

Selling the Cochlear Implant

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Abstract:

This article explores the power of rhetoric and representation, of marked bodies known to the hearing world as “the Deaf,” and also an artifact branded as a *cochlear implant* (hereafter referred to as CI). The CI invokes a story of culture wars ostensibly about ontological disputation. The case study examines the *conditions* of the implant’s production, the kinds of *commitments* invoked in product development and the processes of *bandwagoning* that led to the creation of a cochlear implant *black box*. Argument concludes that the normalization of the cochlear implant is due not just to the obtainment of inter-organizational networks of “relevant” social groups but was made possible through a deferment to *negative ontologies* of Deafness and the deployment of the inherent preferability of “hearing” as social capital. The study concludes that technologies of cochlear implantation, by being promoted as a technology of “treatability” in effect produce agreements and foreclose discussion on the contestability of the concepts of deafness, hearingness, aberrancy and normalcy.

Keywords: ontology; cochlear implants, Deaf culture, rhetoric, Disability Studies, deafness, hearing, science ethics.

Selling the Cochlear Implant

Cochlear implants remind me, more than anything else, of sex-change surgery. Are transsexuals really members of their chosen sex? Well, they look like that other sex, take on the roles of that other sex and so on, but they do not have all those internal workings of the other sex, and cannot create children in the organic fashion of members of the chosen sex. Cochlear implants do not allow you to hear, but rather to do something that looks like hearing. They give you a process that is (sometimes) rich in information and (usually) free of music. They make the hearing world easier, but they do not give you hearing. What they give you has value, so long as you know in advance what that is (Solomon, 1994, p. 14).

This article is about the power of rhetoric and representation, not only of marked bodies known to the hearing world as “the Deaf,”¹ but about an artifact branded as a *Cochlear Implant* (hereafter referred to as CI). It is also a story — a story about the incubation and birth of an artifact that its designers argue creates or mimics “sound”. Narratives of persuasion enabled the transmutation of an experimental and rather novel “hearing device” into a *bona-fide* curative solution to the “problem” of profound “deafness”. The CI additionally invokes a story of culture (wars) ostensibly about ontologies — those that are privileged and those outlawed and the ways competing notions of being-ness and rhetorical positioning are fashioned through either *etic* or *emic* lens (Clifton, 1968; Freire, 1970).

As part of the storytelling, I am interested in examining the *conditions* of the implant’s production, the kinds of *commitments* invoked in product development and the processes of *bandwagoning* that led to the creation of a cochlear implant *black box* -- a type of toolkit of knowledges, devices, plans and rationalizations. The selling of the cochlear implant was made possible through the creation of an actor network. A network develops by way of a process of *translation* and consists of three major stages: problematization (the defining and limiting of interests), interestment (a process of convincing other actors and stakeholders to accept definition of the focal actor, in this case the manufacturers of the implant), and enrollment (Callon, 1986). This article will show that numerous actors have been involved in a different process of translation, each with its own level of engagement and outcomes. I conclude that the “successful” normalization of the cochlear implant is

due not just to the obtainment of inter-organizational networks of “relevant” social groups but was made possible through a deferment to, and a harnessing of, *negative ontologies* of Deafness (and disability). Instead the deployment of the inherent preferability of “hearing” as social capital was invoked. In this way, I argue that technologies of cochlear implantation, by being promoted as a technology of “treatability” in effect produce agreements and foreclose discussion on the contestability of the concepts of deafness, hearingness, aberrancy and normalcy. The discussion is divided into two parts. The first part looks at the development of CI as *morphed* hearing. Part two moves to a discussion of critical ontological concerns that feature as subtexts in the rhetoric of deafness and cochlear implantation.

The epigram by Solomon (1994) that opens this article points to the ways technology has the capacity to mediate and destabilize forms on human subjectivity and ontologies of corporeal holism. The tale of the cochlear implant is primarily about *ontological transitions* and tussles over the locus of power. Biotechnologies enact, to use Hofmann’s (2001) language, a *technê matriké* inaugurating a constitutional binary of “this” and “that”, “what is” and “what isn’t”:

Medical technology has become the measure of all things; a kind of *ars mensura*. It has become the *technê matriké* of the modern age, the measure of what is good and bad, what is to be treated and not, and hence, what is diseased and what is not. This can be entitled the *technological invention of disease* (Hofmann, 2001, pp. 17-18).

From another angle, such versions of constitutionality shape and ultimately seek to enforce certain *moral landscapes* of reading difference and cultural ordering as well as contestable ethos’s of sound. Whilst the theme of this article may well be described in terms of ontological contestations, my analysis also points to sites of *converging interests* between apparatuses of medicine, law and commerce.

Working on a Doable Problem: The Evolution and Acceptance of the Cochlear Implant

CIs are touted by the popular press and the flashy brochures of manufacturers as providing the “miracle of hearing”, as resembling a “bionic ear”. This is despite the fact that both audiologists and otologists alike regard children with cochlear implants as remaining “severely hearing impaired” [sic] (Boothroyd, 1993; Horn et al., 1991). The following discussion examines how this rhetorical situation came to be, how the CI was transformed from a dubious experimental device to an established, celebrated developing technology. It was Jean-Marc Gaspard Itard (1774–1838), a doctor at the Paris Institute for the Deaf who in 1808 developed a *medical* formulation of deafness after the investigation of a “mute” student named Lefebvre. Nicholas Mirzoeff sums up Itard’s criteria for diagnosis:

If the patient showed signs of improvement in understanding and intelligence, the disease was simply deafness; if not deafness compounded with idiocy. Diagnosis thus depended upon the results of treatment, not upon the invisible and immeasurable deficiency of hearing it was supposed to correct (1995, p. 56).

Now that a definition and diagnosis of “deafness” was possible all that was needed was a “cure”, Itard had his life’s work cut out (no pun intended) for him. Itard was understood to have used injections, astringents, electricity, and hot irons to “unblock” deafness (Lane, 1992, pp. 212-213). The CI can be understood as a modern descendant of this search for a cure. The first direct stimulation of the auditory nerve was carried out by Lundberg in 1950 and improved by otologist Charles Eyries and medical physicist Djourno in Paris in 1957 after a desperate request by a deaf man for some hearing (Clark & Tong, 2000; Djourno & Eyries, 1957). Stuart Blume (1997) provides a worthy synopsis of the history of CI development that I do not intend to duplicate herein; rather I will detail key points of technological emergence. The period from the 1960s from the development of the multi-channel CI William House prototype until the late 1970s can be characterized as *experimental*, ambiguous and somewhat controversial (Blume, 1994; Blume, 1997; House, 1995).

