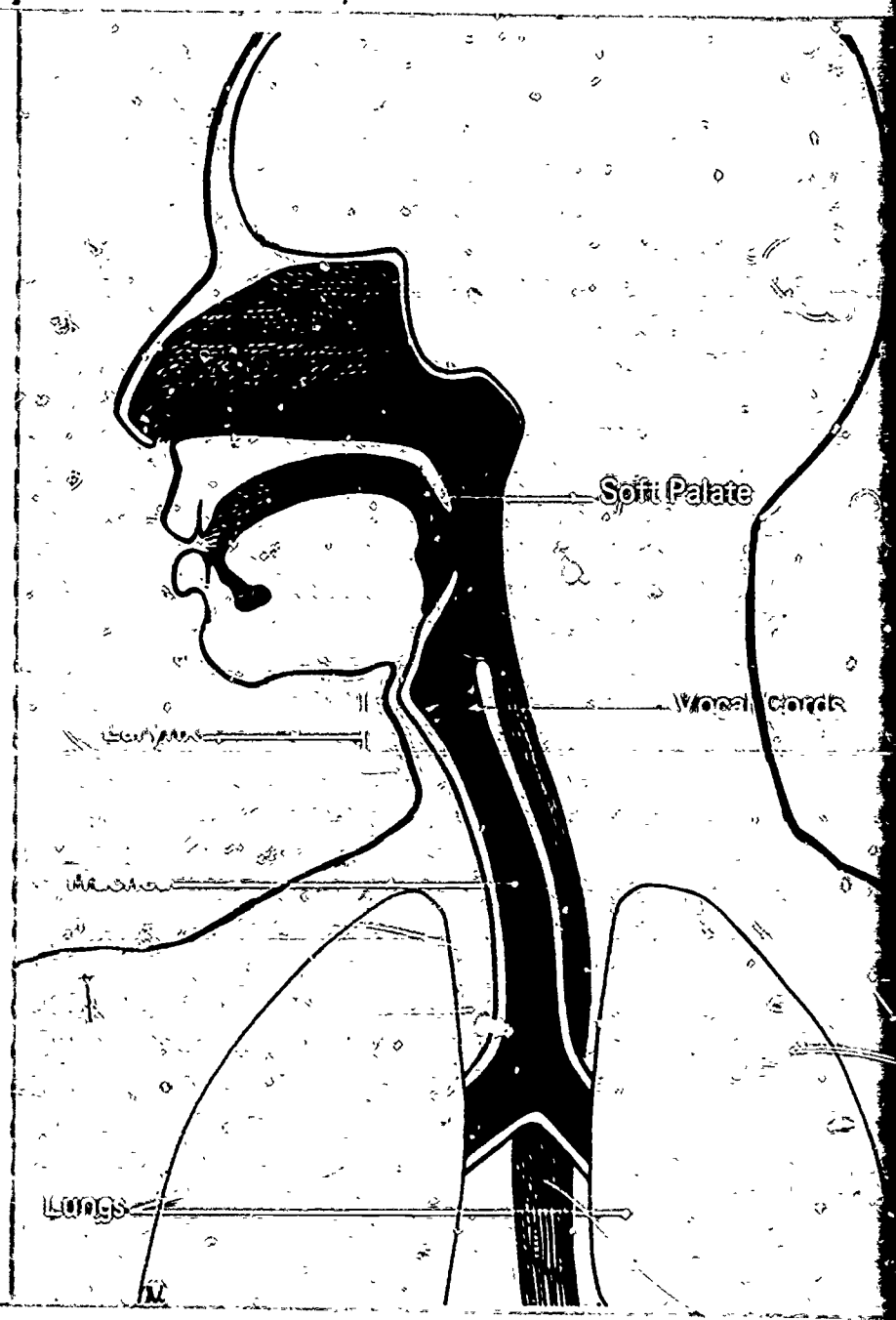
In speaking, your own air column changes shape as you produce a sound. This column is really a long tube which starts at the lungs and continues upward through the wind pipe to the larynx. Above the larynx is the section called the vocal tract, containing the throat and branching into the nose and mouth. (See drawing.)

The vocal cords, located in the larynx, act as a valve for air from the lungs used in speaking. When the vocal cords rapidly open and shut, a column of vibrating air making a humming sound results. The faster the vibrations, the higher the frequency of the resulting hum. A change in the length and shape of the vocal tract alters the humming sound coming from the vibrating vocal cords.

In the production of nasal consonant sounds like M and N, the mouth is blocked by the soft palate, a flexible, muscular appendage which extends from the roof of the mouth into the throat and acts as a little gate between the nose and the mouth cavities, and all the air is expelled through the nose. When the walls of the throat constrict and the soft palate is lifted against the back wall of the throat, the nose is closed off from the mouth, and the non-nasal sounds are heard.

The part of the tube called the mouth can change its shape more than any other section of the vocal tract. The lips change the length and shape of the tract by rounding, spreading, or closing briefly to interrupt the air flow. The teeth can reduce or stop the flow when placed close to the lips, as in the sound V, or when brought close to the tongue tip, as in TH. The tongue is the most flexible portion of the mouth and can move backward, forward, up and down. Parts like the tip and center can move independently of the rest. Changing the shape of the vocal tract to produce different sounds is called *articulation* and a highly skilled exercise it is.

"The word 'church' requires 20 different adjustments of the lips, tongue, larynx, and jaws," according to Dr. Spencer F. Brown, formerly of Yale University. "These adjustments must occur in correct sequence and must be made precisely. Yet the word



requires less than a quarter of a second to speak, which means that the average time available for each of the 20 necessary movements is barely over one hundredth of a second."

It is easy to see why a child with poor muscle coordination has trouble making himself understood. The same is true for the child born with a leak between his nose and mouth cavities due to a cleft palate, which is a hole in the roof of the mouth. The most essential organ for mastering articulation is not the vocal tract at all, but the ear. Unless a child can detect the differences in speech sounds, he cannot learn to make them himself.

The ear itself is a superb piece of engineering. It is capable of receiving, amplifying, and transmitting hundreds of thousands of tones rapidly and efficiently. The functioning ear is divided into three chambers called the outer, middle, and inner ear. (See drawing.) The only part of the ear visible on the outside of the head is that curiously molded flap of skin and cartilage called the auricle. Its use in humans is mainly decorative.

Sound amplification begins in the outer ear, called the external auditory canal. The canal, an air-filled tube sealed at its inner end by the ear drum, acts as a resonator. For certain sounds in the range humans hear best (from 2000 to 5500 cps) the air column can double the sound pressure. Thus we hear better because the ear drum is located at the end of the inch-long canal instead of on the surface of the head.

The ear drum looks in on the middle ear, an air-filled chamber containing a chain of three tiny bones called the ossicles. The ossicles, called individually the hammer, anvil, and stirrup, form a bridge which connects the ear drum with the oval window, another smaller drum on the opposite side of the middle ear. Acting as a lever system between the ear drum and the oval window, the bones can triple the incoming sound pressure as they convert airborne sound energy from the outer ear to mechanical energy in the middle ear. The sound pressure is amplified 30 times more as it becomes concentrated on the oval window which is one-thirtieth the surface area of the ear drum. All told, the amplifying qualities of the outer and middle ear can amplify sounds in some frequency ranges 180 times.

