

► **HISTORY**

The “Passages” of Hearing Health Care

Marjorie D. Skafté, *editorial director*

Hearing loss has been a malady affecting the lives of mankind since the beginning of recorded history. Numerous Biblical passages refer to individuals who could not hear. The search for ways to help these individuals has been ongoing with the instruments developed to provide assistance prior to the twentieth century primarily either unsophisticated devices or large, cumbersome, non-electric type products.

the twenty-first century, have moved from that received when listening to sound spoken into a hollow tube to that offered by instruments that incorporate digital signal processing.

Prior to the twentieth century, the power for available hearing instruments was provided by batteries the size of those used in lanterns and motorcycles to the miniscule zinc oxide batteries that are smaller in size than an eraser on the tip of a standard-sized pencil.

The earliest recorded known description of a hearing device is found in a book by Pietro Maria Amiane, published about 1640. A type of ear trumpet is detailed there in a section of the book titled, “Hearing Instruments for Those with Weakened Hearing.” Sketches and descriptions of various types of ear trumpets can be found in literature of the 16th, 17th, 18th and 19th centuries. These ear trumpets were available in various shapes from simple trumpets that followed the design of the horns found on animals like cows to instruments that resembled cones, funnels, pipes or bells. Some of the ear trumpets were collapsible for portability while others were attached to eyeglasses.

In the 1800s, speaking tubes became popular. The speaker spoke into one end of a hollow tube while the person with the hearing loss held the other end of the tube to his or her ear. Acoustic canes had some popularity in the nineteenth and first decade of the twentieth century. The canes worked on somewhat the same principle as a speaking tube. One model had a small ear trumpet mounted atop the cane and could be used as a cane and when needed, for hearing. Pinna inserts, devices which could be fitted into the outer ear, became popular in the late 1800s. These devices were marketed under names like Earwell, Acoustiphone, Radium-Ear, Vibraphone and Audiophone.

Acoustic chairs, with built-in or
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Part I: The “Passages of Hearing Health Care—A brief review of the development of amplification devices for the hearing-impaired prior to the decade of the 1940s.

Part II: A *Hearing Review* Timeline highlighting some of the historical developments in hearing health care that occurred during the ‘40s-‘60s appears on pages 14, 16 and 19. A similar review of the ‘70s-‘90s will be included in an upcoming issue.

The twentieth century has seen tremendous progress in increasing the capabilities of, as well as reduction of, both the size and weight of instruments for amplifying sound for the hearing impaired. The devices we now call hearing aids or hearing instruments have, during the 20th century, moved from console products the size of floor-model radios to a portable product resembling a ladies’ large purse or a medium-sized transistor radio. Reduction in instrument size has continued and now, in 1996, we have available a product that is smaller in circumference than the tip of your “little” finger—the completely-in-the-canal instrument. Amplification capabilities of hearing instruments, as we prepare to enter

"Passages" of Hearing

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attached speaking tubes or constructed with a design that directed the sound toward the ears, were built in the 17th and 18th centuries. In advertising many of these non-electric devices, the copy often included references that these devices helped the individuals avoid the detrimental effects of electricity.

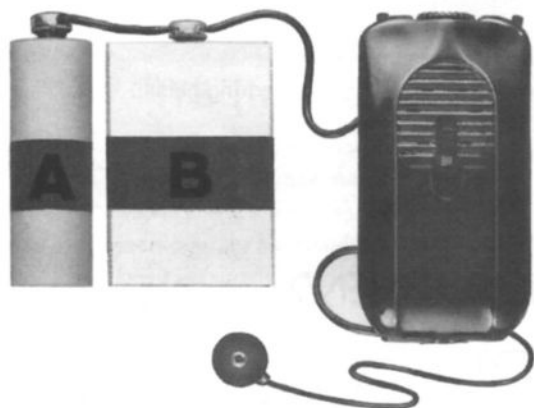
Bone conduction devices are described in literature as early as



An electric powered "portable" hearing instrument circa 1920.

131-200 A.D. The bone conduction phenomenon was utilized in hearing testing by physicians as early as 1712. Utilizing this principle, simple wooden rods which were held between the teeth of both the speaker and listener were utilized by individuals with hearing loss in the 1800s. Bone conduction devices such as the Rhodes' hearing fan and other types of acoustic fans were available late in that century.

The first electric hearing aid



A body-worn hearing instrument requiring two large batteries.

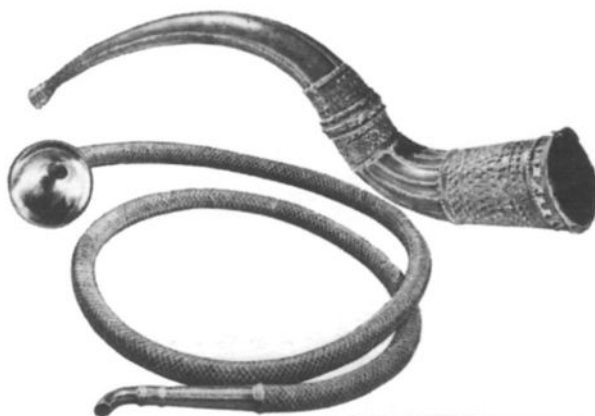
patent was issued in 1880 soon after the invention of the telephone by Alexander Graham Bell in 1876. The first commercially-made electric hearing aid was introduced in 1898 or 1899. The first practical wearable electric hearing aid was made by Miller Reese Hutchinson in 1902. This instrument, the Acousticon, was a carbon hearing aid which incorporated a microphone (transmitter), an earphone and was powered by a battery.

The invention in 1907 of the vacuum tube by deForest in 1907 was the initiation of the electronic age and in 1923, Western Electric demonstrated their first hearing amplifier which was housed in a furniture console. Radioear Corporation, established in 1924 as E. A. Myers & Sons, also produced some of models of non-portable hearing aids about this time.¹

Development of portable models of hearing amplifiers incorporating vacuum tubes followed and in 1937, Arthur M. Wengel, an electronics research engineer for Ray-O-Vac Battery Co. applied for a patent for a vacuum tube hearing aid, said to be the first vacuum tube aid in the United States. Only a few of these instruments were produced. About the same time (1933-34), Ralph Allison built a hearing aid which used vacuum tubes and his first instruments were produced in his basement in Minneapolis, MN. A sales representative for Acousticon, Allan Hemple, learned of Allison's instrument and together these two men set up a company in Minneapolis called Telex Products Co in 1936 to market this portable hearing aid called Telex. Some early US companies manufacturing vacuum tube hearing instruments were Acousticon, Aurex, Maico, Radioear, Sonotone and

Western Electric.² Incorporation dates of these companies were: Acousticon Electronics, Inc. as Akouphone Co. in 1898; Aurex Corp in 1935; Maico in 1936 by Leland Watson as Medical Acoustics Instruments Co. and Sonotone in 1929.¹

Oticon, which was incorporated



A variety of hearing instruments have been used over the ages even including a tin kitchen funnel (lower right)!

in 1904 to distribute Acousticon hearing instruments, began manufacturing their own line of hearing instruments in 1940, and Siemens, which was incorporated in 1847 and began manufacturing hearing aids in 1910, were major manufacturers in Europe producing amplification products at the beginning of the 1940s.¹ ♦

References

1. Berger KW: *The Hearing Aid. Its Operation and Development.* Livonia, MI: The National Hearing Aid Society, 1984.
2. Skafte MD: *50 Years of Hearing Health Care.* Duluth, MN: Edgell Communications, Inc. 1990.