It was only with the surgical implantation in 1978 by Australian otologist Graeme Clark and then throughout the 1980’s, that CIs were understood as a useful *therapeutic artifact* thereby gaining credibility amongst otological peers (Clark, 1987; Clark & Tong, 2000; Epstein, 1989). Like Alexander Bell, Graeme Clark’s “motivation” to develop a “solution” to deafness was due in part to his

experiences with a deaf father. Both Bell and Clarke conceptualized deafness as a world of silence and horrendous isolation (Bruce, 1974; Clark, 2000; Mackay, 1997). Since the 1980s to the release in 2000 of the *ESPrIt 3G™*, (a behind the ear processor) by Cochlear Limited, the development of “morphed hearing” transplants has been *multidirectional*, alternating between single and multiple electrodes, invasive and non-invasive prototypes (See Figure 1).

Multidirectional View of the Development of Morphed Hearing Implants

I now turn to the work of Clarke and Fujimura (1992), for assistance in identifying what needs to be studied to create a “roadmap” for our inquiry. Their schema for studying scientific work of CI is instructive:

Everything in the situation, broadly conceived: who is doing it and how is the work organized; what is constructed as necessary to do the work; who cares about the work (in the pragmatist and philosophical sense); sources of sponsorship and support both locally and elsewhere; what are the intended products, and for which consumers or users; what happens to the products after they are sent out of the door into the user workplaces; and last ... what interpretations do participating actors construct over the course of the work (Clarke & Fujimura, 1992, p. 5).

Pinch and Bijker (1987) provide a slightly different, but complimentary process. Using modeling based on a Social Construction of Technology (SCOT) methodology, they formulate a *multidirectional approach* to technological development by mapping four key areas, namely: artifact, social group, problem, and solution. Combining these two approaches not only provides a rich source of information but also will help in the mapping of broad networks of association across many social worlds.

One of the most striking features of the multidirectional development of CIs is the lack of artifact stabilization, i.e. the switching from single to multi-channel electrodes and back, the regional diversification of key stakeholders, and the non-linearity of product development. Nonetheless the project of building a “hearing device” was viewed by scientists and technicians as doable from the start. According to Joan Fujimura, “the construction of a doable problem is the process of solving a problem from the beginning to the end. ... Doable problems are sociotechnical achievements” (1996, p. 10). Yet the doability inscribed to the scientific work, occurs *ex post facto*, after the “solution” to describe and mask developmental problems.

Arguing from a different perspective, Hesslow (1993) suggests that technological treatability (in this case the CI) constitutes the “disease,” i.e. formulations of deafness and hearingness. He concludes: “it is not really the presence of a disease that is crucial, but the fact that some medical intervention may be beneficial and that it is within the physician’s power to help the patient” (Hesslow, 1993: 7). In other words, technologies of “treatability” engage in a circular logic with the agency of the artifact folding back onto the potential recipient who is then figured as diseased or deficient, i.e. the possibility of “curing” deafness means that Deafness *needs* and therefore *must* be “cured”. Further to this argument, disability is always *in waiting* and is preemptively deficient even before it is diagnosed.

Description of the C.I. as a product

About 1,000 Australian adults and children use a cochlear implant and this estimate, according to the *Cooperative Research Center for Cochlear Implant and Hearing Aid Innovation* (CRC, for short), represents only 5% of potential users (Cooperative Research Center for Cochlear Implant and Hearing Aid Innovation, 2001). This figure represents to ‘tip of the iceberg’ is terms of potential users, according to the annual reports of CI producers, who reiterate to stockholders that the market reach has been barely exhausted arguing significantly larger market exists that is yet to be captured.

A cochlear implant is a form of instrumentation that directly stimulates the cochlea and purports to “elicit patterns of nerve activity that mimic those of a *normal* [sic] ear for a wide range of sounds ... today’s devices enable about *10 percent* of those implanted to communicate without lip reading and the vast majority to communicate fluently when sound is combined with lip reading” (Eddington &

Pierschalla, 1994; my emphasis). The device is made up of five components: The electrode array (which is inserted into the inner ear); a receiver; a speech processor that is usually worn by the user and a transmitter coil and microphone that are worn behind the ear (See Figure 2).

The Internal Component of the Cochlear Implant

Lane provides a precise description of the three to four hours surgery required to insert the implant:

...The surgeon cuts the skin behind the ear, raises the flap, and drills a hole in the bone. Then a wire carrying electrodes is pushed some 25 mm into the coiled inner ear. The tiny endings of the auditory nerve are destroyed and electrical fields from the wire stimulate the auditory nerve directly. A small receiver coil connected to the wire is sutured to the skull and the skin is sewn over it. [See Figure 3]. A small microphone worn on an earpiece picks up sound and sends signals to a processor worn on a belt ... the processor sends electrical signals back to the implanted receiver via a transmitter mounted behind the ear, and those signals stimulate the auditory nerve (Lane et al., 1996, p. 388).

What is rarely mentioned in literature produced by exponents of the CI is that creation of “sound” occurs at the expense of any residual “hearing” during the surgical implantation of long electrode CIs in the recipient (Bogies et al., 1989; Wrigley, 1996). The forces of scientific ableism produce a rather strange, if not perverted logic that instrumentally proposes that it is efficacious to “knock out” residual hearing in order to gain “synthesized hearing”. This kind of destruction represents a point of significant divergence from traditional hearing “aids”.

The nature of the artifact — “what is it meant to do?”

Representations about the nature of CI have not only shifted since the early prototypes of the 1950's they reveal contestations over the ‘purpose’ and outputs of such devices and their reception within various socio-medical contexts. CI's have moved from being figured as Experimental — as an Established device to a Developing Technology. So what professions are engaged in research and development (R & D) and how has the work been organized? The key players have been otologists working in conjunction with biotechnology corporations. In addition, alongside these players are various fundraising/education bodies funded either by the corporations or in an adjunct relationship. As we will see later, a vast inter-organizational network of association has converged around this emergent technology in order to authenticate and entrench CI's future. Whilst the work was originally (especially in the ‘experimental’ phase) conducted by various universities today it is situated with the context of high technology specialized companies spanning various global networks and the precarious world of share trading markets.

The CI industry is dominated by two major players, the North American corporation, Advanced Bionics (AB), who manufacture the *Clarion* range of implants, and the Australian multinational Cochlear Limited (COH), who produce and market the *Nucleus* implantation system. Advanced Bionics was founded in 1993 to manufacture and distribute the CLARION CI. Advanced Bionics evolved from two other highly successful companies that developed and marketed medical devices, such as pacemakers and micro-infusion systems (miniature drug delivery pumps used in the treatment of diabetes). The Clarion System was based on work of the research laboratory of the University of California at San Francisco conducted by Alfred Mann. Mann entered into a License Agreement with the University in 1988 for the right to make, use and sell the inventions of the University developed over the previous 15 years. Thereafter, a small team of engineers and scientists began to develop the device in the Alfred Mann Foundation for Scientific Research, as well as MiniMed Technologies, Limited, the predecessor of Advanced Bionics.