Beyond the oval window lies the inner ear, a maze of spiraling and arching channels, carved in the hardest bone in the body. The central and upper sections of the chamber contain the body's balance mechanism and have nothing to do with hearing. The cochlea, the organ of hearing, is a spiral-shaped structure occupying the lower portion of the inner ear. It is about the size of the tip of your little finger.

The inner ear chamber is filled with fluid. As the ossicles press against the oval window, the window bulges against the inner ear and sends a sound pressure wave swelling through the fluid in the cochlea. The mechanical force from the middle ear thus becomes hydraulic force in the inner ear. The specialized touch cells in the cochlea—there are about 24,000 of them—"feel" the movements of the fluid and stimulate the nerve fibers to send electrical signals through the auditory nerve leading from the inner ear to the hearing center in the brain.

About 25,000 nerve fibers have the task of transmitting electrical signals from the organ of Corti, the structure in the cochlea containing the touch cells, through the auditory nerve to the brain. Different groups of fibers carry different sound frequency signals. The greater the number of fibers a sound activates, the louder the sound seems to the brain. The nerve signals reach the brain as an electrical code. The brain deciphers the code, depending on its sound memory center, stored with memories of all the various sounds you have heard since birth and their meanings. The brain can distinguish among almost 400,000 different signals by the time you reach adulthood. Nerve pathways connect this memory center with the areas which control muscle movement and thought.

Thus when you call your child's name, saying "Jimmie, come here!" the sound pressure waves travel from your mouth to Jimmie's outer ear, which channels the sound energy moving the air and focuses it on the ear drum. The bones in the middle ear convert this energy into mechanical force, which presses against the oval window. The window bulges into the inner ear, where the sound becomes hydraulic force acting on the inner ear fluid. The vibrations in the fluid stir the touch cells whose movements convert hydraulic energy into electrical energy which the auditory nerves then carry to the brain.

Jimmie's sound memory center in his brain deciphers the electrical code, and tells him not only that sounds forming his name have been uttered, but also that the sounds are those of your voice, coming from a certain distance in a certain direction. Nerves from this sound-interpreting area carry the message to other parts of his brain, to the area which controls his speech muscles, so that he says "Yes, I'm coming," and to the muscles which permit him to walk toward you.

how do children become able to talk?

Talking doesn't just happen. Children have to learn how.

There is a definite pattern which children follow in learning to talk and if you know what signs to watch for you can recognize their progress. No two children will show the same signs at exactly the same time, of course. Nevertheless, certain signs can serve as check points to tell you how well a child is developing. And so a child who fails to show these signs at all, or who lags a full year or more behind other children in his behavior, may be the child who needs help.

the first year

The baby spends his first year of life learning to listen. Although the newborn infant comes equipped with a pair of finely-tuned signal receivers, his ears, he doesn't yet know how to use them. A buzz of meaningless noise surrounds him and no one sound is more important than any other. Unlike his ears, the hearing center of his brain is still immature. As the baby grows, two things happen: he becomes more skilled at picking out certain sounds and associating them with meanings, and his brain becomes more adept at interpreting and remembering sound signals.

This development is easy to see very early. If you make a sudden, loud sound near a day-old baby's head, you will not see any reaction. Only a check on his pulse or breathing rate will show a change in

response. But just two weeks later, the same noise will make him jerk and turn his head toward you. A noise called the human voice means something to him now. If he hears another baby crying, he will cry. By his fourth to sixth week familiar sounds like the telephone bell or the closing of a door no longer make him start. He can pick out one voice—his mother's—from all the others, and it can soothe him and stop his crying. By eight weeks these mother-sounds can make him smile.

What is actually happening is that he is beginning to be able to listen. He can select certain sounds and memorize them, so that when he hears that sound again he can match it with the one he has heard before. Attention, selection, memorization, recall, matching—these skills are basic to all learning, and especially to learning to talk.

At the same time these early hearing and language skills get under way, the infant begins to practice sound-making. His first sounds are the *discomfort sounds*, shrill, nasal whines which he seems to spend all his time making when he is not quiet or sleeping. They mean nothing to him yet, but are part of his squirming, fussing movements which tell his mother that he is uncomfortable, maybe wet or hungry.

Within the baby's first month, another kind of sound emerges: the *comfort sounds*. These are clearly different from the discomfort sounds. They are less nasal, more throaty and vowel-like. These coos, gurgles, sighs and grunts are the ancestors of true speech. As the child grows, his comfort sounds will contain more of the vowels and consonants and rhythms which he will later use in speaking.

As the months go by you can detect several new kinds of sound-making. When the child is about eight weeks old he begins to *babble*, a very important step. Until now, his noises signalled comfort or discomfort, but when he babbles he is making sounds for the fun of making and hearing them. First he plays with the vowel sounds, "ee", "ih", and "uh"; then come the consonant sounds, M, N, P, B, T, D, and G. Some of this babbling is social and the baby will perform with other people around, when he seems to be talking back to the voices around him. But much babbling is private and stops when he is interrupted. Babbling is a very necessary practice session for the child and he should be encouraged. It will take him several years to master the complicated muscle movements which form sounds into words, and the more practice he can get the better. Any enthusiasm you show will add to his enjoyment and the interest in sounds he needs in order to learn to talk.

At five or six months you can detect another change as the baby's babbling develops into *vocal play*. He begins to use sounds for a purpose: to get attention, to mean "no", to mean "I'm hungry." Private babbling doesn't stop, but now the child seems to enjoy social noise-making. He will answer your sounds with

a sound of his own, listening and talking to you in his own fashion.

At eight months the babbling develops another feature, *inflection*. His voice begins to have rises and falls. Sometimes he seems to be asking a question, giving you an order, making a serious statement, or expressing surprise. These inflections sound like true speech. They are the first feature of his babbling which closely resembles adult sound-making.

The infant who never babbles, or who stops babbling about the time he is four- to six-months-old should make you suspicious. Deaf children gradually stop babbling at this age. Since they can't hear the sounds they make, they lose interest in playing with mouth movements and exercising their vocal muscles.

During this period the baby also shows signs of better listening ability. The four-month-old can tell the difference between friendly speech, which makes him smile, and angry sounds, which make him frown and whimper. The eight-month-old finds sound so interesting that a quiet, conversational voice can make him turn his head and shoulders toward its source. The sound of his mother's voice is all-powerful. It quiets him when he frets, even awakens him when he sleeps. He will respond to other sounds if they are nearby—the vacuum cleaner, the dog barking. his own name. "No" begins to mean something to him when you say it.

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the one-year-old

The baby spent his first year in a pre-language state, developing a readiness to listen. He will spend his second year in a pre-speech state, developing a readiness to talk. This happens as he comes to recognize that certain sounds stand for certain objects. His responses show this. He reacts to the sound of the human voice by jabbering, to the sound of scolding by frowning, to thunder by crying and to the sound of his mother working about the house by quieting.

By his 12th month he can understand some words. "Cup, show me the cup," his father demands, and the baby will look toward or point at the cup.

About the time he is a year-and-a-half-old, the child seems to stretch his hearing skills. He will pay attention to sounds which come from a considerable distance, from another room or outside, sounds which he ignored before. At this age some children can identify parts of their bodies. Say "nose" and they point to their nose, "mouth" and they touch their mouth. They still need your gestures to help them understand what you say.