Photos on this page are from "Have You Heard...!," published by the Hearing Aid Industry Conference, Inc. (HAIC), 1968.

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1940s

THE ERA OF CONSIGNMENT, FRANCHISED DISPENSERS AND BODY-WORN HEARING INSTRUMENTS.

Carbon hearing aids become outmoded, replaced by the smaller, more advanced vacuum tube instruments. Batteries get considerably smaller, too, integrating the bulky A & B packs. Wearable hearing aids (weighing about 2.5 lbs.) became possible in the mid-30's and, in the '40s, clinical involvement in dispensing accelerates. Hearing aid size (body aids) and background noise issues come to the forefront. A hot topic is the clinical referral system, which has audiologists testing patients then recommending instruments by model and brand, often based on their clinic's hearing aid stock/inventory. Hearing aid dealers then provide these devices. Problems for

the field emerge as hearing aid dealers protest that they are becoming only "order fillers." A large percentage of the hearing testing and fitting of hearing aids is carried out in homes and in satellite centers in hotel suites/rooms. Manufacturers want franchises to protect their investments. Earmold impressions are made using plaster of Paris. Most earmolds are made of acrylic plastics, and hard rubber is used for patients who experience allergic reactions. The teachings of Carhart become influential (today, some call this the Carhart Era). Industry public relations efforts focus on physician education relevant to the role of the hearing aid in rehabilitation of hearing-impaired people. ♦



Sam Lybarger, circa 1930s, models the first Radioear wearable hearing aid—Model B6.

► **1940:** Arthur M. Wengel, an engineer at Rayovac Battery Corporation, receives a patent for the first vacuum tube hearing aid invented in the U.S. (patent applied for 3-6-37). The devices were marketed under the name Stanleyphone from 1937-38.
 ► **1943:** There are 43 manufacturers selling hearing aids. Six companies dominate half the units marketed (according to David Barnow, Beltone).
 ► **1945:** Batteries get smaller. Formerly, they came in two cells: the A battery warmed the filament in the tubes and the B battery amplified the sound.
 ► **1946:** Drs. Norton Canfield and Frances Lederer, MD, and Raymond Carhart, PhD, lead drive to convert speech clinics to hearing & speech centers which include hospitals & rehab centers served by physicians; colleges and universities served by audiology students; community hearing

centers served by local AHS chapters and gov't veterans' centers.
 ► **1946:** The Harvard Report is published in *Laryngoscope* with controversial recommendations that will greatly influence hearing instrument selection procedures.
 ► **1947:** Radio Ear introduces an all-magnetic, wearable vacuum tube hearing aid.
 ► **1948:** The "Day Bill" proposes licensing of both dealers and manufacturers. In 1949, a counter-bill, the Burns Bill, is introduced to set acceptable standards. It says the profession of fitting hearing aids is called *audiometry* which is done by *audiometrists*.
 ► **1948:** *Ride the Pink Horse* runs at movie houses, featuring a protagonist who wears a hearing aid.
 ► **1948:** Hearing aids are the first civilian use of mercury-type battery power cells.
 ► **circa 1948:** About 3000-3500 hearing aid dealers in the field,



The country is called into service, including Henry Meltner (l) and Harold Spar (r), who establish Hal-Hen at the war's conclusion. Sydney Gurschkov, founder of Insta-Mold received a Presidential citation, two Silver and one Bronze Stars for his action in the war.

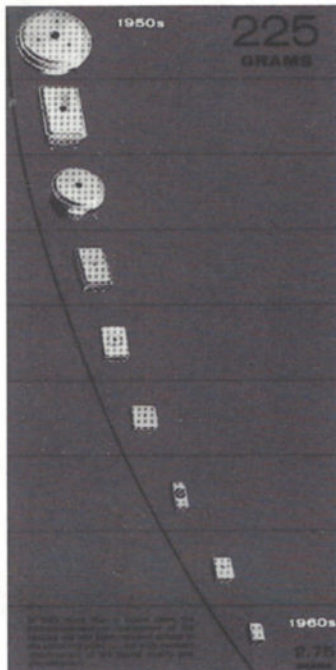
	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949
CORPORATE	► Beltone Electronics and Clearstone established.		► Zenith and Goldentone established.	► GN Danavox established. ► American Hearing Aid Mfts. Assn. (AHAA) informally forms.	► RION Co. established.	► Scientific Plastics established.	► Knowles, Duracell USA, HAL-HEN, Hocks Labs, Microtronic, Audiotone & Televox established.	► First issues of Hearing Aid (later HI) and National Hearing Aid Journal (later HJ) published.	► Dahlberg Inc. forms. ► American Hearing Aid Mfts. Assn. (AHAA) formally forms.	► Grason-Stadler, Industrial Acoustics and Am. Overseas Trading form.
TECHNOLOGY	► Ceramic capacitors add to instrument life and reliability.		► World War II profoundly affects the industry. The War Production Board regulates battery models, cutting down the variances in external leads and connectors. Shortages of electronic parts and batteries, in particular, become common, as they are requisitioned for the service branches. Hearing protection was not common in WWII, although the "Ear War" was used by some soldiers (although branded uncomfortable).			► First hearing aid components and batteries incorporated into one case appear.	► Acrylic impression material introduced, as well as hydrocolloid and alginate base materials which require chilling prior to use.	► First printed circuits used, replacing 173 parts. ► Otometry mentioned in trade journals.	► John Bardeen, Walter Brattain and William Shockley, Bell Laboratories, introduce transistor. ► Eveready introduces an "air cell" that triples the life of its size 1016E penlight batteries.	► "Prescription hearing" via selected prescription parts offered by Universal Hrg. Institute, Inc.
MARKETING	► The switch is on, as many existing hearing aid manufacturers change from carbon to vacuum tube models, including Telex, Maico, and Sonotone, as well as Acousticon, Aurex, Aurophone & Western Electric. ► The film <i>Audiology</i> , produced in 1935, is copyrighted.			► "Commander" McDonald, founder of Zenith Radio Corp., runs full page newspaper ads selling \$40 aids, causing consternation among manufacturers.		► Beltone introduces the popular "Mono-pac," the first one-piece wearable vacuum tube instrument, which becomes the template for the rest of decade.	► Fusing tubing for attachment to earmolds begins to gain acceptance in late '40s.	► American Earphone Co. advertises Electro-Ear, a one-piece aid that, among other things, filters out background noise via a range selector. ► The Telex 97 is advertised as a one-piece instrument that gives "six full octaves of noiseless hearing" via a recessed sound aperture and air-cushioned, pivot-mounted mic.		► Bob Hope endorses Paravox aids in <i>Newsweek</i> , <i>Business Week</i> , <i>Life & Parade</i> . ► Sears Roebuck catalog offers aids for \$84.52.
THE FIELD					► Many colleges and universities add audiology courses at the conclusion of the War.	► Harvard Report on "The Selection of Hearing Aids" is issued.	► The Am. Speech Correction Assn. changes its name to American Speech & Hearing Assn. (later ASHA)	► The National Hearing Aid Consultants Assn., the first national assn. for hearing aid dispensers forms. First convention held at Chicago in May.		► First mtg. of the Intl. Hearing Aid Assn. (IHAA) held. Some members pledge to contribute \$1 for each hearing aid sold to set up Better Hrg. Foundation.