Minor players include AllHear Inc, which manufacturers a single electrode CI in the tradition of the work of William House and an Innsbruck, Austria-based company MED-EL, which manufactures a “thin” high speech multi-channel CI known as the *COMBI 40* system. AllHear Inc is a company that designs, manufactures and sells cochlear implants. The company was founded by Dr. William F. House who produced the first practical cochlear implant in 1984 in conjunction with the House Ear Institute and the 3M Corporation. The CI of AllHear, Inc. is unique among the current crop of implants because it uses a short, single electrode that apparently does not destroy natural or residual hearing.

AllHear's cochlear implants at the time of writing were not yet approved by the FDA for general sale in the United States (House, 1995).

While most of the manufacturers of CIs appear to have adopted a relatively cautious approach to terminology describing the outputs of CI hardware, the rhetorical and fundraising arms of such ventures aren't so restrained — they represent CIs as “miracles of hearing” or machines that enable an adult or child “to hear because of a bionic ear” (Bionic Ear Institute of Australia). Another variation to this theme is the expression that CIs produce “useful hearing sensations” (Cochlear Implant Clinic, 2000).

Concomitantly, corporation logos provide interesting examples of imaging and iconic representation. The Cochlear Limited web page opens with the following logo “*Cochlear: Hear now. And Always*” (<http://www.cochlear.com.au>). The April 2002 edition of the Advanced Bionics web page advertised in graphic form the following jingo: “*More Sound Better Hearing. Imagine the Possibilities*”. The October 2002 edition of the page no longer includes this representation. Are these shifts and changes merely a sign of regional and contextual variations or is something more rhetorically significant happening here? I am in agreement with Blume who observes that there is a wide gulf between “the extravagant claims by media [or marketing flyers and] the rather more modest claims made in professional periodicals” (1997, p. 44.) Our analysis needs to take Blume's observation's one step further and examine the kinds of constructions of CIs that are being used in order to justify, legitimate and carry out scientific research, product development and sales of CI. Whilst COH still speak of “bring[ing] the gift of hearing to every child and adult who can benefit”, in the same breath when referring to the device terms of functionality; the representation is discursively maneuvered to become a “stimulation is designed to allow individuals with severe to profound hearing loss to perceive sound” (Cochlear Limited, 2002).

“Sound” is not a value-neutral or mere audiological concept; rather it is possible to speak of cultures of sound and hearing. Some sounds and hearing are deemed pathological — *hearing voices* being a case in point, while other formulations such as *seeing sound* — invoke the strange and unknown. CI adherents could be accused of proposing a moral quality to sounds not unlike the ways that advertisers attempt to seduce customers with certain sounds identified as highly desirable and pleasurable.

The subtext of this maneuver provides fertile ground for bigger philosophical battles over the nature and representation of “sound”, “hearing” and by default “deafness”. If “hearing” became an explosive term — how is “that” which is produced by the CI to be framed? — but as “sound” of course is the rejoinder, the discernment and perception of complex sounds (Cochlear Limited, 2000, p. 2; Wrigley, 1996, p. 208). We may well ask whether “sound” and “hearing” is one and the same thing. According to House (1995), they are:

Implants provide access to sound, do they not? To say no is to engage in a semantic dispute which begins in words and ends in words, and which has no pragmatic consequence. Come, let us admit the matter until we have some useful reason to deny it: implants provide access to sound ... For those who would quibble, the phrase might be more accurately rendered as “implants provide a stimulus which is interpreted as sound,” but my point is that a functionally significant difference has never been proven (House, 1995).

A more nuanced interpretation is provided by Timothy Reagan (2002, p. 55) who suggests that “implants do not restore hearing; rather they create the perception of sound”. This perspective is supported by a group of CI users who articulate the outcome of CI in the following terms: “[CI's] do not provide normal hearing – they provide an improvement in the use of sound” (Cochlear Implant Association Inc, 1997). Nevertheless, what is meant by “sound” and what are the conditions of its interpretation? Is what is being referred to a matter of degree (and quality) of audiological inputs, i.e. a strictly medical delineation or does “sound” denote and elicit a more cultural nuance, a qualitative aspect of subjectivity that interfaces and mediates a world obsessed with oralist interactivity. For example, in 1880 the International Congress of Educators of the Deaf held in Milan marked the turning point in framing sound and its relationship to communication in narrow terms. At this meeting the use of sign language in schools was officially banned. Does such a concept of “cultural sound” provide space for a Deaf person to “see a voice” (Ree, 1999; Sacks, 1989).

Certainly biomedical perspectives have shaped and dominated this debate (actually there has not really been a debate) to the exclusion of issues raised by the Deaf community (culturalists) and have made it “safe” (at least within academic cohorts) to acknowledge the provisional dimension of CI “sound”. As Arthur Boothroyd suggests,

the immediate purpose of hearing aids, tactile aids, cochlear implants, and visual aids is to enhance sensory evidence. This point cannot be emphasized strongly enough. Prosthetic assistance does not directly change the perceiver's knowledge or skills. It may do so eventually, in combination with training, maturation, and experience, but its immediate effect is at the sensory level (1991).

Similarly, Thomas Balkany acknowledges that such “hear[ing] does not approximate that of normal subjects” (cited in Cherney, 1999, p. 29). Overall, many questions remain unanswered about the benefits and efficacy of CIs suffice to say that evaluations overall report poor performance and little understanding of “sound” variability across patients. Dr Robert Shannon of the House Ear Institute in Los Angeles has the last word on this matter:

I think we are at the stage in cochlear implants at present which is analogous to getting a pair of glasses, except that, in the cochlear implants, we give everybody the same set of glasses. Although that works pretty well for some people; for others, those glasses aren't well suited for this kind of vision problem ... (Shannon, 1999).

For the public the representation of the “success” of CIs is less provisional. CIs are touted as a technology of possibilities (... made real).

Networks of Interest

For the CI to become viable in terms of market reach and credibility the product developers (otologists and corporations) needed and continue to need to enroll many allies to support their project. This kind of necessity means that scientific work is in essence heterogeneous, having a diverse group of actors and participants whose task is to “...create common understandings, to ensure reliability across domains and to gather information which retains its integrity across time, space and local contingencies” (Star & Griesemer, 1989, p. 385). These networks of interest in their connectivity enact, perform and configure ontologies of deafness and hearingness. The achievement of consensus about the merits and efficacy of CIs is necessary to make the project continually doable (especially as the target group for the device grows broader). Consensus is required amongst otologists about the reliability and design of the technology and further consensus is required about product justification, which is the necessity in the first place to “cure” deafness thereby making the enterprise a form of ethically valid work.