For most parents the most exciting event in their child's second year is his first word. But just be ause your baby makes the sound "mamamama" doesn't mean that he is using the sound to mean his mother. He must be actually saying the sound for the purpose of communication before you can be really certain that he has said a word. Not until "mama" means "Mother, come here," or "Mother, lift me up," is he using the sound in the sense of a tool.

The first words he uses are most often words of command ("mum" for "I want milk") or words of recognition ("goggie" when he sees a dog). They are not pronounced perfectly. Almost always they contain the sounds he has practiced earlier in his vocal play, sounds which he can make easily. Many of these words have a very general meaning. "Goggie" can mean a dog, a cat, a stuffed lion, or a horse. As time goes on you will teach him to notice the differences between these objects and the appropriate names for each of them. You will help him understand that "animal" and not "goggie" is a general name which can refer to all these forms, but that a dog, a cat, a lion, a horse, and a toy are each different enough to deserve their own special names as well. You are not only teaching him to talk; you are teaching him to think in your terms, to notice the differences which *you* think are important.

Two other kinds of vocalization appear in the baby's second year: jargon and echolalia. *Jargon* is a stream of unintelligble jabber which usually develops between the 12th and 15th month. It is the child's practice of fluency, his way of bridging the gap between his few hesitant words and the rushing tor-

rent of sounds in adult speech. Rather than simply playing with sounds, the child jabbers purposively. He "talks" to his toys and to you, seldom repeating the same syllable twice.

Jargon reaches its peak at 18 months, when another form of sound-making also appears, one that can put a mother in doubts about her sanity. Called *echolalia*, it is the child's parrot-like echoing of the speech he hears. Often he does this without thinking, his attention elsewhere.

Echolalia goes like this:

"Baby want some milk?"

"Want some milk?"

"Here is your cup."

"Here cup."

And on and on. Echolalia seldom lasts beyond age two-and-a-half.

Meanwhile, vocal play continues, usually when the child is alone in bed, as he practices the sounds he uses to respond to the vocal world around him. You will hear him playing with repeated syllables or making streams of "S" sounds. He finds he can use his new teeth to whistle, and he does.

the two-year-old

The two-year-old should be talking; not just saying single words, but using simple and compound sentences such as "Bobby go in car, get Daddy." (The two-year-old who has not yet said his first word should have a thorough check-up.)

At this age the child's pronunciation is often faulty, his voice not quite under control and therefore loud rather than soft. His rhythm is often broken; he hesitates, stumbles, stops and starts over again. This should not worry his parents. This hesitancy is not stuttering: it does not mean that your child will talk in this stop-start pattern forevermore. Consider his plight as he struggles to remember the correct sounds and string them together in the right order. He is just not going to produce the polished, rounded flow of adult speech at this age. Calling attention to his struggles only shows him that you disapprove rather than admire his efforts. Asking him to slow down and repeat at this early age may so discourage him that he will stop trying to talk altogether, or he will try so hard to speak smoothly that his speech will show even more hesitation than before. You would not put this pressure on an adult making his first trial runs in a foreign language. Much of his speech is interspersed with unintelligible jargon, of course, as the child tries to "talk" as fast as you do.

A two-year-old's ability to grasp the meaning in long bursts of sound has now progressed to the point where he can follow two-part spoken commands, like "Get the book and bring it to Mommy." He should be able to do this without his mother's needing to

help him by pointing or gesturing. He can identify familiar objects when you name them and can name some of them himself. He can imitate sentences of two or more words and other people can understand him when he does. One dramatic sign of his progress is his ability to learn a new word after hearing it just once.

three and four: the high-point years

The three-year-old has too much to say to rely on jargon and gesture alone and so he uses words socially to tell you what he thinks and wants. He learns so fast that you would have to follow him about with a tape-recorder to get a good picture of his progress. There are some landmarks to watch for, however.

His hearing skills have matured to the point where he can repeat a four-word-long sentence.

His language shows a considerable understanding of words and what they mean. For example, he can identify objects, like "truck", and activities, like "running", from pictures. He names familiar objects with ease. He knows whether he is a boy or a girl. He understands and he uses some verbs, adjectives, pronouns and prepositions. His speaking vocabulary probably contains 900 to 1000 words and he understands another one to two thousand. (No one, of course, would advise you to count your child's words, even if you could, in order to tell whether he's normal or not. This estimate from research studies just shows how much even a three-year-old knows about his native tongue. It also suggests why you should be worried if your three-year-old only says one or two words.)

The four-year-old child begins to notice the usefulness of different forms of words. He learns to use plurals; there is one "cookie" and then there are "cookies", even more delicious. He calls Mommy's shoe "hers" and Daddy's shoe "his" and can be quite insistent in the use of the adjectiv 'my." He learns words that show differences in size, like "big" and "little." Past and future mean something to him and so he finds it helpful to learn the appropriate verb forms: "Daddy went to work," "Daddy's coming home soon." He can put words together in their proper order and he speaks in short sentences.

All his years of practice in making sounds now show their value. Strangers can understand about 90 percent of what he says. As far as complexity goes, he speaks in roughly the same form as the everyday, conversational speech he hears around him. During his fourth year he perfects his pronunciation of *S* and *Z* sounds, of blend sounds like *TRee, BLame, teLLS,* where two consonants follow one upon the other, and of friction sounds like the *J* in *Joke,* and *baDGE* and the *CH* sound, in *CHew* and *batCH.* These require new sound combinations and skillful muscle coordina-

tion. The four-year-old has mastered most of the vowels and the diphthong sounds like *OU* in *OUt* and the *OI* in *OIl*. He can say the consonants P, B, N, W, T, D, N and H.

He can control his voice better than before and when he speaks the sounds come forth more smoothly, his voice is not so loud, and it rises and falls to express questions and statements.

During these third and fourth years children develop a feed-back system. They begin to listen to the sound of their own voices as they talk and they correct themselves. They start to compare their own speech sounds with the speech around them. The result is the appearance of a native dialect. The child from the South begins to sound different from the child from New England, just as the people around him pronounce words and use rhythms which differ from those in another part of the country.

five, six, and seven: the years for perfecting

The five-year-old should be entirely understandable when he speaks. This does not mean that he pronounces each word perfectly—that will take more time—but it does mean that you and your neighbors can comprehend what he is saying. You will notice that he is using the K, G, F, and V sounds fairly consistently. These are difficult sounds to make, but he'll be saying them clearly, except in the even more difficult blend sounds like *GR*, *CL* and *ST*.

The six-year-old should be speaking standard English in the complex forms used by the adults around him. He can handle five-word sentences now, and is an expert in the use of prepositions and conjunctions: "Johnny can't play ball UNTIL after dinner;" "Daddy said we could go IF Mommy comes, too."

He is ready to enter first grade with a vocabulary which probably contains about 2,500 words which he can use. His *L*, *S*, *Z*, and *CH* sounds appear regularly. So does the *R* sound, which seems to be very difficult for many children, and which you cannot expect them always to say correctly until their eighth year.