1950s

THE DECADE OF THE TRANSISTOR AND SWIFT TECHNOLOGICAL CHANGE, THE SINGLE VS. MULTI-LINE DEBATE BEGINS, AND EYEGLASS AND ITE HEARING AIDS BECOME A REALITY.

At the beginning of the decade, body aids dominate the market with prices ranging from \$50-200, but new hearing aid types, made possible by the transistor, are soon introduced that transform the industry: eyeglass, barrette/earring, BTE and ITE hearing aids. (Note: patents for many of these types go back as far as 1909.) The decade begins with about 4000 hearing aid dispensers, most of

whom are single-line marketers with franchise arrangements. However, by 1945, significant numbers of dealers start becoming multi-line marketers in order to gain a share of clinic referrals. The roles of clinics, otologists and hearing aid dealers are a hotly debated subject. Mobile hearing care units (e.g., trailers with audiometric test equipment) begin to appear. Direct mail becomes widely used for the first time. Hearing aid imports from Europe increase in the late-'50s. Technical advances in hearing aids and test instruments spur continuing education programs, manufacturer seminars and new university audiology programs. Pure tone audiometers are the primary testing instrument; pediatric screening becomes more important and feasible with the advent of hearing screeners. ♦



A HAIC illustration showing the microphone-receiver component size from the '50s (225 g) to the late '60s (2.75 g). Reprinted from "Have You Heard...!", HAIC, 1968.

their doctors' words of advice." ♦

▶ 1951: "Audiology is a new word coined in 1945...It is defined as the 'science of hearing' and an audiologist...is a physician who has pursued graduate studies in hearing and whose main interest is in the evaluative and rehabilitative aspects of hearing problems."—R. Carhart, Arch. Otolaryng, 1951.

▶ 1951: The Hearing Foundation (HF), sponsored in large part by dispensers, initiates speaking tours and radio testimonials by famous people, including Eleanor Roosevelt.

▶ 1952: SHAA publishes *Decibel*, later known as *Audecibel*.

▶ 1952-53: The industry is the first to make practical use of junction transistors. This dramatically impacts hearing care, with sales of transistor hearing aids jumping from 225,000 units in 1953 to 325,000 in 1954. Avg. price: \$200.

▶ 1953: FTC orders Acousticon to stop requiring that their distributors sell only their products. The FTC says this practice violates the Clayton Anti-Trust Act and FTC Act.

▶ 1956: "It is the patient who suffers when professional jealousies and jurisdictional disputes occur among the different specialists. [Professionals] will serve their interest best, as well as those of the patient, when they all work in a cooperative, unified effort toward a common end."—Maurice Miller, PhD, HD article.

▶ 1957: An atomic battery by Elgin Nat. Watch Co. is developed from by-products of nuclear fission. However, the metal shield makes it as big as a cough drop, and it never catches on.

▶ mid-'50s: As sales of eyeglass hearing aids increase, so does friction between optometrists and hearing aid

dealers. Optometrists were encouraged by their association not to "sell merchandise nor perform services related to hearing aids" and that hearing aid dealers would refer patients to them for the fitting of eyeglasses.

▶ 1957-58: Several individuals begin experimenting with ITEs and applying for patents in the mid-50s to 60's, including Paul and Fred Willoughby and Leslie P. Leale (who manufactured Earmaster). Leale develops a master hearing aid that simulates 45 frequency responses. Earmaster Inc. is purchased by Goldentone in '68. Willoughby Electronics' ITE facility is later purchased by Starkey Labs.

▶ 1958: Dahlberg Co. announces a hearing aid rental plan with a low monthly fee which can be applied against the price of purchase if the person decides to buy the aid.

1950 1951 1952 1953 1954 1955 1956 1957 1958 1959

CORPORATE

▶ Mid-States Labs established.

▶ Audiovox forms when Western Electric leaves the hearing aid field.

▶ Am. Stand. Assn. (ASA) releases new Am. Standard Method for the Measurement of the Characteristics of Hearing Aids.

▶ Qualitone established.

▶ Rexton established. ▶ AHAA gives way to the Hearing Aid Industry Conf., renamed Hearing Ind. Assn. (HIA) in 1956.

▶ Approx. 66 manufacturers of hearing aids; only 12 will survive/remain intact to '90s. ▶ Widex Hearing Aid Co. est.

▶ ADCO, Eckstein Bros. & Vanco Ind. established.

▶ Westone established.

TECHNOLOGY

▶ IAC offers pre-fabricated sound-proof test rooms.

▶ Raytheon introduces junction transistors paving the way for aids which use only the A-battery.

▶ Eveready announces a battery weighing only 1/4-oz. P.R. Mallory announces a button cell low-voltage mercury battery for transistor aids. ▶ Maico, Microtone, Radioear and Unex among first to introduce all-transistor hearing aids, and other companies rapidly convert to this new technology.

▶ GE and Sylvania introduce silicon transistors which operate at higher temperatures. ▶ Dahlberg announces first Miracle Ear ITE.

▶ Portable audiometers, popular due to the door-to-door sales, are manufactured by Beltone, Dahlberg, Eckstein Bros., GSI, Maico, Oto-sonic Electronics, Qualitone, Sonotone, Tonemaster, Ambco, Audiotone, Aurex, Audiovox (Western Electric), and B & K Instruments.

MARKETING

▶ Eveready (Union Carbide) broadcasts commercials in 50 TV stations, bringing the hearing aid story to 10 million people.

