

Conferences as Venues for the Configuration of Emerging Organizational Fields: The Case of Cochlear Implants

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ABSTRACT I examine how conferences can be occasions for the configuration of emerging organizational fields by describing three that I attended during the development and commercialization of cochlear implants. These conferences served as venues for a variety of activities to unfold, ranging from the exchange of information to the enactment of technological possibilities. A full appreciation of conferences as holistic events, I argue, offers us a particularly valuable entry point into gaining a deeper understanding of how new fields are assembled in real time.

INTRODUCTION

What roles do conferences play in configuring emerging organizational fields? Rao (2001, p. 266) suggests that ‘conferences are ubiquitous strategies of claim making that link diverse participants together into a collective performance’. In a similar vein, Knorr-Cetina (1995) suggests that conferences create ‘a grid of discourse spaces for experimental coordination and integration’ in scientific fields. Yet, such occasions remain ‘understudied as mechanisms and venues in organization science and companion disciplines in the study of organizations’ (Lampel and Meyer, 2005).

In this paper, I explore the roles that conferences play in shaping organizational fields by reflecting upon three that I attended during the emergence of the cochlear implants field. Based on my first-hand experiences at these conferences and my detailed trip reports, I suggest that conferences set the stage for a number of activities during field emergence. For instance, conferences provide a forum for actors to meet, interact and exchange information. At the same time, conferences serve as prime venues for contestation between participants embracing different visions of the future. Conferences can also serve as selection environments. In the cochlear implant case, for instance, a three day ‘consensus’

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conference organized by the National Institutes of Health (NIH) produced a statement that resulted in generating differential legitimacy for one approach over another.

I examine these issues by first providing 'sociology of associations' as an overall perspective on the emergence of organizational fields. I then apply this perspective to highlight key mechanisms at play at the three conferences that I attended. My description of these events sets the stage for a discussion on the role of conferences as field configuring events. In the conclusion of this paper, I reflect upon how the literatures on 'organizational field emergence' and 'sociology of associations' can mutually inform each other.

CONFERENCES AS FIELD CONFIGURING EVENTS

There are several questions that arise in gaining an understanding of events that can result in the configuration of emerging fields. First, how might one study a field that is still emerging given that there is likely to be no widespread agreement as to its boundaries and its membership? After all, the traditional definition of organizational fields offered by DiMaggio and Powell (1983) requires that boundaries, roles and mutual interdependencies be widely recognized. Second, what does it mean to configure an emerging field? Given that there is likely to be contestation as to the boundaries and membership of an emerging field, how and where are claims and counter-claims likely to be sorted out?

To address these questions, I build upon a 'sociology of associations' perspective (Callon, 1986; Latour, 2005; Law, 1999). Mainstream conceptualizations of organizational fields become relevant only after a field has already materialized, that is, after it has jelled in the form of agreed-upon categories of relevant artefacts, actors, relationships between them, and the boundaries demarking the domain of the field. A sociology of associations perspective, on the other hand, suggests that scholars must follow field pre-formation processes by paying attention to events, actors, and 'entanglements' (Rip, 2007) that give rise to a field's emergence (Karnøe, 2006; Latour, 1991).

What is the mechanism whereby associations are made during the emergence of fields? The sociology of associations perspective offers 'translation' as a key mechanism. Translation implies a 'displacement, drive, invention, mediation, the creation of a link that did not exist before and that to some degree modifies two elements or agents' (Latour, 1994, p. 32). In other words, translation represents an active mechanism whereby any assemblage of heterogeneous elements, humans and materials, becomes configured and reconfigured in real time.

Where might such translation occur? Conferences can serve as prime venues. They are settings where 'people from diverse social organizations assemble temporarily with the conscious, collective intent to construct an organizational field' (Meyer et al., 2005, p. 467). It is here that participants come together to 'theorize' (Greenwood et al., 2002; Strang and Meyer, 1993) about their idiosyncratic practices (as captured by the concept of 'proto-institutions' offered by Lawrence et al., 2002). Since emerging practices lack wider recognition or acceptance, such theorization results in highlighting both shared and contested beliefs (Hoffman, 1999). The discourse that unfolds in such public settings (Phillips et al., 2004) generates the opportunities for a series of translations as links between different heterogeneous elements are defined and redefined. Consequently, conferences serve as prime venues for the configuration of emerging fields, a proposition

that I explore in greater detail through my description of three conferences that I attended during the emergence of the cochlear implants field.