The checklist below will help you follow your own child's progress. It outlines the behavior which you can expect of your child at various age levels and was compiled by Mary Wootton Masland, a speech, language and hearing consultant for the Maryland State Department of Health. If your child fails repeatedly to respond as the checklist suggests, he may have a problem which requires further evaluation by your doctor or by speech, language and hearing clinicians. Remember, though, that a tired, hungry, or sleepy child may not respond the same way he would if he were wide-awake and content. You will want to go over these items carefully, several times.

average age	question	average behavior
3-6 months	What does he do when you talk to him?	He awakens or quiets to the sound of his mother's voice.
	Does he react to your voice even when he cannot see you?	He typically turns eyes and head in the direction of the source of sound.
7-10 months	When he can't *see* what is happening, what does he do when he hears familiar footsteps . . . the dog barking . . . the telephone ringing . . . candy paper rattling . . . someone's voice . . . his own name?	He turns his head and shoulders toward familiar sounds, even when he cannot see what is happening. Such sounds do not have to be loud to cause him to respond.
11-15 months	Can he point to or find familiar objects or people, when he is asked to? *Example:* "Where is Jimmy?" "Find the ball."	He shows his understanding of some words by appropriate behavior; for example, he points to or looks at familiar objects or people, on request.
	Does he respond differently to different sounds?	He jabbers in response to a human voice, is apt to cry when there is thunder, or may frown when he is scolded.
	Does he enjoy listening to some sounds and imitating them?	Imitation indicates that he can hear the sounds and match them with his own sound production
1½ years	Can he point to parts of his body when you ask him to? *Example:* "Show me your eyes." "Show me your nose."	Some children begin to identify parts of the body. He should be able to show his nose or eyes.
	How many understandable words does he use—words you are sure *really* mean something?	He should be using a few single words. They are not complete or pronounced perfectly but are clearly meaningful.

average age	question	average behavior
2 years	Can he follow simple verbal commands when you are careful not to give him any help, such as looking at the object or pointing in the right direction? *Example:* "Johnny, get your hat and give it to Daddy." "Debby, bring me your ball."	He should be able to follow a few simple commands without visual clues.
	Does he enjoy being read to? Does he point out pictures of familiar objects in a book when asked to? *Example:* "Show me the baby." "Where's the rabbit?"	Most two-year-olds enjoy being "read to" and shown simple pictures in a book or magazine, and will point out pictures when you ask them to.
	Does he use the names of familiar people and things such as *Mommy, milk, ball,* and *hat?*	He should be using a variety of everyday words heard in his home and neighborhood.
	What does he call himself?	He refers to himself by name.
	Is he beginning to show interest in the sound of radio or TV commercials?	Many two-year-olds do show such interest, by word or action.
	Is he putting a few words together to make little "sentences"? *Example:* "Go bye-bye car." "Milk all gone."	These "sentences" are not usually complete or grammatically correct.
2½ years	Does he know a few rhymes or songs? Does he enjoy hearing them?	Many children can say or sing short rhymes or songs and enjoy listening to records or to mother singing.
	What does he do when the ice cream man's bell rings, out of his sight, or when a car door or house door closes at a time when someone in the family usually comes home?	If a child has good hearing, and these are events that bring him pleasure, he usually reacts to the sound by running to look or telling someone what he hears.

average age	question	average behavior
3 years	Can he show that he understands the meaning of some words besides the names of things? *Example:* "Make the car go." "Give me your ball." "Put the block in your pocket." "Find the big doll."	He should be able to understand and use some simple verbs, pronouns, prepositions and adjectives, such as *go, me, in,* and *big.*
	Can he find you when you call him from another room?	He should be able to locate the source of a sound.
	Does he sometimes use complete sentences?	He should be using complete sentences some of the time.
4 years	Can he tell about events that have happened recently?	He should be able to give a connected account of some recent experiences.
	Can he carry out two directions, one after the other? *Example:* "Bobby, find Susie and tell her dinner's ready."	He should be able to carry out a sequence of two simple directions.
5 years	Do neighbors and others outside the family understand most of what he says?	His speech should be intelligible, although some sounds may still be mispronounced.
	Can he carry on a conversation with other children or familiar grown-ups?	Most children of this age can carry on a conversation if the vocabulary is within their experience.
	Does he begin a sentence with "I" instead of "me"; "he" instead of "him"?	He should use some pronouns correctly.
	Is his grammar almost as good as his parents'?	Most of the time, it should match the patterns of grammar used by the adults of his family and neighborhood.

what may be involved if your child has trouble learning to speak

"Speech is the trigger point which brings most parents to seek help for their children" say Drs. William and Miriam Hardy, who have tested more than 30,000 children at the Hearing and Speech Center at Johns Hopkins University Medical Center.

The child may not talk at all, he may talk but be impossible to understand, or he may be extremely slow to learn words. There are many possible explanations, but the very first question a doctor will try to answer is: How well can this child hear? No matter how intelligent, no matter how eager to learn, the child who cannot hear will have trouble talking. If he cannot hear everything you say you can expect him to have a very hard time learning what sounds mean what, and learning how to imitate the sounds you make. He is very likely to become frustrated, angry, and unsure of himself, and to feel helpless.

Few children are totally deaf. Different kinds of damage to the ear can affect the ability to hear in different ways. The question is not only *how much* a child hears, but also just *how* he hears. His parents may have noticed that he does hear some sounds, and so, even when the child seems to have difficulty talking, they fail to suspect a hearing loss. Instead their child seems disobedient, stubborn, incapable of paying attention, and slow to learn.

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hearing damage

conductive loss: the "louder please" problem

Three-year-old Celia is an example of one kind of hearing impairment.

At first her parents didn't worry because they thought she was just slow in developing. After all, she had been late to stand, late to walk, and it seemed natural that she would be late to speak. By the time she was two she had only spoken a few words; by the time she was three she was just starting to put words together into sentences, but her pronunication remained very poor.

Gradually her mother noticed that Celia didn't respond to sound the way other children did. She didn't come when she was called, although she was spanked for disobeying. Even a whistle didn't attract her attention. She liked television, but only when she could turn the volume so high that her brothers and sisters complained. Celia was a shy child; she didn't mingle with the family much. What puzzled her parents was that she seemed to understand everything they said to her. How could she possibly have trouble hearing?

Exams by an ear, nose and throat specialist and a battery of hearing tests showed how Celia was born with obstructed auditory canals in her outer ears, canals so narrow that the doctor could not even see her ear drums. The hearing tests showed that very little sound gets through to her inner ear. She can sometimes understand what is said to her, but only if the speaker stands no more than three feet from her head. At a greater distance sound seems so muffled that Celia simply ignores it. Celia is not disobedient; she simply doesn't hear her mother calling her.

For this child help comes from a special kind of hearing device called a bone conduction aid, which can amplify sound and direct it through the bones of her head to her inner ear. When she is older, perhaps six-years-old, a surgeon will widen one of her obstructed auditory canals. Meanwhile this child will need help from her family to learn to understand and pronouce all the sounds she has missed for so long.

Celia's kind of hearing impairment is called a *conductive loss*. Damage to the outer or middle ear, the structures which amplify and transmit sound to the cochlea, is the source of the problem. A conductive loss means that all sounds seem faint, no matter what their frequency. High C on the piano seems just as distant and fuzzy as middle C. Conductive loss is the most common kind of hearing impairment and is the cause of 80 percent of hearing problems in school-age children, according to Dr. William G. Hardy. Fortunately, these children are the very ones which a hearing aid can help most. They need only loudness in order to hear well.