▶ Legislative bills regulating hearing instrument dispensing and advertising are introduced on a state level in early '50s. ▶ Beltone sponsors several radio and TV shows featuring Dave Garroway, Mary Margaret McBride & Gabriel Heatter.

▶ Philco introduces a television sound system ALD for up to four people. Hal-Hen continues to be a large supplier of ALDs throughout the decade.

▶ The "Robot Salesman," a self-screener, which resembles a telephone and costs \$150, is used at fairs and shopping centers.

▶ Introduction of the Listener by Ontario, a fully-contained eyeglass aid, spurs a revolution as the eyeglass aid dominates for years to come.

▶ A hearing aid contained in a custom-built earmold, delivered within 10 days of the order, is advertised by Stanley Webster Labs.

▶ Maico Hear-Rings, an at-the-ear adaptation of earrings, become widely popular. ▶ Mallory runs several battery ads in *Time*.

▶ BTE and ITE advertising begins to gain steam. Model names include Hidden Ear (Qualitone) and Magic Ear (Dahlberg).

THE FIELD

▶ The Hearing Foundation increases awareness of hearing care to the public. Hearing Awareness Week is sponsored by the Am. Hearing Soc. (AHS). ▶ Soc. of Hrg. Aid Audiologists (SHAA) begins to establish standards for certification as a "Certified Hearing Aid Audiologist."

▶ *Hear No Evil* features Tony Curtis as a boxer with hearing loss. A Maico H-1 audiometer is used in the movie to test his hearing.

▶ WI State Fair research project to establish a set of standards for hearing. Over 3600 people are tested. ▶ SHAA forms Natl. Bd. of Certification.

▶ ASHA establishes Am. Spch-Lan.-Hrg. Foundation.

▶ Educational courses for hearing aid dealers and college courses in audiology increase throughout the decade. Dealer training seminars sponsored by manufacturers.

▶ *The New Scientist* reports on a man who receives an implant of a tiny coil next to the temporal bone.

▶ First HAIC Dealer Education Workshop held in Chicago.

1960s

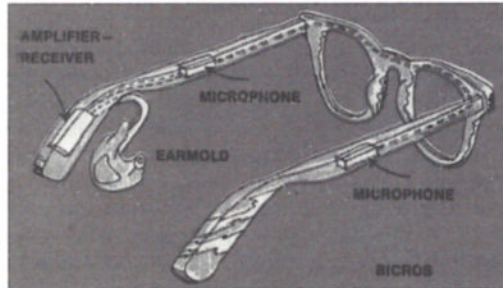
TIMELINE OF THE HEARING INDUSTRY

THE ERA OF THE BTE, STATE & PROFESSIONAL LICENSING, GOVERNMENT HEARINGS, & TRIAL PERIODS.

How hearing instruments are dispensed and by whom become a debated issue. As non-profit speech and hearing centers increase, so do concerns about their role in hearing health care and their specification of certain models and types of instruments. (Dealers felt that their daily work with many different instrument models made them uniquely qualified to add input into instrument selection and cited as a problem the lack of education about amplification in audiology curriculum.) The first audiologists start dispensing hearing instruments and are labeled "unethical." Some physicians begin dispensing hearing aids from their offices. Manufacturers encourage closer dealer-referral relationships, and hearing instrument sales increase. Dispensers send clients to physicians for examination when abnormalities in the ear are noted. As referrals increase, more dealers move into multi-line dispensing to better accommodate referral sources. Trial periods become popular, although disputed due to concerns about technical, perception and cost concerns.

Many new types of instruments and formulae for "prescriptive fittings" are

introduced, although the use of this term is hotly contested. Transistor aids dominate the market and their size decreases. Among the many technological innovations are CROS, BICROS, integrated and push-pull circuits, miniature magnetic mics, capacitor/transducer developments and telephone pick-up coils. New capabilities in test instruments are devised, and earmold and impression taking techniques become more



Eyeglass aids start the decade at about 65% of all sales and end the decade comprising about a quarter of all instruments sold. BTEs gain rapid popularity. This illustration shows a BICROS aid. Reprinted from "Facts About Hearing and Hearing Aids," 1970.

► **1959:** Eyeglass aids account for 65% of the market; BTEs 12%; body 12%; barrette aids 9%. ♦

► **1960:** Leland Watson, president of Maico and industry leader, is killed in a tragic airline crash. Due to a mistake in booking, Russell Bennett, present-day HIA counsel, is "bumped" from the same ill-fated flight, saving his life.

► **1960:** A survey conducted by the Colorado Soc. of Hearing Aid Audiologists says 97.5% of 1014 people who had hearing instruments wore them. 87.7% said they were satisfied with their aids; 86.1% wore the aids more than 4 hours/day; 71.5% wore the aids more than 8 hours/day.

► **1962:** Kefauver investigation of many industries' professions includes hearing aid industry pricing and dealer practices.

► **1962:** "A [trial period] is much the same as a person who can-

not drive a car going into an automobile showroom and asking to take a car out on trial. He must be taught the use of the instrument and what to expect."—*Maurice Berkley.*

► **1963:** Ralph Campagna proposes the establishment of a public relations program like that of the Better Vision Institute. Each dealer is to contribute \$100, each manufacturer \$1000, in support of greater consumer awareness efforts.

► **1965:** Sales approach 400,000 units with BTEs comprising 46.9%; eyeglass aids 29.5%, body aids 17.3% and ITEs 6.3%.

► **1965:** "If a man builds an aid to a prescription, we must be allowed to say so." — *Hyman Goldberg, Electronic Development Co. in HI in response to rulings against the use of the word "prescriptive fitting."*

► **1967:** Hearing industry licensing bills

increase. Legislative action is taken in 20 states. Model state licensing bills developed by HAIC, NHAS, FTC and Council of State Governments.

► **1968:** Sen. Church (ID) holds hearings. Testimony from industry experts report that 13% of those over 65 suffer hearing loss and 93% who constantly wear aids are satisfied. Nanette Fabray testifies as to importance of hearing health. Little comes of hearings except bad press.

► **1968:** Establishment of a model licensing bill that was jointly developed by HAIC, NHAS and AAOO Committee on Hearing.

► **1969:** Of approximately 9000 otologists, only 1% have audiometers, according to Arne Darbo, Maico.