CI's networks of interest have moved beyond the containment of the audiological industry and developers have actively solicited the interests of a broader cross-section of society who they have deemed may ‘care’ about the work. I argue that this elastic and broad enrollment is the key to the rise of the hegemonic status of CI as a “cure” for deafness. Other allies to “care” are obvious: educationalists, speech therapists and the “cure” industry in general, whilst some actors such as multinational companies and governments emerged by necessity. In the case of companies, CIs are big business (more on that point later); whilst governments have been enrolled to potentially defuse concerns about cost containment and funding (Blume, 1997).

Increasingly as competition beefs up amongst the two largest CI producers, the rhetoric underpinning these networks of interest is taking on a nationalistic tone. This turn to nationalism reflects the changed context in which the discourses of science and technology are produced in a fluid market economy. As Cohen et al. points out, there is a view that

sees the purpose of scientific endeavor as the generation of national prosperity and the improvement of quality of life ... publicly funded research should take its lead from industry ... to ensure that its work addresses real problems, thus benefiting industry and (by extension) the country as a whole (Cohen et al., 2001, p. 146).

Two recent news stories from 2002 support this assertion. The first relates to a report in March 2002 about a Deaf same-sex couple in the United States who used assisted conception to conceive a Deaf child (Anstey, 2002; Hays, 2002; Levy, 2002; McLellan, 2002; Spriggs, 2002; Young, 2002). The Australian press could not report this story without reference to the impact this choice [of a Deaf donor] had on the shares of Cochlear Limited should Deaf Australians dare consider this option (Griffith, 2002a; Griffith, 2002b)! CIs have become it seems integral to Australia's Gross National Product! The other story also from the U.S. (July 2002) concerned the link between the use of CI's and the risks of contracting meningitis. COH went to great lengths to distance itself from the U.S. story suggesting that consumers should buy the superior Australian product. For example, cochlear limited shares plummeted 7.5% (\$27) when to story broke only to surge five days later (to \$33.40) when its' rival, Advanced Bionics, withdrew their product. Professor Graeme Clarke in one news story was reported as saying "I am concerned that what has been a wonderful thing for so many deaf people [has been] tarnished by a company that has actually designed something incorrectly" (Infolink, 2002). Many Deaf people report a hesitancy to criticize CIs because to do so would be to criticize the work of Professor Graeme Clarke and bear the allegation of being pronounced un-Australian and therefore a defective citizen (Baker & Campbell, forthcoming).

"Would the real deaf stand up?": Battles over target groups

It would not be possible given concerns about the efficacy of CI for this device to be trumped as a technological miracle had not the carriage of the CI been accompanied by trading in negative symbols of disability and deafness in particular emerging from a conceptual schema of scientific ableism. Scientific ableism is not unlike its conceptual twin scientific racism, a coital union between law, medicine and ethics which uses science to argue for the facticity of impairment as deficiency, thus distorting if not obscuring the social and cultural production of disability and the privileging of certain bodily formations. An *etic* framework of deafness assumes a life of tragedy and silence. As Robert Crouch puts it,

According to many among the hearing, the life of a deaf person is a priori an unfortunate and pitiful life, and is considered by some to be a full-scale tragedy. The hearing parents of the deaf child, themselves members of hearing society ... will naturally turn to the medical community in the hope that their child's disability will be 'fixed' (Crouch, 1997, pp. 14-15).

In other words, the aim of CI's is to simulate (fabricate) "hearing" in order to facilitate the assimilation of deaf individuals into the dominant hearing world, thereby ensuring the deafened become productive (ableist) citizens and as Hughes (2000) puts it "aesthetically validated". The original target population for CIs was post-lingually deafened adults aged 18 and over -- the U.S; Food and Drug Administration (FDA) approved the first 3M/House device for adults in October 1984. However, the uptake from this group was slow. One explanation for this was that Deaf communities were not involved or consulted in the processes of product development. This is not surprising as Blume indicates that the dynamic behind techno-medicine

can be understood in terms of the articulation of [a] common interest between medical and surgical specialties on the one hand and their industrial suppliers on the other ... patients are typically not seen as competent interlocutors in the innovation process (Blume, 1997, p. 32).

"Hearing" designers simply assumed that Deaf adults would have nothing to contribute to the CI prototype or understanding of deafness and would willingly accept such technological gifts with open arms. Despite vehement opposition from a large number of otologists and neurophysiologists to implantation of pre-lingually deaf children over the decade of the 1980's CI's steadily became normalized and thus accepted (Bertling, 1994; Blume, 1994; Carver, 1990; Crouch, 1997; Horn et al., 1991; Lane and Grodin, 1997). This broadening acceptance and increased target group purview does not however mean that CI candidacy is an "open affair". Candidacy is for reasons that will become clear, strictly policed.

Although the dominant rhetoric invoked by manufacturer focuses on the scientific and outstanding capacities of CIs as a therapeutic artifact, when it come to the actual usage of CIs this rhetoric "thins out" and transmogrifies into an emphasis on the burden of "success" of the technology falling squarely on the recipient. In a case study on Clint Hallam, recipient of the world's first forearm

transplant, Campbell (2004) argues that there is a shift in the burden of responsibility towards the patient (victim blaming) when the incorporation of such *tentative technologies*, “fails” in any way. There is a reversal of the old rhetoric of *virtuous suffering*, where the impaired person gracefully accepts their limitations towards a *compulsion of mitigation* through prosthetic correction (Campbell, 2001). Seymour confirms this view and argues that where there are “endless possibilities for bodily manipulation ... If one can choose to alter one’s body to reflect particular attitudes, one must accept blame for failing to act in accordance with broad social ideas about proper behavior, presentation, and practice” (Seymour, 1998, p. 183).

The CI can be squarely characterized as a technology of self, in a Foucauldian sense. Acceptance into a programme requires the candidate (and their families) to be motivated, productive and compliant with the therapeutic regime installed as part of the implantation package. As a device that morphs hearing, CI individuals are able to enact a “number of operations on their own bodies and souls, thoughts, conduct and way of being, so as to transform themselves in order to attain a certain state of happiness, purity, wisdom, perfection or immortality” (Foucault, 1997, p. 225). The promises of the CI are based on a process of continual deferment where the candidate foregoes immediate needs in exchange for the potential gains that technologies may hold out for the common good. Crouch points to the “opportunity costs” of such a process and suggests that the burden of “failure” extends beyond the CI process itself. He argues that

the child whose life is centered upon disability and the attempt to overcome it grows up in a context that continually reinforces this disability, despite his or her own best efforts to hear and to speak and despite the diligent work of the educators ... These children are therefore always aware that they are outsiders, outsiders attempt to be on the inside (Crouch, 1997, p. 18).