What causes conductive loss? In the outer ear the problem is often a plug of hardened wax which blocks incoming sound. By removing the wax a doctor can often solve the problem. Sometimes a child is born with too narrow a canal, like Celia's, or no canal at all. Then surgery sometimes can help, as well as a bone conduction hearing aid.

In the middle ear infection is usually the villain and can produce temporary hearing loss in a few hours. The infection behind a simple sore throat can spread from the tonsils and adenoids up the Eustachian tube into the middle ear. Sometimes the tube swells and closes off, or pus and mucus fill the middle ear, immobilizing the three ossicles and the ear drum. If fresh air cannot enter the middle ear chamber through the Eustachian tube to offset the air pressure on the other side of the drum, the drum can rupture and tear so severely that it will never heal. By puncturing the drum a doctor can relieve the pressure, drain the middle ear, ease the pain, and prevent the drum from tearing and scarring. Untreated infections can also spread to the middle ear's bony casing where they may settle and cause chronic infection.

Antibiotics can arrest infections, but only early treatment can prevent a permanent hearing loss. This is why parents should be especially concerned when children complain about pressure or pain in their ears. This is why a child who is the constant victim of colds and sore throats should see a doctor. Some children never do get that tell-tale earache which signals infection.

The potential for children who do have a conductive loss is usually good. With good medical care and a hearing aid they can often catch up and keep pace with normal-hearing children in a regular school program.

sensory-neural loss: the "I hear, but I can't understand" problem

Sara has this type of hearing impairment, and for years she confused everybody. Her parents thought that as an infant she had reacted normally to the sounds around her. She had vocalized well and started to speak at the age of one. But when Sara reached one-and-a-half her parents noticed that she didn't always respond to being called. A doctor removed her tonsils and adenoids, but she didn't improve. Finally her parents tried a hearing aid; Sara refused to wear it.

At this point the explanation seemed to be that Sara had an emotional problem. A year in a nursery class for the emotionally disturbed had no effect. The next year, when Sara was five, she entered a normal nursery school. There she seemed to repond fairly well, although she could not always follow directions. She liked to recite before the class, but nobody could really understand what she said. She enjoyed playing with other children, but she communicated with them through pantomime. At five-and-a-half Sara still did not speak in sentences and her speech was far from clear. Her parents brought her to a speech and hearing clinic for testing.

They felt confused. "Why is it that Sara doesn't hear the telephone ring, but still can understand everything her grandmother says to her over the phone?" they asked the doctors. "Why does she always use her right ear when she listens to the radio? Does she have an emotional problem? Is that why she's so stubborn and refuses to talk better?"

After a very thorough work-up by a team of doctors and speech and hearing clinicians the answer was clear. Sara has a hearing loss, which is why she cannot learn to speak clearly. For her the problem is a particular kind of hearing impairment called a *sensory-neural loss*. This means that the damage is not in the outer or middle ear, but in the inner ear, where different sound frequencies activate different nerve cells in the cochlea. If some of these nerve cells or their nerve pathways to the brain don't function

properly, then the ear will have difficulty perceiving sounds in certain frequency ranges.

This is what makes the behavior of a child like Sara so confusing. Sara could not hear consonant sounds very well. Most consonant sounds occur in the high frequency ranges of 1200 cps or above. If the nerve cells in the basal turn of the spiral-shaped cochlea which respond to these frequencies don't function, then the child will hear all the vowel sounds, but will not be able to tell the difference between words with different consonant sounds. Sara cannot tell you the difference between words like "bit", "kit", and "sit". She seems to hear through a filter, which screens out all the high frequency sounds.

Other children hear sounds in the high frequency range, but miss the low frequency ones. And some have a reduced sensitivity to all sound because damage has run throughout the cochlea.

Most children with a sensory-neural loss hear, but they hear incompletely. They hear, but they cannot understand you.

What can cause a sensory-neural loss? Sometimes an error occurs during the development of the inner ear and its nerve pathways and the child is born with a defective hearing mechanism. Sometimes certain conditions damage the sound-sensing nerve cells while the child is still in the womb. Incompatible factors between the parents' and the child's blood is one such

condition, and can injure the auditory nerve which carries signals from the nerve cells of the inner ear to the brain.

Viral diseases like flu or mumps during the mother's pregnancy can also pass from her to her unborn child, destroying the cells in the cochlea. German measles, also called rubella, can do this. An epidemic of rubella swept the United States during 1964, damaging thousands of children. One study in Baltimore, Maryland, part of a research project sponsored by the National Institute of Neurological Diseases and Stroke, found more than 350 children in that city injured by German measles which had infected their mothers during pregnancy. Many of these children suffered multiple damages, such as blindness, mental retardation and heart defects. The Baltimore unit's study showed that more than 50 percent of the children infected by German measles also had communication problems.

Many of these children are being missed because they appear normal until their hearing is tested. Thus any mother exposed to German measles during her pregnancy should be especially alert to signs of deafness in her child.

Scarlet fever and meningitis, an inflammation of the tissues lining the brain, can also cause nerve damage in childhood.

There is no way to restore a nerve cell, once it is damaged. Thus hearing aids do not always help. Sometimes, however, amplifying a sound will make the stirrup bone transmit a stronger vibration to the inner ear and thus cause a greater number of nerve cells to react to a sound. In other cases this will not work. Training in lip-reading can help a child learn to use his eyes to help him understand better and speech training can assist him in making sounds he can't hear well enough to imitate on his own. If such help comes early enough, the child with a sensory-neural loss may develop enough language and speech to be able to get along in a regular school class. Often such children need the individual attention and the experienced teaching available in special classes for the deaf.

Not all hearing impairments fall neatly into these two categories, of course. Some children contend with both conductive and sensory-neural damage. In some cases the damage is slight and in others very severe. Then there are the children who have only one bad ear. They will find it difficult to locate the source of sound since it can only reach them through one side of the head.

One mother became aware that her son had this problem at a birthday party where the children were playing a game called "telephone." The leader had to think of a message and whisper it to the next child and so it went around the circle and back to the first child again. When it came Tommy's turn his mother was startled to hear him say:

"You'll have to whisper in my right ear 'cause it's my whispering ear and the other one's no good."

Tommy needs to have preferential seating in the classroom so that his good ear is always toward the teacher and the other students.

what can be done for the hearing-impaired child:

The most important thing about a hearing impairment is that it interferes with the child's ability to communicate normally. When he feels excited or angry or worried he cannot tell you about it. He cannot explain himself to you and he cannot understand what you say to him. He is a prisoner in his own head and he needs help getting out.

Teamwork will be necessary to free him. This calls for good cooperation between the pediatrician; the otologist, who specializes in ear, nose and throat problems; the clinical audiologist, who tests hearing; the psychologist, who tests learning ability; specially trained teachers, and most important, you, the parent. You are the person who spends the most time with a young child and you are the person to whom the child goes for understanding, sympathy, and help.

A hearing test will tell you not only how well, but also in what manner the child hears. Most speech sounds range from 250 to 8000 cps. Before you can help a hearing-impaired child you need to know whether he is deaf to all of this range, or only part of it.

A medical examination will tell you whether surgery or drugs can be expected to relieve the problem.