► **1969:** 470,981 hearing instruments are sold with BTEs comprising 55.1%; eyeglass aids 24.2%, body aids 14.2%, ITEs 6.5%. ♦

1960 1961 1962 1963 1964 1965 1966 1967 1968 1969

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
CORPORATE	► The ASA revises its 1953 standards, releasing S3.3. ► HARC and Madsen Electronics established.	► ISO/R389 establishes worldwide audiometric threshold standard for air conduction.	► First Nat. Assoc. of Earmold Labs (NAEL) meeting held. Buel Kent voted first president.	► Electone, Phonic Ear and Starkey Laboratories Inc. (Starkey Labs Inc. in 1971) established.	► All American Earmold and Microsonic established. ► HAIC exhibits hearing instruments at World's Fair in New York City.	► Phonak and Nicollet established.	► Earmold Design, Pacific Coast Labs (formerly Ward H. Pound) established.	► Magnatone and Quest Electronics established.	► AMPLUS (Amplaid) established.	► Over 100 different models of audiometers. Test instruments continue to increase their capabilities.
TECHNOLOGY	► Microtone introduces 12-transistor aid. ► Artificial mastoid by Bellone, used as control device in producing audiometers & aids.	► Test instruments gain in function and complexity. The Otic Evaluator by American Electronic Inst. Corp. determines max. pressure gain and freq. response needed for a prescriptive aid. ► Eveready introduces silver-oxide batteries after 12 years of research.	► Rayovac introduces the Dial Pac.	► Audiovox introduces a method evaluation of custom-built aids using pure tones, SP tolerance and SP limiting measures.	► Harford & Barry publish landmark article on CROS hearing aids in the <i>J Speech Hear Dis.</i> ► <i>Newsweek</i> describes researchers at Stanford Univ. who are implanting wires into the auditory nerve to bring sound to a person who is deaf.	► Mid-States Labs earmolds meet and fulfill NASA requirements for communications on Apollo 9.				
MARKETING	► Need for greater focus on consumer education & awareness is recognized by both dispensers and manufacturers. ► HAIC institutes statistical collection program.	► Widex offers one of the first travel awards programs for dispensers.	► The use of the words "prescriptive" and "prescription" are hotly debated. HAIC and SHAA Ethics Committee forbids their use in 1963; AMA deems it improper use of the words in 1964; and FTC in 1965 says it's improper unless "such product was made pursuant to a prescription given by a physician."	► Suggested models for state dealer licensing bills developed by AHIC, NHAS, FTC and the Council of State Governments. ► HAIC launches consumer education program.	► Senator Church holds hearings, causing a backlash of bad publicity. Sales suffer.	► VA hearing aid purchase list released to the public.				
THE FIELD	► FTC hearings on proposed revision of trade practice rules for hearing aid industry. ► SHAA home study course introduced. Several colleges and univ. set up accredited courses. ► 81 audiologists have advanced certification and 144 audiologists are reported to have basic certification with ASHA.	► Of the 34 manufacturers at the Soc. of Hrg. Aid Audiologists Convention, 50% are from outside the US. ► Kefauver investigation.	► SHAA establishes executive offices in Detroit.	► FTC expands and revised trade practice rules are issue.	► FTC holds hearings on proposed revised trade practice rules for the industry. ► SHAA and NHAS merge.	► Hearing aid dealer licensing bills and legislation increase. ► 700 audiologists are reported to be members of ASHA.	► The Am. Council of Otolaryngology is incorporated. Dr. Jerome A. Hilger named chairman of the board.	► Joint HAIC & NHAS educational 4-day workshops for dealers is initiated. ► 50th Anniv. of NAHSA.		

1970s

THE BEGINNING OF THE MICROCHIP AGE AND THE DECADE OF CONSUMERISM; GOVERNMENT INVESTIGATIONS AND GREAT ADVANCES IN TEST INSTRUMENTS AND EARMOLDS.

Hearing instrument dispensing moves to in-office businesses (58% dispense from office while only 37% dispense from home and 5% split between both). The clinical referral system leads to the gradual breakdown of the franchise system, and wholesale distributors flourish as multi-line dispensing becomes more popular. Hearing instrument selection begins to move away from letting word lists and recognition scores select hearing instrument models/types; prescriptive fitting methods become a popular

tool for selecting and fitting hearing instruments. Great strides are made in the sophistication, numbers and types of audiometric test instrumentation. Instant earmold materials become available for the first time. Likewise, the "Syringe Method" of making ear impressions is adopted and quickly becomes standard procedure. Most state licensing bills contain many of the provisions that NHAS and HAIC developed in their model licensing bills, and legislation to license dispensers and audiologists becomes widespread (e.g., Florida is the first to enact an audiology licensing bill). The '70s are a tumultuous time for hearing industry manufacturers, as the FTC issues Proposed Trade Regulations for the Hearing Aid Industry, Sen. Church holds congressional hearings, and the *Nader Report* is released. Ensuing negative publicity, combined with the economy, cause depressed sales. According to Market Facts, 90% of hearing aid owners are satisfied with their amplification while only 5% rated themselves as very dissatisfied. ♦

► **1970:** The majority of dispensers charge one fee for hearing aid(s) and service, however, a number of dispensers start "unbundling" fees. Provision of service after the sale of an aid was estimated at 17.5 hours: 11 hrs. on fitting and maintenance and 6.5 hrs. on rehab.

► **1971:** "The climate for increased sales has never been more favorable. As a result of the Walsh-Healey Act and the Omnibus Safety Bill, public consciousness...is being raised to a new high." *Robert Winslow, HAIC president.*

► **1971:** The first Intl. Hearing Aid Seminar is held in San Diego.

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► **1971:** The first Intl. Hearing Aid Seminar is held in San Diego.

► **1972:** Over 20 NHAS/HAIC workshops on fitting technology are offered. HAIC also approves a \$100,000 budget for consumer education.

► **1972:** FTC issues complaints against

five manufacturers regarding imposed territorial restrictions, exclusive dealing and anti-competitive practices.

► **1972:** Southern Audiological Soc. established.

► **1972-73:** The Retired Professional Action Grp., supported by Ralph Nader, undertakes the Hearing Disability Study. After 10 mos., its director, retired diplomat Joseph E. Wiedenmayer, resigns. What emerges is a 16-mos. study entitled *Paying Through the Ear*, coordinated by Elma L. Griesel with assistance from the NYC Gray Panthers. Widely referred to as the *Nader Report*, it alleges that hearing aid manufacturers and dispensers maintained artificially high prices. The Associated Press later quotes Weidenmayer as saying, "It seems to confirm what I was afraid of. It would seem that such a

report could, inadvertently or otherwise, only confuse or frighten the hard of hearing."

► **1973:** Senator Bob Dole is the featured speaker at NHAS Annual Meeting.

► **1973:** The American Audiology Soc. forms and changes its name to the Am. Auditory Society in 1978.

► **1974:** Senator Charles Percy launches an attack on the industry in the Senate and calls for a probe of the industry while the HEW, FDA and FTC are already investigating.

► **1975:** 80th Annual Mtg. of the Am. Acad. of Ophthalmology & Otolaryngology includes a lecture on "Proper Auditory Rehabilitation."