It is not surprising then that the CI recipient’s relationship with the implant can be aptly spoken in terms of a *marital merge* – not just with the artifact but with the corporation. In fact manufacturers, to instill a sense of brand loyalty amongst their customers have used this “lifetime therapy” with the corporation as a marketing tool. The branding and badging of implants has resulted in “brand wars” amongst recipients posting flames in defense of their brand in various Internet listservs. I will now move into Part two of our discussion and consider critical ontological concerns that feature as subtexts in the rhetoric of deafness and cochlear implantation.

Ontology Wars: Hearing vs. Deafness

The “hearing world” in general *thinks-deafness in the audiological* and displays a limited awareness of Deaf culturalist paradigms. For some people a Deaf worldview is so foreign, so subaltern that the following statement by Karen Lloyd from the Australian Association of the Deaf may appear shocking. Lloyd states:

to us [Deaf identified people], deafness is a natural part of life, it is something that has always been there and is an integral part of who we are. It is not something we have lost or that needs to be “cured”. The Deaf community has a rich cultural heritage that revolves around its language, Auslan, and Deaf people who belong to this community enjoy a fulfilling and active social and cultural life (Lloyd, 2001).

This sub-section explores the silencing of Deaf sensibility and the subject of hearingness and the creation of the productive citizen by invoking and simulating “hearing” as social capital.

The silencing of Deaf Sensibility

Like other forms of different bodies considered impaired, the life of Deaf people (because of deafness) has been considered one that is *inherently* negative — silent and pitiful. In this view deaf people are not just different but are evaluatively ranked and are considered “at least in a physiological sense, inferior to hearing people” (Reagan, 2002, p. 45). It is easy then to appreciate that for many hearing parents with a deaf child that they would unquestionably assume that hearing is *objectively preferable* to being deaf. Whilst internationally there have been flourishing Deaf subcultures for centuries, it is only recently that the Deaf community has euphemistically “come out of the closet”. Dolnick in *The Atlantic* remarks:

Lately ... the deaf community has begun to speak for itself. To the surprise and bewilderment of outsiders, its message is utterly contrary to the wisdom of centuries: deaf people, far from groaning under a heavy yoke, are not handicapped [sic] at all. Deafness is not a disability. Instead, many deaf people now proclaim, they are a subculture like any other. They are simply a linguistic minority [speaking sign language] and are no more in need of a cure than are Haitians or Hispanics (Dolnick, 1993, p. 302) .

Earlier I pointed to the highly developed networks of interest that have converged to legitimate CIs. The Deaf community's entrance into this terrain has been very late and therefore I would proffer that they have been on the "back foot" in challenging dominant perspectives. The D/deaf spectrum has been subjected to the politics of diagnostic enumeration — resulting in the placement of audiological "impairments" and identities, "like" and "unlike" in a single cluster. As Blume (1997, p. 51) has pointed out that unlike other marginalized groups, Deaf people have been required to harness allies with legitimated and privileged voices due their own lack of cultural and social capital (credibility). For the hearing (and often the hearing impaired) population — Deafness induces no social capital — Deafness is a profoundly foreign, alien land existing in the hidden backwaters of civilization (Reagan, 1995). The adoption of counter rhetoric about the cochlear implant has been through engaging articulate academics to put forward alternate viewpoints and well as the use of television documentaries (Blume, 1994; 1997; Crouch, 1997; Lane, 1992; 1997; Reagan, 1995; 2002; & Wrigley, 1996). Broader attempts have been made to showcase Deaf culture in the public domain by way of Deaf Festivals of the arts.

Overall, the response by Deaf culturalists has been to view the CI as another emergent technology that represents a cultural invasion where the dominant hearing world seeks to impose their values on a smaller minority culture. In other words, while CI may be the newest gadget — as a technology its construction is in keeping with historical genealogies of Deaf subjugation. Deaf activist Paddy Ladd described the implants in terms of "Oralism's Final Solution!" (Ladd, quoted in Blume, 1997, p. 48). Equally, strong language has been used to describe and deconstruct the technicians engaged in CI production. Invasive medical procedures have been described as a form of child abuse that has robbed the Deaf child of their priceless gift of deafness. George Montgomery accused the implants of being "cheerful headchoppers in the Sir Lancelot mould, hell bent on curing deafness and thus committing casual genocide on the deaf community and its language" (cited in Cherney, 1999, p. 28). Wrigley (1996), in rather an understated fashion (quite uncharacteristic of him I must say), summarizes the tension as a clash in *ways of being*, the exclusion of an alternative way of knowing and the meaning given to different kinds of personhood.

Telling about Hearing

As with many forms of asymmetrical relations, much of the orientation of the CI/deafness debate has centered on the delimitation of deafness rather than on the deconstruction and problematization of hearing, hearingness and hearingism. Ableist epistemological foundations that assume the preferability of "hearingness" and the compulsory abolition of deafness, have an albeit unacknowledged centered location with bio-technological discourses. The inversion of this traditional, seemingly "common sense" gaze enables an exploration of what the silencing of Deaf sensibility can tell us about hearingness. It is only then that the problematization of the CI seems likely rhetorically.

In his work on the Deaf in 16th century Turkey, Mirzoeff (1995) introduces the concept of the "silent screen" to denote the processes of interactivity between hearing and deaf persons that configures ontologies. In the interaction between "hearing" people looking at deafness Mirzoeff proposes that Deaf people respond to such voyeurism by subverting or confirming the image produced. This screen/visualization becomes a fabrication, a simulation that does not necessarily bear any resemblances to Deaf subjectivity or hearing subjectivities of deaf people. The conclusion reached by Mirzoeff is that the "silent screen" is a shifting construction that requires two people to see deafness. Mirzoeff (1995: 62 - 64) also notes that in resisting appropriation of their culture, Deaf people have engaged in acts of mimicry — lampoon imagery and conceptualizations. While I agree, Mirzoeff neglects to mention is that this "silent screen" also produces the *seeing of hearing* especially for the hearing subject who can make "sense" of their sensorial difference. The literature supports this conclusion asserting that the delimitation of deafness could only be achieved within

the context of the development of technologies that could visualize/see hearing/sound (Hogan, 1997; Mirzoeff, 1995; Ree, 1999; Sacks, 1989; Sterne, 2001).

I wish to conclude this article with a discussion about the productive citizen. In its documentation Cochlear Limited continually stress that CI's will reduce the economic cost of supporting a deaf child as "benefits may translate into reduced educational costs and increased earnings" (Cochlear Limited, 2000: 12) and even though there has been a paucity of research undertaking a cost benefit analysis of competing options (Newell, 2000). The underlying assumption of this view is that Deaf people are somehow deficient and as adults they do not contribute to civil society and are economically unproductive. Negative ontologies of deafness (disability) make it possible to construe the lives of Deaf people in terms of burden (both economic and psychic). This is not the case. What is more worrying about this approach is that there is an implication that a proper citizen is a productive one, that the use value of personhood is conflated with restrictive notions of "productivity".