Therapy should begin as early as possible. The needs of each child differ, but in general the period between 18 and 30 months of age seems to be the best time to start. Since children learn language most easily and eagerly from this period until the time they are five, waiting until they are six and seven before seeking help is foolhardy.

Most handicapped children possess some degree of hearing which they can be taught to use more efficiently. They will need special training to sharpen their listening skills. They will need practice in lipreading, in making speech sounds, in controlling their breath pressure and rhythm, their tone of voice and its volume.

They will need help in understanding language principles. Instead of learning speech easily, the hearing-impaired child may require weeks to learn to understand and pronounce a single word. It is very difficult for him to understand past tense and future tense, the difference between "I *bought* you some candy today" and "I *will buy* you some candy tomorrow." Secondary meanings are another challenge. He

learns that a plane *flies* and birds *fly*, but how hard it is for him to understand what you mean when you say "time *flies*" or "that's a *fly* ball." How hard it is for him to learn the words for things he cannot see around him, concepts like "hour", "glacier", "continent", "silly", "noble", "worried". This is why he needs special teaching, and special understanding.

The 20th Century has given the hearing-impaired child a wonderful gift: the hearing aid. This small, wearable device works like a miniature loud-speaker system. It converts sound into electrical energy, amplifies it, and converts it back to sound again. Before the invention of the hearing aid the moderately deaf child was not much better off than the child with no hearing at all. Now hearing aids can help most children with even a slight degree of hearing to learn to speak.

An aid can help a moderately-impaired child to hear almost normally. It can serve the severely-impaired child by alerting him to sound, telling him that something is going on, like a door closing, or that something is being said, so that he can concentrate all his skills on understanding. Effective as the hearing aid is, it can never enable a child to hear as if he had perfectly normal ears. Sound through a hearing aid appears somewhat tinny and distorted. It's like trying to hear a symphony orchestra through a telephone receiver. Hearing aids don't amplify all sounds equally. They work best for sounds in the range of frequencies used

in conversation. But limited as they are, they can put the wearer in contact with sound all day long and they can be used very effectively early in life. Most children seem to adjust best to a hearing aid between the ages of two and three.

difficulty making speech sounds

Speech itself, the act of making sounds precisely enough to be understood by others, is an athletic feat. Like any other physical skill, speech demands a good physique and good muscle coordination. Some children are handicapped by weak muscles or poorly formed structures in the mouth or vocal tract. Others cannot command their muscles to perform the rapid, fast-changing adjustments which the pronunciation of words requires. Because these children cannot speak easily and because they quickly become frustrated by their continual failure, they may appear to be deaf, mentally retarded, or emotionally disturbed. Thus any examiner confronted with a child who has trouble learning to talk will be certain to check the physical structures involved in producing speech and the child's ability to maneuver them.

Christopher is an example of a child who has difficulty making speech sounds.

He had passed his second birthday when his mother brought him to a clinic for a speech, language and hearing evaluation. He could say only one word which his parents could understand: "more." He jabbered all the time at home, but his speech consisted mainly of vowel sounds, and occasionally an M, N, R or L. Although his muscle coordination was normal he didn't use his tongue for making sounds if he could avoid it.

Chris was born with a cleft lip and palate, a split in his upper lip which continued back through the roof of his mouth, so that he had an opening between his mouth and nasal cavities. Surgeons had repaired his lip when he was six-weeks-old and had closed the cleft palate when he was one-and-a-half. But Chris still had physical deformities which caused him trouble: too short a soft palate to permit him to block off his nose from his mouth; mis-aligned teeth which left a gap or open bite on the left side of his mouth, and in addition, a habit of protruding his tongue. His doctors plan to straighten his teeth and lengthen his soft palate through dentistry and surgery when Chris is older. Meanwhile, he needs help in learning how to make speech sounds despite his handicap. Following the advice of speech consultants, his parents have enrolled Chris in a year-round nursery school program for speech-handicapped children which is supplemented with individual therapy sessions.


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At first Chris could not even blow a feather across a table top, a sign that he has trouble controlling his breathing and developing sufficient air pressure for speaking. After Chris succeeded in this task he had to learn how to tell whether he was blowing through his mouth or his nose. He had to learn that for some sounds he must use his mouth and for others he must send the air through his nose. At first Chris could not make his tongue move up or down or side-to-side more than a fraction of an inch. This meant that T, F, TH, S and many other consonant sounds were impossible for him to imitate correctly.

Chris wants very much to speak, a strong plus in his favor. He has not yet become so frustrated over his failure to make himself understood that has given up altogether. To encourage him and give him confidence, his teacher has helped him learn 15 words beginning with M and N, the consonant sounds he can make, words like "moon", "money" and "many." This child is well on his way to joining the speaking world, but like other cleft palate children or children with deformed and poorly functioning structures, he will need years of help and his parents' understanding that he is not ruined for life.

What causes such structural deformities? No one knows yet. What happens is that in the process of laying down the tissues which form the hard and soft palate, the throat cavity and the base of the skull, something goes awry. Sometimes there is too much tissue and sometimes too little. The result is often some opening, slight or severe, in the palate which separates the top of the mouth from the nasal cavity, and air leaks through. Usually the doctor spots the problem at birth and surgeons go to work to repair the deformity. Often this requires a series of operations at different stages in the child's development. Sometimes the surgeon will have to fashion an artificial device like a plate to cover the cleft, or a valve the patient can wear in his throat and operate to close his mouth off from his nose.

A cleft is not always visible. Sometimes it lies concealed beneath the mucous membrane lining of the roof of the mouth and only the child's difficulty as he tries to speak suggests that something is wrong. Then X-rays and examinations by specialists will reveal the extent of the problem.

Poor muscle coordination prevents other children from making themselves understood. Their speech-making equipment is perfectly intact. The problem is that they cannot manipulate it. Suppose you took a three-year-old to a puppet show where the skilled handling of 30 separate strings could make a small puppet dance, run and throw a ball. Now you give the same puppet to the child. The object becomes a lifeless doll in his baby hands and gone is all the magic.

Speaking is far more complex than manipulating a puppet, yet far easier a task for most of us because the brain and spinal cord plan and direct the sequence of necessary movements. Any impairment in this unconscious, effortless signal system can make learning to talk as difficult as working a dozen puppets.

Cerebral palsy can affect a child this way. C.P. is not a specific disease, but rather a name for a pattern of behavior caused by different kinds of injury to the brain and spinal cord. C.P. children cannot control their muscles easily. The simple act of reaching for a toy may be accompained by flailing and waving arm movements and their heads may bob and roll. Naturally, speech with its requirement for smooth, delicate muscle adjustments is supremely difficult for them.

For other children the damage may be slight and coordination problems on a smaller scale. Awkward in hopping, jumping and dancing to music, they are awkward in their speech movements too. Therapy often calls for exercises to reduce their overall clumsiness. With smoother movements their speech improves as well.

Exercise and practice is the treatment for all these children. They need skill in listening so that they can identify individual sounds which call for individual muscle movements. They need skill in making the muscles involved in speech more flexible and controllable. They need confidence and encouragement as well.

Of course their prospects for improvement depend upon the severity of the damage involved. Many will not learn to speak on their own beyond a certain level, but good teaching can show them what to aim for and how to achieve better command of their muscles. Their speech may never be as smooth and effortless-seeming as it is for other people, but they can often be helped to make themselves understood, certainly a triumph, and their doorway to the speaking world.