► **1975:** "The specter of adverse legislation hovers over 1975 dimming the light of progress. The threat of legislation...will con-

sume a major amount of time, energy and financial resources which could be better directed toward the cause of upgrading products and services for the hearing impaired." — *William Austin, Starkey.*

► **Mid-Late '70s:** Many new educational programs emerge. The Hearing Aid Institute is started in Lubeck, Germany, and the audioprosthology educational program begins at the Univ. of TX-El Paso.

► **1977:** Last joint-meeting of the Am. Acad. of Ophthalmology & Otolaryngology.

► **1978:** ASHA changes name from Am. Speech & Hearing Assn. to the Am. Speech Language Hearing Assn.

► **1979:** HIA Market Development Committee initiated. ♦

1970 1971 1972 1973 1974 1975 1976 1977 1978 1979

CORPORATE

- **1970:** Great Lakes Earmold Lab & Dyna-Aura Eng. Labs est. ► **1971:** Auditec of St. Louis established. ► **1972:** Ameriphone, Audiological Engineering Corp. and Electro-Medic, Inc. (Medical Tech., Inc.) established.
- **1973:** Frye Electronics and Gennum established.
- **1974:** Unित्रon Industries Ltd., Precision Earmold Labs, Microtronic A/S and Audiometrics Inc., est.
- **1975:** Williams Sound Corp. established
- **1976:** Best Labs, Hearing Services Intl., Nu-Ear Electronics and Tel-Star Electronics established.
- **1977:** Resistance Technology, Emtech Labs and Rastronics USA established.
- **1978:** Unimax Hearing Instruments and Ultratec established.
- **1979:** Argosy Electronics, Authorized Hearing Systems, Biologic Systems & San Diego Oto Supply established.

TECHNOLOGY

- **1970:** The average hearing aid user consumes 10.5 packs of batteries per year. ► **1971:** Knowles introduces smaller electret/FET mic. ► **1972:** Great interest and advances in horn earmolds (particularly by Killion) and insert valves (VVV, PVV and Select-A Vent) take place in early '70s. KEMAR developed in 1971.
- **1973:** Frye Electronics introduces first digital hearing aid analyzer. ► **1974:** Tibbetts introduces Diabow microphone.
- **1975:** Push-pull amplifiers with separate pre-amp and output stages available.
- **1976:** Amplifiers for moderate/mild gain aids and plastic mini-pacs launched. ► **1977:** Zinc air battery introduced by Gould Inc. ► **1978:** Modular amplifier concept introduced.
- **1979:** First surface-mount package offered and first sale of chips.

MARKETING

- **1970:** Hearing instrument prices between 1955-1970 increase 23%, while prices increase for eyeglasses 64%, physicians fees by 86% and hospital daily service by 246%. ► **1971:** BTEs make up 66% of market, while eyeglass aids comprise 16%, body aids 10%, ITEs 8%.
- **1972:** FTC issues complaints against six manufacturers. FTC also issues 3-day "cooling off" period for door-to-door sales.
- **1973:** Sales experience deep slump from 1973-1977 due to government investigations, bad publicity, and the energy shortage/economy. Unit sales drop from approx. 511,000 in 1970 to 410,000 in 1977.
- **1974:** Hearing instrument unit sales exceed 600,000.
- **1975:** FTC issues Proposed Trade Regulation for the Hearing Aid Industry. Magnuson-Moss Warranty FTC Improvement Act signed by President. Professional & Patient Labeling and Conditions for Sale published in the *Federal Register*, Apr. 1976.

THE FIELD

- **1970:** NHAS membership reaches 2700 with 45 state and provincial chapters.
- **1971:** Beltone releases *To Conserve and Protect*, a film endorsing hearing protection. AG Bell launches its "Hearing Alert" program.
- **1972:** Better Hearing Inst. (BHI) begins in March. ► **1973:** HAIC membership reaches 29 companies. ► **1974:** Southern Aud. Soc. est.
- **1975:** BHI launches first public service announcements. ► **1976:** American Tinnitus Assn. formed by Dr. Charles Unice.
- **1977:** ASHA celebrates 50th anniversary. ► **1978:** PL94-142 Education for All Act leads to an increase in hearing screening in schools. ► **1979:** In June, ASHA proposes change to Code of Ethics that would permit audiologists to engage in retail sale of hearing aids.
- **1979:** ASHA Code of Ethics changed. By end of decade, app. 900 audiologists dispense hearing aids. ► **1979:** H.E. "Rocky" Stone establishes SHHH.

1980s

TIMELINE OF THE HEARING INDUSTRY

THE DECADE OF DEREGULATION. GREAT ADVANCEMENTS IN MICRO-MECHANICAL COMPONENTS AND DIGITAL/PROGRAMMABLE INSTRUMENTS. RADICAL CHANGES IN HEARING INSTRUMENT TYPES AND DISPENSING DEMOGRAPHICS.

As the population of the U.S. gets older, increasing numbers of people find themselves coping with hearing loss. Hearing loss is noted by the National Center for Health as the third most prevalent health condition, and it is estimated that 10% of the entire population and 28% of the age-65+ population suffer from impaired hearing. President Reagan is fitted with a hearing instrument and the ensuing positive media attention dramatically boosts sales. Major changes occur in the popularity of instrument types. In 1980, twice as many BTEs are sold than ITEs. By 1989, ITEs outsell BTEs by a ratio of 5-to-1. Canal instrument unit sales nearly triple in only five years, from 90,965 units in 1984 to 255,793 units in 1989. Likewise, the demographic profile of the average dispenser also changes radically. The decade starts with only 912

dispensing audiologists, but ends with nearly 5000. The average dispenser is younger compared to dispensers of the last decade and nearly half are female.

With deregulation, the hearing industry experiences a relatively calm legislative period, and hearing instrument unit sales are brisk throughout the decade. In government, "supply-side" and "voodoo" economics become household words. Income levels during the '80s favor the well-to-do; the top 20% of the wage-earning population (avg. = \$85,000/yr) see their incomes increase by \$9000, while the bottom 20% (avg. = \$8800) see their incomes fall by \$576. ♦



The Hearing Industry Foundation board of directors, circa 1980, included (l to r) Alfred Dunlavy, Raymond Rich, Veryl Conn, Jr., Marjorie Skafte, John Kojis, Larry Kent and John Kenwood.