An etical view of deafness cannot be other than assimilationist geared towards "breeding the deaf out" or at the minimum pursuing the goal of making deafness acceptable (palatable). Making deafness acceptable through the use of morphing or simulative technologies enables deafness to bear some commodity/use value to hearing society (Crouch, 1997; Wrigley, 1996). The CI performs this role. No mention is made in the literature of the impact of corporeal transformations on CI users and the ways that such bodily reconfigurations maybe understood by oneself, others and the public framing of legal disability. One of the unintended consequences of the move (to use CIs) is I argue the creation of hybrids, who are destined to exist in "the twilight zone"² of the hearing and Deaf worlds. Leaving aside matters of subjectivity, such hybridity in the public realm problematizes the delimitation of legal disability. In other words, can CI users utilize disability protection laws when their impairment has been mitigated? (Campbell, 2001).

Conclusion

In this article I have attempted to show that the impetus for the development of (disabled) technologies such as CI's as a case study. These developments occur within a purview of contestations over ontologies of deficiency and perfectibility. Negative ontologies of deafness that assume an ethics of compulsory correction towards hearingness, and such ontologies were harnessed rhetorically to promote the efficacy of cochlear implantation technologies as well as the nullification of oppositional discourses of Deaf culturalists. Notions of "deafness" and "hearingness", phenomenologically and audiologically, reside and are formulated in an interdependent relationship. The examination of the technical developments of the CI within this article has foregrounded many disjunctures and disagreements amongst scientists and commentators over the representation of CI technological outputs — as morphed hearing, (real) hearing, sensing or simulation. A lesson from this study is that for marginalised communities to "successfully" claim narratological and rhetorical "space," they need to enroll and engage with a broader range of networks of interest that are empathetic with culture-based arguments and have the social capital necessary to effectively transmit counter-rhetorical perspectives.

Endnotes

References

Anstey, K. (2002). Are attempts to have impaired children justifiable? *Journal of Medical Ethics*, 28(5), 286-288.

Baker, B. & Campbell, F. (forthcoming). Transgressing non-crossable borders: Disability, law, schooling, and nations. In S. Danforth & S. Gabel (Eds.) *Vital questions in disability studies and education*. New York.

Bertling, T. (1994). *A child sacrificed: To the Deaf culture*. Wilsonville, Or: Kodiak Media Group.

Blume, S. (1994). Making the Deaf hear: The cochlear implant as promise and threat'. *Medische Anthropologie*, 6, 108-121.

- Blume, S. (1997). The rhetoric and counter rhetoric of a "Bionic" Technology. *Science, Technology and Human Values*, 22, 31-56.
- Bogies, M., Baker, J., & Balkany, T. (1989). Loss of residual hearing after cochlear implantation. *Laryngoscope*, 99, 1002- 1005.
- Boothroyd, A. (1991). Assessment of speech perception capacity in profoundly Deaf children. *American Journal of Otology, Supplement*, 12, 67-72.
- Bruce, R.V. (1974). *Alexander Graham Bell, teacher of the Deaf*. Northampton, Mass,: The Clarke School for the Deaf.
- Boothroyd, A. (1993). Profound deafness. In R. Tyler (Ed.), *Cochlear implants: Audiological foundations* (pp.1-33). San Diego: Singular.
- Callon, M., Law, J., & Rip, A. (1986). *Mapping the dynamics of science and technology: Sociology of science in the real world*. Basingstoke, Hampshire: Macmillan
- Campbell, F.A.K. (2004). The case of Clint Hallam's wayward hand: Print media representations of the "unco-operative" patient. *Continuum: Journal of Media & Cultural Studies*, September, 9(3), 447-462.
- Campbell, F.A.K. (2001). Inciting legal fictions: 'Disability's date with ontology and the ableist body of the law. *Griffith Law Review*, 10(1), 42-62.
- Carver, R. (1990). Cochlear implants in prelingual Deaf children: A Deaf perspective. Address presented to the Cochlear Implant Forum, Canadian Hearing Society, Toronto, March 31, 1990. Deaf World Web, retrieved from <http://dww.deafworldweb.org/pub/c/rjc/cicarver.html>.
- Cherney, J. (1999). Deaf culture and the cochlear implant debate: Cyborg politics and the identity of people with disabilities. *Argumentation and Advocacy*, 36 (Summer), 22-34.
- Clark, G. (1987). *The University of Melbourne-nucleus multi-electrode cochlear implant*. New York: Karger.
- Clark, G., & Tong, Y. (2000). *History of the University of Melbourne/Cochlear Limited cochlear implant*. The Bionic Ear Institute. Retrieved from <http://www.medoto.unimelb.edu.au/info/history3.htm>.
- Clark, G. (2000). *Sounds from silence: Graeme Clark and the bionic ear story*. Sydney: Allen & Unwin.
- Clarke, A., & Fujimura, J.H. (1992). *The right tools for the job: At work in twentieth-century life sciences*. Princeton, N.J.: Princeton University Press.
- Clifton, J. (1968). *Introduction to cultural anthropology*. New York: Houghton Mifflin.
- Cochlear Implant Association Inc. (1997). *What is a cochlear implant?* Cochlear Implant Association Inc, Washington DC. Retrieved from <http://www.cici.org/english/whatis.htm>.
- Cochlear Implant Clinic. (2000). *What is a cochlear Implant?* Melbourne: The Bionic Ear Institute.
- Cochlear Limited. (2000). *Annual Report 1999/2000: Executive Summary*. Cochlear Limited.
- Cochlear Limited. (2002). *What is a Cochlear Implant?* Retrieved from <http://www.cochlear.com.au/NewToCochlear/161.asp>.
- Cohen, L., McAuley, J., & Duberley, J. (2001). Continuity in Discontinuity: Changing Discourses of Science in a Market Economy. *Science, Technology & Human Values*, 26, pp. 145-166.