What causes poor muscle control? There are many sources of damage. Malformations in development due to oxygen deprivation or infections in the womb, premature birth or birth injuries, virus diseases during infancy which cause nerve damage, tumors, blood clots in the vessels supplying the nerves and muscles, concussions and other accidents are some of the major factors responsible.

What is important is that the child be helped as early as possible. He will need years of extra practice before he can be understood easily by others and the more time he has the better. He almost always has some potential for improvement. There are persons who have overcome partial paralysis, deformed tongues, and the loss of all their teeth and whose speech is clearly intelligible.

impaired language functions

Some children don't learn to talk easily not because of poor hearing, not because of poorly functioning speech organs, but because of a language learning disability. It often takes a highly skilled examiner to show that they are not deaf, or mentally retarded or psychologically disturbed, for to the casual observer they look as if they do have these handicaps.

Their problems vary. The trouble may be that they cannot pay attention long enough to learn, or that they cannot easily store and recall sound patterns and meanings, or that they cannot formulate their ideas in words.

Three-and-a-half-year-old Brian had such a language-learning problem. His speech wasn't much better than his two-year-old brother's. When Brian tried to speak he got very upset. He used gestures to try to make people understand him. Playing with neighborhood children was difficult for him because he could not communicate with them. By the time he was three he had become so frustrated that he began hitting and scratching his playmates. One day he returned from a nursery school trip to the zoo and in great excitement tried to tell the family what he had seen. No one could understand him. Brian threw his dinner on the floor and fled screaming to his room where he stayed all evening.

His mother described him as terribly active, almost impossible to discipline, and a child who wanted to be in the spotlight all the time. She felt sure that the problem was not poor hearing. Instead, she and her husband thought the difficulty must be due to Brian's extreme jealousy of his baby brother.

A hearing test did prove Brian's hearing to be perfectly normal. But an examination by a speech pathologist showed that Brian used a strange language formula when he talked. He strung together one-syllable words which held a lot of meaning for him and left out all the small words like "the", "a", "and", "in", and "with", which made what he said appear nonsense to his listeners. He left the endings off many words and substituted some letters for others. When Brian said: "Ray go too, da tuh Boh too," he meant "Ray went and Daddy took Bobby too."

Brian has been enrolled in a special nursery school program which offers group teaching and individual therapy for children with language-learning problems. Through a combination of teaching and testing the specially trained people working with Brian have been able to narrow in on his problems.

His major difficulty seems to be a poor auditory memory span, which puts his capacity two years below his age level. This means that Brian cannot remember sounds in the order in which he hears them. "Lips"

and "lisp" sound like the same word to him. He can recall two digits, like "four, six" and say them back to you, but when it comes to three digits, like "four, six, five," Brian is apt to say: "four, six . . . (long pause) . . . two?"

His poor memory for sounds is probably responsible for his unintelligible pronunciation. He cannot always remember just how a word should be pronounced. He also has a related problem, difficulty controlling his attention and concentrating on what he is supposed to do. When the class stops a free-play session and switches to a story-listening period, Brian cannot shift his attention easily. He becomes excited and runs about the room. He also has difficulty following directions. He is not willful and disobedient, he just can't remember instructions long enough to obey and has to struggle to interpret a long series of commands.

Brian has a normal intelligence. He needs help in stretching his attention span, in learning to remember sounds so that he can store them in his head and repeat them correctly when he needs to use a word later.

What causes language-learning problems? No one yet knows all the answers to that question, but it does seem evident that the brain and nervous system don't function correctly. Again the cause may be an inborn developmental mistake, birth injury, exposure to virus diseases or drugs which can damage the growing infant, or severe head injuries.

These children too can be taught and helped to overcome their handicaps. Teachers use methods which involve the other senses, such as vision and touch, to assist a child like Brian in remembering the correct sounds. Brian may learn the word "airplane" more easily when he can look at a picture of a plane and hold a model plane in his hands.

It is seldom possible to determine at once just what the nature of the child's problem is. But as the teacher tries different methods and uses different tests, she will be able to better understand just where the difficulty lies and what approach will work best. This process is called *diagnostic teaching* because it combines diagnosis with therapy.

By the time Brian was four-and-a-half his speech was much more intelligible. His vocabulary has grown considerably and at home he is teaching his baby brother new words and correcting him when he makes mistakes. Brian talks more often without relying on gestures to make himself understood. Most important, he feels less frustrated, more relaxed, as every day he comes a bit closer to the speaking world.

He will need several more years of special teaching before he can enter a regular school program, but he will probably make it, thanks to thorough testing, skilled teaching, and parents who weren't satisfied with the explanation that Brian was just jealous of a baby brother.

the wise parent is a concerned parent

The children described in this booklet had problems which were easy to detect once they were put in the hands of experienced testers. Not all children have such relatively simple problems. They may be examples of complex involvements of conductive and sensory-neural hearing losses, aggravated by poor muscle control, language-learning dysfunctions, and lack of speech stimulation at home. Basic intelligence is the most important factor in determining how well a child can overcome his problems. The mentally retarded child can learn to speak, but his progress will be much slower than for other children.

Any examiner confronted with a child with a communication problem will try to determine the answers to these questions:

"How much and how does he hear?"

"How well does he see?"

"How well and how does he learn?"

"What are his capacities for memory and retention?"

No matter how severely impaired the child is, he will find the world a friendlier place when he can learn to talk and be understood. The wise parent is a concerned parent. It is not always easy to determine just what a child's problem is. Sometimes a visit to several doctors may be necessary before an accurate examination and program of help can be found. If you don't find satisfactory answers to your questions, keep trying. No reputable doctor or professional clinician can object to another consultation by another doctor.

appendix

where to take your child:

Always start with your family physician or pediatrician. He will want to check the child's over-all development and will search for evidence of infection or other complications which may be contributing to the problem. He may then suggest further evaluation by such specialists as:

The *otolaryngologist*, a medical doctor who specializes in diseases of the ear and larynx, sometimes called an ear, nose and throat specialist. He is trained to determine the cause of problems like hearing loss and can recommend medical and surgical correction.

The *audiologist*, a person trained to measure the exact degree of hearing loss and to determine its effect on the child. He recommends a course of therapy and can prescribe a hearing aid if needed.

The *speech pathologist*, a person trained to determine the nature of the speech and language problems and to correct them through therapy.

The *psychologist*, a person trained to determine whether the child has any problem in learning and dealing with those around him. He may recommend therapy and can help parents better understand how the child's communication problem affects his behavior.

Speech, language and hearing specialists may be in private practice and may offer testing and therapy in weekly or daily sessions on an appointment basis.

The speech and hearing clinic often offers both testing and therapy, although some specialize in just one area. The professionals listed above may be full-time staff members of the clinic or may work with it on a consultant basis. Such clinics may be provided by the community or they may be associated with a university medical department, a university speech and hearing department or a hospital.

Schools for children with communications disorders, such as schools for the handicapped or schools for the deaf, offer full-time residential programs and day classes from nursery school level through high school and college, depending upon their organization.

how to find out about services in your area

1. Write to your State Department of Education or your State Department of Health. They will know about qualified services offered in your area. They may offer such services under their own rehabilitation, crippled children's service, special education or maternal and child health offices.