- ▶ **1980:** HIA Market Development Committee begins active campaign to expand market. HIA also conducts a Gallup poll of 1600 adults: 41% knew of someone with a hearing loss and 4-of-10 of those people owned a hearing aid.
- ▶ **1980-83:** Researchers, including Killion, Dillon and Macrae, provide valuable insights into earmolds. E. Robert Libby develops the Libby Horn.
- ▶ **1981:** The average dispenser is 45.5-years-old, male (83.17%) and has been dispensing for 10.6 years. In 1989, the typical dispenser is 40-years-old, has been dispensing for 9.26 years and is less likely to be male (57.4%).
- ▶ **1981:** AAO-HNS and American Council of Otolaryngology (ACO-HNS) merge. Membership at end of decade exceeds 8700.
- ▶ **1983:** NHAS Annual Meeting pays tribute to women in hearing care field.
- ▶ **circa mid-'80s:** Test instrumentation, particularly real ear measurement and evoked potential, become standard. Frye Electronics and B&K Instruments conduct hearing aid test box seminars. Madsen, Grason-Stadler, American Electromedics and Teledyne provide courses on impedance audiometers, while Nicolet, Bio-Logic and Cadwell offer schools on evoked response instrumentation.
- ▶ **1985:** The FTC recommends that its rulemaking (Proposed Trade Regulation Rule) be terminated, pointing out in its commissioned study that "most hearing aid buyers are satisfied with their purchases and that only 4% of those surveyed described their aids as 'very dissatisfactory'...93% of hearing aids purchased were covered by a warranty...trial periods were offered in at least 70% of sales..." After several proceedings, 203 witnesses, 6000 pages of documents & 4000 pages of comments, stemming back to 1975, the proposed regulation comes to an end.
- ▶ **1986:** Evoked response measurement finds acceptance. Portable systems include Amplaid, Biocoustics, Bio-logic, Cadwell Laboratories, LifeTech, Nicolet, Otologic Products/3M and Tracor Northern.
- ▶ **1986:** NHAS members participate in White House Conf. on Small Business.
- ▶ **1988:** Margaret Skinner authors *Hearing Aid Evaluation*. ♦

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989			
CORPORATE	▶ Micro Audiometrics established.	▶ Omni Hearing Systems, Cochlear Corp., Finetone Hearing Instr. & Oto-Sonic established.	▶ Ensoniq and HITEC established.	▶ Audioscan (Etymonic Design) & Etymotic Research established.	▶ ReSound Corp., Warner Technologies (from Warner Ind. Supplies) and Audex established.	▶ Virtual, Bausch & Lomb (Voroba Tech.), General Hrg. Instr. & Hearing Technology est.	▶ Micro Tech and Hearing Healthcare News established.	▶ Audio Enhancement established.	▶ Bell Hearing Inst., Harmony Hrg. Aids, United Hearing Systems established.	▶ Hand-tronix established.			
TECHNOLOGY	▶ Information emerges from work on Zwislocki ear simulator mounted on KEMAR, including research by Harford, Hawkins, Preves and Teder.	▶ First working digital hearing system, using MAP-300 array, is produced by Harry Levit.	▶ Audiotone develops a potentially wearable digital/programmable aid that is later released as the System 2000 in 1987.	▶ Nicolet begins Project Phoenix, the development of a digitally prog. hearing aid and computer-based hearing test instrument.	▶ Rastronics CCI-10 freq. resp. analyzer & Acoustimed HA-2000, Madsen IGO-1000 & EARTRON INVIVO probe-tube mic systems introduced.	▶ New products introduced in the late-'80s include the Argosy Manhattan I and II circuits, Etymotic Research K-AMP; Knowles Class D amplifier, EP receivers, and Stepped Response™ mic; and Intellitech Zeta Noise Blocker microchip. A sampling of new digital/programmable instruments include ReSound Personal Hearing System™; Ensonique Sound Selector™, 3M Memory Mate™; Bernafon-Maico PHOX™, and Widex QUATTRO among others.	▶ Silver oxide batteries almost vanish as zinc air grows to comprise 82% of the market (from 37% in '81.)						
MARKETING	▶ Hearing aid sales increase slightly in first three yrs. of '80s, from 736,642 units in '80 to 854,485 in '82.	▶ Cost of hearing instruments rises only moderately throughout decade compared to other consumer and electronic items: '82: \$403; '83: \$455; '84: \$471; '85: \$493; '86: \$503; '87: \$513.	▶ Large spike in hearing instrument sales. Unit sales top 1 million for first time.	▶ Background noise cited as the major problem by 32% of hearing aid users.	▶ FTC recommends end to FTC Proposed Trade Regulation Rule for Hearing Aid Industry (proposed in '75).	▶ BHI, with support of all disciplines, continues its public outreach efforts throughout decade. Popular spokespeople include Lou Ferrigo, Lorne Greene, Burt Reynolds, Bob Hope, Buddy Ebsen, C. Everett Koop and Bill Cosby.	▶ 53.7% of dispensers carry out marketing according to an established plan. Direct mail #1 popular mktg. method.						
THE FIELD	▶ NHAS establishes Nat. Inst. of Hearing Instrument Sciences (NIHIS).	▶ The Vanderbilt Symposium is sponsored by the VA and organized by Bess & Studebaker.	▶ OSHA Hearing Cons. Prog. for industry effective in April.	▶ Nat. Board Certification in Hearing Instr. Sciences (NBC-HIS) initiated in 1982.	▶ President Reagan publicly acknowledges hearing problem and is fitted with hearing aids. Sales increase.	▶ SHHH holds first national convention. In '88. Access 2000 prog. makes all meeting sites communally accessible.	▶ President Reagan switches from ITE instruments to ITCs. More positive press follows.	▶ Hear Now established.	▶ James Jerger proposes the establishment of the Amer. Acad. of Audiology. The first mtg. is held in 1988 in Houston.	▶ National Institute on Deafness & Other Comm. Disorders est.	▶ Groundwork for AuD laid at ADA Conf. on Prof. Education.	▶ Mayo Symp. uses closed-circuit TV and is accredited by the AMA & ASHA.	▶ ASHA membership exceeds 50,000.

THE ERA OF MANAGED CARE, DIGITAL/PROGRAMMABLE, DEEP CANAL AND DSP INSTRUMENTS; BINAURAL FITTINGS GAIN WIDESPREAD ACCEPTANCE. FDA REGULATION REVISITED: SALES FALL BETWEEN '92-'95.