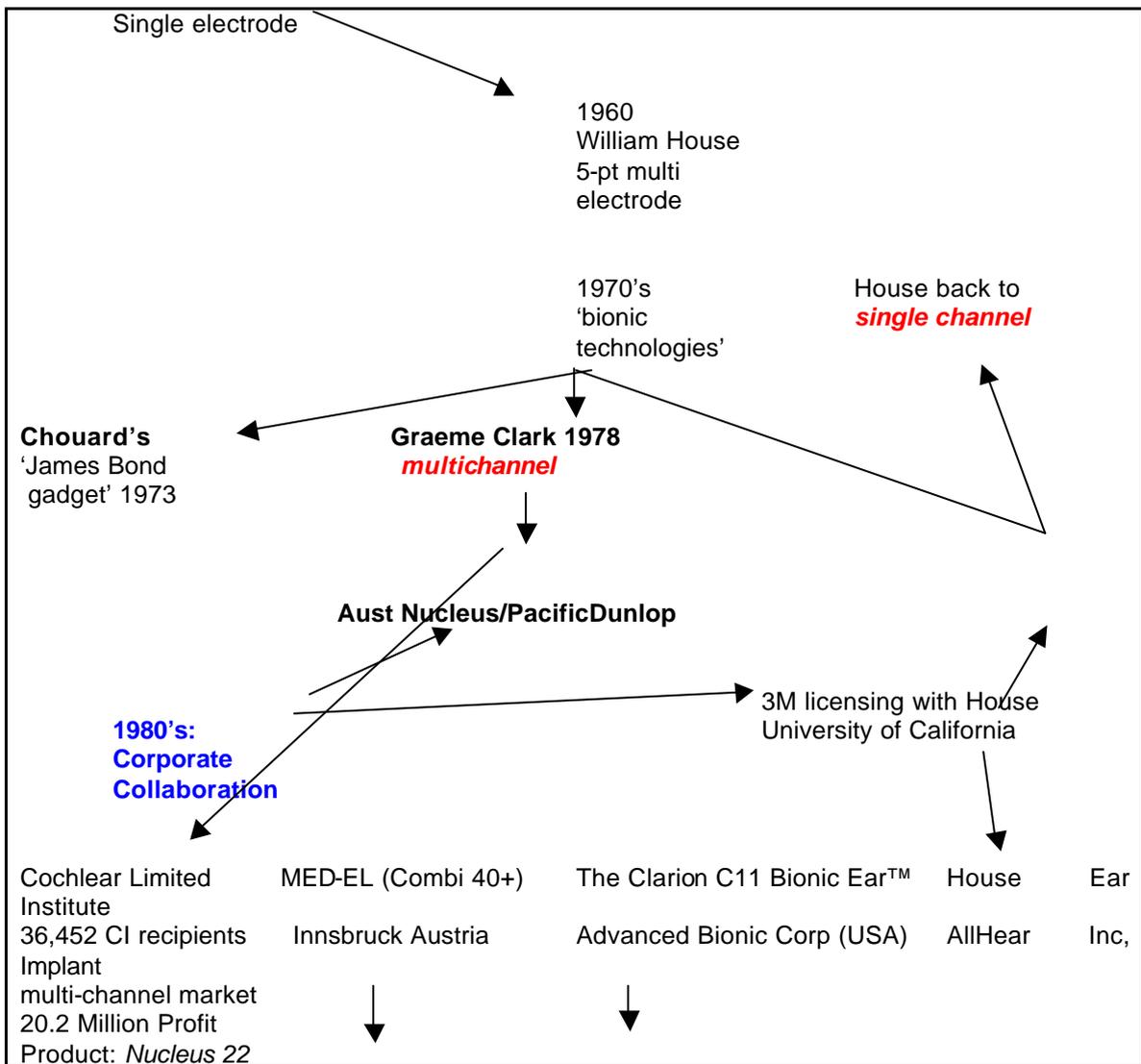
- Cooperative Research Centre for Cochlear Implant and Hearing Aid Innovation. (2001). *Centre Mission*. Retrieved from <http://www.medoto.unimelb.edu.au/crc/>.
- Crouch, R. (1997) Letting the Deaf be deaf: Reconsidering the use of cochlear implants in prelingually Deaf children. *Hastings Center Report*, 27, pp. 14-21.
- Djourno, A. & Eyries, C. (1957). Protheses auditive par excitation electrique a distance du nerf sensorial a l'aide d'un bobinage inclus a demeure. *Presse Medicule*, 65, 63.
- Dolnick, E. (1993). Deafness as culture. *The Atlantic*, 37-53.
- Eddington, D. & Pierschalla, M. (1994). Cochlear implants restoring hearing to the Deaf. 'On the Brain': *The Harvard Mahoney Neuroscience Institute Newsletter*, 3.
- Epstein, J. (1989). *The story of the bionic ear*. South Yarra, Vic.: Hyland House.
- Foucault, M. (1997). Technologies of the Self. In P. Rabinow (Ed.), *Ethics: Subjectivity and truth* (pp.223-251). *Essential works of Michel Foucault, 1954-1984*, vol. 1. London: Allen Lane/The Penguin Press.
- Freire, P. (1970). *Pedagogy of the oppressed*. Middlesex: Penguin Education.
- Fujimura, J.H. (1996). *Crafting science: A sociohistory of the quest for the genetics of cancer*. Cambridge, MA.: Harvard University Press.
- Griffith, C. (2002a). Hearing the evil. *The Courier Mail* (Brisbane), 6th April.
- Griffith, C. (2002b). Lesbians admit plan to create a Deaf child. *The Courier Mail* (Brisbane).
- Hays, C. (2002). A tale of three mothers. *Women's Quarterly*, (Spring), 2.
- Hesslow, G. (1993). Do we need a concept of disease? *Theoretical Medicine*, 14, 1-14.
- Hofmann, B. (2001). The technological invention of disease. *Journal of Medical Ethics: Medical Humanities*, 27, 10-19.
- Hogan, A. (1997). Issues impacting on the governance of deafened adults. *Disability & Society*, 12, 789-801.
- Horn, R., Nozza, R., & Dolitsky, J. (1991). Audiological and medical considerations for children with cochlear implants. *American Annals of the Deaf*, 136, 82-86.
- House, William. (1995). *Cochlear implants: my perspective*. AllHear Inc. Retrieved from <http://www.serve.com/AllHear/monographs/m-95-htm.html>.
- Hughes, B. (2000). Medicine and the aesthetic invalidation of disabled people. *Disability & Society*, 15(4), 555-568.
- Infolink. (2002). Bionic ear inventor vouches for Australian product. *Dialinfolinkmanufacturing (Reed Business Information)*. Retrieved from <http://www.dialinfolink.com.au/articles/63/0c00f763.asp>.
- Lane, H. (1992). *The mask of benevolence: Disabling the Deaf community*. New York: Alfred Knopf.
- Lane, H. & Grodin, M. (1997). Ethical issues in cochlear implant surgery: An exploration into disease, disability, and the best interests of the child. *Kennedy Institute of Ethics Journal*, 7, 231-251.
- Lane, H., Hoffmeister, R., & Bahan, B. (1996) *A Journey into the DEAF-WORLD*. San Diego: DawnSign Press.