2. Ask your local or county school superintendent about services. Some school systems now provide special education programs for children as young as three years who have communications impairments.

3. Ask your doctor or your local medical association for recommendations.

4. Write to the following organizations which provide information for parents or order one of the following directories:

The American Speech and Hearing Association
9030 Old Georgetown Road, Bethesda, Md. 20014

Will make referrals to or provide the names of qualified audiologists and speech pathologists who hold clinical certification from the Association and will tell you about registered clinic programs in your area. Also provides a list of publications and reprints of articles from its three professional journals: the Journal of Speech and Hearing Disorders, the Journal of Speech and Hearing Research, and ASHA, a monthly journal.

The National Association of Hearing and Speech Agencies
919 18th Street, N.W., Washington D.C. 20006

Will provide the names of community agencies which offer services for children with communications disorders. Answers inquiries from parents, sends out information kits, offers reprints from pertinent magazine articles, publishes the bimonthly journal "Hearing and Speech News" for parents and professionals; also a newsletter, "Washington Sounds," which reports on relevant health legislation and on new publications in the field.

The Alexander Graham Bell Association for the Deaf
Headquarters: The Volta Bureau, 1537 35th Street, N.W., Washington D.C. 20007

Acts as an information service center for parents through its headquarters, the Volta Bureau, and will answer inquiries and send a free information kit to parents with deaf or hard-of-hearing children. Provides a free directory called "Schools and Classes for Deaf Children Under Six" and lists of books and articles in English and Spanish for teachers and parents which can be ordered from the Association. Publishes a monthly journal, "The Volta Review," with articles on education and parents' activities. Subscribers are entitled to membership in the Association, and use of its lending library. Parent members can join the International Parents' Organization which has 180 local parent groups who meet to discuss their problems, hear speakers, and view films provided by the Association. Offers correspondence clubs for groups of five to seven parents from different sections of the country.

The National Society for Crippled Children and Adults, Inc.
2023 West Ogden Ave., Chicago, Ill. 60612

Many of the member state and local societies provide treatment centers for children with communication disorders and offer testing and educational programs for parents and teachers. Also publishes reading material and operates the Easter Seal Research Foundation.

The John Tracy Clinic
806 West Adams Blvd., Los Angeles, Calif. 90007

Provides a correspondence course in both English and Spanish designed for parents of deaf children between the ages of two and six throughout the world. The course is adapted to the individual needs of the child and his parents. Course work, letters and reports are exchanged.

Directory of Services for the Deaf in the United States.
American Annals of the Deaf
Gallaudet College, Washington D.C. 20002

An extremely thorough listing of schools, clinics, instructional materials, conferences, agencies and organizations relating to the problem of deafness and containing more than 800 pages. The Directory is published annually as an issue of the journal "American Annals of the Deaf," the official organ of the Conference of Executives of American Schools for the Deaf and of the American Instructors of the Deaf. The Annals are published five times a year and subscriptions and back issues can be requested from the editor.

Services for Crippled Children:
Children's Bureau Folder 38. 1968. 30 pages. 15¢
The Superintendent of Documents, U.S. Government Printing Office, Washington D.C. 20402.

Lists state agencies administering services for crippled children and describes their functions.

where to read more

If You Are A Parent:

Books

Bloom, Freddy. *Our Deaf Children.* London, Melbourne, Toronto: William Heinemann Ltd. 1963.
A British mother of a severely hard-of-hearing little girl describes the problems a family faces in dealing with a young deaf child.

Lassman, Grace Harris. *Language for the Preschool Deaf Child.* New York: Grune and Stratton, Inc. 1950.
A teacher of the deaf discusses fundamental concepts, activities and techniques of training; also includes a design for nursery school and parent education, and selected case histories.

Mycklebust, Helmer R. *Your Deaf Child, A Guide for Parents.* Springfield, Illinois: Charles C Thomas. 1950.
A straightforward, sympathetic book describing the kinds of problems confronting parents in caring for the deaf child and discussing parents' attitudes and the child's needs.

Palmer, Charles E. *Speech and Hearing Problems, A Guide for Teachers and Parents.* Springfield, Illinois: Charles C Thomas. 1961.
An excellent book, in question-and-answer format, in two parts; the first deals with speech problems and the second with hearing problems with suggestions of what to do and where to go for help.

Van Riper, Charles. *Teaching Your Child to Talk.* New York: Harper and Row, Publishers. 1950.
A highly readable explanation of how children normally learn to talk and how to encourage them.

———. *Your Child's Speech Problems.* New York: Harper and Row, 1961.
A description of various kinds of speech problems and what may be involved, with illustrated cases and suggested techniques for help.

Pamphlets

Harris, Grace M. *For Parents of Very Young Deaf Children.* 60¢
Alexander Graham Bell Association for the Deaf, 1537 35th Street, N.W. Washington D.C. 20007.

McDonald, Eugene T. *Bright Promise, for your child with cleft lip and palate.* Parent Series No. 6. 1959. 25¢.
The National Society for Crippled Children and Adults, Inc., 2023 West Odgen Avenue, Chicago, Illinois 60612.

The following pamphlets on communications problems can be ordered from the Superintendent of Documents, U.S. Government Printing Office, Washington D.C. 20402:

The Child Who is Hard of Hearing.
Children's Bureau Folder 36. 10¢

Hearing Loss. Hope Through Research Series.
Public Health Service Publication No. 207 15¢

Choosing a Hearing Aid.
Children's Bureau Folder 55. 15¢

The Child with a Speech Problem.
Children's Bureau Folder 52. 15¢

The Child with a Cleft Palate.
Children's Bureau Folder 37. 10¢

The Child Who is Mentally Retarded.
Children's Bureau Folder 43. 10¢

The Preschool Child Who is Blind.
Children's Bureau Folder 39. 10¢

If You Are A Physician Or Other Professional:

Hardy, William G. *Children with Impaired Hearing.* Children's Bureau Publication No. 326. 1952. The Superintendent of Documents, U.S. Government Printing Office, Washington D.C. 20402.
Suggestions for management of children with impaired hearing emphasizing the public health point of view, by the Director of the Hearing and Speech Clinic and Associate Professor of Otolaryngology at Johns Hopkins Medical School.

Van Riper, Charles. *Speech Correction, Principles and Methods.* 4th ed. Englewood Cliffs, New Jersey: Prentince-Hall, Inc. 1963.
A thorough review of concepts, correction techniques, and diagnostic procedures supported by case history material.

Of General Interest:

Denes, Peter B. and Pinson, Elliot N. *The Speech Chain, the Physics and Biology of Spoken Language.* Bell Telephone Laboratories, Inc. 1963.
(Available through local telephone business offices and through the distributor: The Williams and Wilkins Company, Science Series, 428 Preston Street, Baltimore, Maryland.)

A short textbook on sound, hearing and speech and a review of current research efforts, with clear explanations and illustrations. For the interested student; an excellent teaching aid.

Stevens, S. S. and Warshofsky, Fred. *Sound and Hearing.* Life Science Library. New York: Time Inc. 1965.
A description of the physics of sound and the mechanism of hearing, and a history of discoveries in these areas, with lavish illustrations.

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