Hearing care research and development focuses on helping people to hear better in the presence of background noise, deep canal fittings, digital/programmable technology, PC-based software for fitting programmable aids and managing offices, and digital signal processing (DSP). Recognition that technology is outpacing audiological fitting strategies/techniques prompts calls for protocols that address digital/programmable and compression instruments (e.g., IHAF). Real ear measurement and otoacoustic emissions become more common ways to test and validate clients. In 1990, 43.8% of dispensers use real ear measurements to test after fitting. Subjective and objective validation techniques also gain prominence. Video otoscopy is used. Increasingly, calls are made for greater emphasis on pre- and post-fitting counseling, aural rehabilitation, and hearing instrument orientation groups. Dealing with managed care organizations becomes common-place for many businesses/practices for the first time, and many hearing care professionals struggle to weigh the benefits and risks (e.g., capitation, discounts, etc.) of servicing MCOs. Due to these and other reasons, data-driven systems for patient satisfaction, verification of hearing instrument benefit and preferred practice

patterns achieve heightened importance. CICs gain rapid market acceptance, similar to ITCs in the '80s. In 1993, the FDA holds hearings on the revision of the proposed Hearing Aid Regulation, and a dramatic slump in hearing instrument sales ensue, causing several dispensing offices (and manufacturers) to close their doors. The personal computer revolution leads to increased use of computers in fitting, selection and business management. NOAH and other software become available. Professional discourse on the nature and implementation of the Aud program takes place, and the issues of Entitlement and Equivalency are often hotly debated. Universal hearing screening programs for the 4-million babies born each year are debated, advocated and, increasingly, implemented. Likewise, advocacy for more funding and greater numbers of professionals in the field of educational audiology is advanced in the face of budget cuts. Further growth in the popularity of zinc air batteries virtually phases out silver-oxide and other types. Rayovac introduces the 5A battery. ♦



FDA panel in Rockville, MD, December, 1993.

▶ **1990:** Siemens dedicates new headquarters in Piscataway, NJ; Intelligent Hearing Systems offers first product.

▶ **1991:** A survey of dispensers conducted by Sergei Kochkin indicates that 26% of potential customers don't buy due to stigma, cosmetics or vanity; 22% refuse due to price; 17% due to lack of awareness of loss; 12% due to lack consumer education; and 9% due to the image of dispensers.

▶ **1991:** Dispenser-programmable instruments are the subject of many articles; popularity of 3-channel instruments grows.

▶ **1991:** House Ear Inst. and House Ear Clinic move into new combined facility.

▶ **1992:** NAHS changes its name to the International Hearing Society (IHS).

▶ **1992:** The US Public Health Service & National Academy of Sciences recommend an increase of at least 60% of primary care hearing screening of age 65+ population.

▶ **1992:** Growth of managed care noted in hearing care field.

▶ **1992:** Sertoma Communicative Disorders Scholarship Program established.

▶ **1993:** NIH establishes National Temporal Bone, Hearing and Balance Pathology Resource Registry.

▶ **1993:** Bausch & Lomb purchases Dahlberg Inc.; Welch-Allyn purchases Grason-Stadler.

▶ **1993:** In April, third auditory brainstem implant performed at House Ear Institute

▶ **1993:** Telex provides personal listening systems at Rose Bowl.



1995: Miss America Heather Whitestone, who wears hearing instruments, helps bolster the image of those using amplification.

▶ **1993:** NIDCD and VA team up to research benefits of hearing instruments (on-going research).

▶ **1993:** Josef Zwislocki receives First Hugh Knowles Prize for Distinguished Achievement in Audiology.

▶ **1993:** FDA sends Warning Letters to all manufacturers. Proposes stricter hearing aid rule changes. Senate special committee investigates dispensing of hearing aids. FDA proposes eight questions and a six-member panel listens to testimony from consumers and hearing care professionals.

▶ **1993:** Baylor initiates first AuD program in January. Central Michigan and Ball State follow.

▶ **1994-96:** The Internet plays an increasing role in hearing health care with professional resources ranging from *Med-Line*, *bionet*, *audiology*, and hearing instrument manufacturers' organizations' home pages.

▶ **1994:** Grant MacEwan Hearing Aid Practitioner Diploma Program initiated in Edmonton, Alberta.

▶ **1995:** Nintendo enrages hearing health care field with "Play It Loud" ad campaign.

▶ **1995-96:** Market begins to right itself; sales increase. ♦

1990

▶ Active Electronics, Audina, Ultratec and Philips Hearing Instr.(US) established.

1991

▶ Decibel Instruments and AVR Sonovation established. GN Danavox forms instrument division.

1992

▶ Sentech Systems established.

1993

▶ *Hearing Review* established.

1994

▶ HIMSA-America, MedRx, First Aid for Hearing Aids and Audio "D" established.

1995

▶ Mimosa Acoustics and Custom All Hear established. ▶ Oticon Holding A/S purchases Ascum Audiosys AS.

1996

▶ ReSound purchases 3M Hearing Health (renamed SONAR) & Microtronic U.S. established.

CORPORATE

TECHNOLOGY

▶ Truly portable Baudot/ASCII TTDs enter market; public TDDs debut. ▶ Several REM devices introduced. ▶ Computer systems do hrg. aid analysis, real ear & office management. ▶ 22 channel cochlear implant approved by FDA.

▶ Knowles introduces ES receivers. ▶ Jed-Med introduces video otoscope.

▶ Hand-held programmers and infrared programming remotes introduced. ▶ Real ear equipment emphasized.

▶ CICs sales increase 5-fold. ▶ *How to Get the Most Out of Your Hearing Aids* video by C. Everett Koop available.

▶ Oticon and Widex introduce digital signal processing (DSP/DAP) instruments. ▶ Programmable instruments gain in technology and acceptance, from approx. 5% of the market at the end of 1994 to 12-14% by the end of 1996 (estimated). Likewise, CICs comprise 13% of mkt.

MARKETING

▶ 91.9% of fittings are performed in-office. 79.3% of instruments are ITEs. ▶ 46.5% of all fittings are binaural.

▶ Increased profits noted by 77.4% of dispensers. ▶ 44% of all hearing aid batteries are sold by dispensers.

▶ Hearing aid sales reach high-point of 1.67 million units. ▶ Hearing aid sales decline from 1.67 million in '92 to 1.46 million in '94—a 13% decline.

▶ AARP publishes *Report on Hearing Aids*. ▶ Dec. '93: FDA public hearing on Federal Hearing Aid Regulation. Negative publicity causes sales free-fall. ▶ Est. 400,000 Whisper XLs are sold for less than \$30 ea.

▶ 59% of all fittings are binaural. ▶ FDA takes first steps toward reform. ▶ First Lemon Laws appear in state legislatures.

▶ Wireless Summit convenes on digital telephone interference. ▶ Whisper XL mft. ordered to pay refunds & settlement.

THE FIELD

▶ Americans with Disabilities Act (ADA) becomes law. ▶ Approx. 9446 professionals dispense hearing aids. The average dispenser is 41-yrs. old. ▶ 1991: 20th Intl. Hearing Aid Seminar held.

▶ U.S. Public Health Service & Nat. Acad. of Science recommend an increase of at least 60% of primary care hearing

▶ 48 states license dispensers.

▶ IHAF protocol unveiled at Jackson Hole Rendezvous. ▶ Miss America, Heather Whitestone, uses hearing aids.

▶ AFA holds "AuD Standards & Equiv. Conf." ▶ "Hearing Awareness Week" is declared by US Dept. of Health.

▶ HIA initiates "Hearing on the Hill" program to promote hearing health care to Congress. ▶ AAO's centennial.