- Levy, N. (2002). Deafness, culture, and choice. *Journal of Medical Ethics*, 28, 284-285.
- Lloyd, K. (2001). Cochlear implants — the AAD View. *Vicdeaf News*, Victoria (Australia), October. Retrieved from <http://www.aad.org.au>
- Mackay, James. A. (1997). *Alexander Graham Bell: A life*. New York: J. Wiley.
- McLellan, F. (2002). Controversy over deliberate conception of Deaf child. *The Lancet*, 359, 1315.
- Mirzoeff, N. (1995). Framed: The Deaf in the harem. In J. Terry & J. Urla (Eds.) *Deviant Bodies: Critical Perspectives in Science and Popular Culture* (pp.49-77). Bloomington: Indiana: Indiana University Press.
- Newell, C. (2000). Access to opportunity or oppression? An Australian policy analysis of the ethics of the cochlear implant. *Interaction*, 13(3), 16-23.
- Pinch, T. & Bijker, W. (1987). The social construction of facts and artifacts: Or how the sociology of science and the sociology of technology might benefit each other. In W. Bijker, T. Hughes, & T. Pinch, T. (Eds.), *The social construction of technological systems* (pp. 17-50). Cambridge, MA: MIT Press.
- Reagan, T. (1995). A sociocultural understanding of Deafness: American sign language and the culture of Deaf people. *International Journal of Intercultural Relations*, 19, 239-251.
- Reagan, T. (2002). Toward an "archaeology of Deafness": Etic and emic constructions of identity in conflict. *Journal of Language, Identity, and Education*, 1, 46-66.
- Ree, J. (1999). *I see a voice: Deafness, language and the senses: A philosophical history*. New York: Metropolitan Books.
- Sacks, O.W. (1989). *Seeing voices: A journey into the land of the Deaf*. Berkeley: University of California Press.
- Seymour, W. (1998). *Remaking the body: Rehabilitation and change*. Sydney: Allen and Unwin.
- Shannon, R. (1999). *Keynote speech at the Cochlear Implant Conference Institute, Manhattan Beach*. Cochlear Implant Association. Retrieved from <http://www.cici.org/docs/Shannon.pdf>.
- Solomon, A. (1994). Defiantly Deaf. *The New York Times*, August 28, 1994, alternative url: <http://dww.deafworldweb.org/pub/d/nytimes.html>.
- Spriggs, M. (2002). Lesbian couple create a child who is Deaf like them. *Journal of Medical Ethics*, 28, 283.
- Star, S.L. & Griesmer, J. (1989). Institutional ecology, "translations" and boundary objects: Amateurs and professionals in Berkeley's Museum of Vertebrate Zoology, 1907-39. *Social Studies of Science*, 19, 387-420.
- Sterne, J. (2001). A machine to hear for them: On the very possibility of sound's reproduction. *Cultural Studies*, 15, 259-294.
- Wrigley, O. (1996). *The politics of Deafness*. Washington D.C: Gallaudet University Press.
- Young, C. (2002). Sound judgment: Does curing deafness really mean genocide? *Reason*, 33, 20-21.

Figure 1: Multidirectional View of the Development of Morphed Hearing Implants

Description:

1957 Djourno



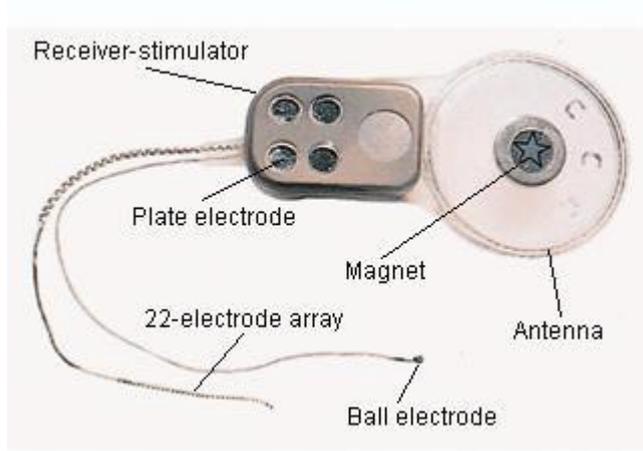
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Figure 2: The Internal Component of the Cochlear Implant

Source: <http://www.bionicear.org/mhg/cic/aboutcochlearimplants.html>

Description of Figure 2:

The internal parts of the cochlear implant are depicted. They are the receiver-stimulator, plate electrode, magnet, antenna, 22-electrode array, and ball electrode. All of the parts shown in the Figure are placed under the patient's skin behind the ear during the implant operation. The implant package (or receiver-stimulator) contains the circuits that send electrical pulses into the ear. Attached to the package are tiny wires that join to electrodes. The implant package also contains an antenna that receives radio-frequency signal from the external coil. The 22-electrode array is inserted into the shell-like structure in the inner ear known as the cochlea. The ball electrode is placed under a muscle near the ear. There is also a plate electrode on the outside of the receiver stimulator package. The other parts of the implant system are worn externally.



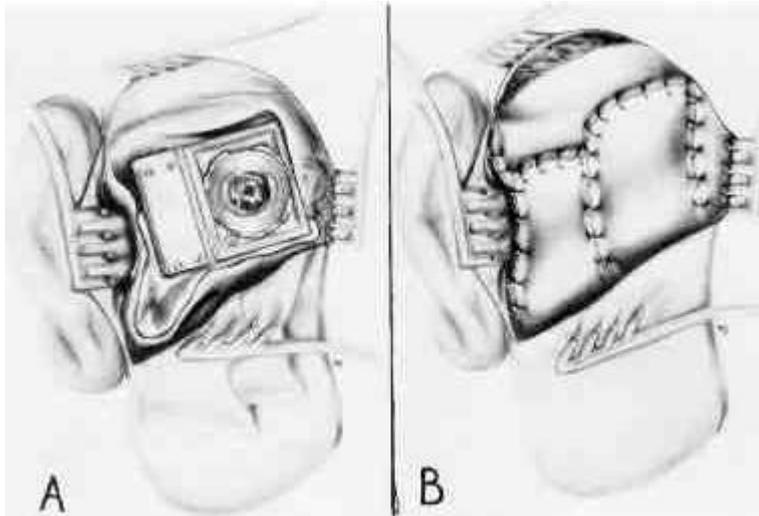
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Figure 3: A) The Receiver-Stimulator Device in Place. B) The fascial flaps sutured in place over the implanted receiver-stimulator device

Source: www.bionicear.org

Description of Figure 3:

Image A depicts a drawing of the internal parts of the cochlear implant surgically implanted. Image B depicts flaps of skin sutured over the cochlear implant.



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¹ In line with established conventions, I refer to Deaf to refer to people who identify with the Deaf community, language and culture, in distinction from *audiological deafness* represented by a lower case 'd'.

² This phrase was the description used by CI users on a Yahoo group electronic discussion list.