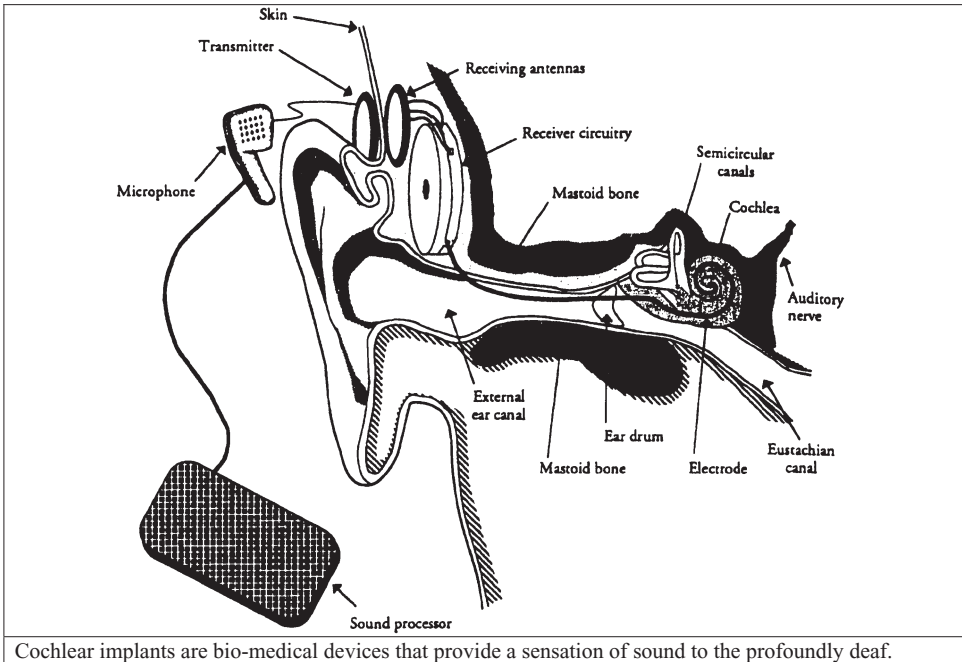
A BRIEF BACKGROUND ON COCHLEAR IMPLANTS

My foray into the field of cochlear implants began in 1984 when I joined a team of researchers at the University of Minnesota to study innovation. Our approach was to immerse ourselves completely into an ongoing innovation process so as to track its emergence from the inside (Van de Ven et al., 1999). As part of the study, I found myself studying the development and commercialization of cochlear implants by 3M Corporation.

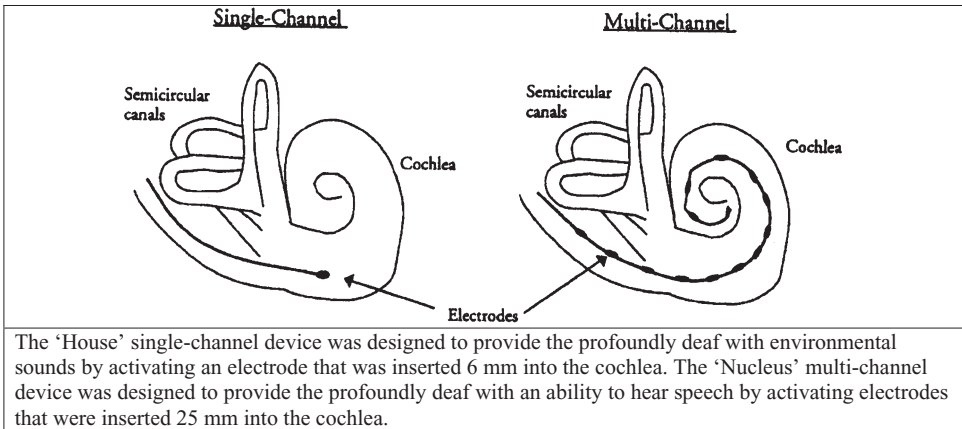
Cochlear implants are electronic bio-medical devices that provide the profoundly deaf with a sensation of sound. A typical cochlear implant has many parts including a microphone, a signal-processor, a transmitter and electrode(s) that are surgically implanted into the cochlea (see Figure 1). Sound impulses detected by the microphone are converted into electrical impulses by the signal-processor and transmitted through a receiver to electrodes in the cochlea. Several different cochlear implant designs are possible depending upon the specific performance criteria that a designer chooses to emphasize.

At 3M, I immersed myself in the task of tracking the commercial development of cochlear implants. Following Miles and Huberman's (1984) primer on qualitative research, I attended meetings, interviewed people, transcribed notes, sorted through data, and generated and filed reports (see Van de Ven and Poole, 1990 for the event method protocols we followed). Very soon, the complexities associated with tracking the emergence of even a single innovation by one firm operating within an emerging field began taking its toll (Van de Ven and Garud, 1989). Events affecting field development were unfolding everywhere, not just at 3M. Several firms, such as Cochlear Corporation headquartered in Australia with a subsidiary in the USA, and Symbion, makers of the artificial heart, headquartered in Salt Lake City, were pursuing different approaches to developing cochlear implants. Then there were government players such as the Food and Drug Administration (FDA) and the NIH that determined regulations and controlled funding, not to mention trade associations such as the American Speech and Hearing Association (ASHA) that influenced users. There was also the broader scientific and clinical community, including sub-specialized otolaryngologists and other physician specialty groups to contend with. The list was endless.

In real time, how does one track the activities of different actors operating across different arenas, especially when the field's boundaries are emerging? In other words, what is the meaning of being grounded when the ground itself is emerging? We were making progress tracking unfolding events at 3M Corporation, having gained generous access to this firm. Yet, we knew that data we were gathering from 3M could offer only a one-sided perspective of the emerging field. It was clear that there was much happening in the field based on what little we could gather from our discussions with 3M personnel as well as from our reading of the scientific journals and the trade press. However, we were making only limited progress in gaining first-hand information from other players. We feared that events would overtake and overwhelm us.



Cochlear implants are bio-medical devices that provide a sensation of sound to the profoundly deaf.



The 'House' single-channel device was designed to provide the profoundly deaf with environmental sounds by activating an electrode that was inserted 6 mm into the cochlea. The 'Nucleus' multi-channel device was designed to provide the profoundly deaf with an ability to hear speech by activating electrodes that were inserted 25 mm into the cochlea.

Figure 1. Schematic of cochlear implants

XIII OTOLARYNGOLOGY CONFERENCE

It was at this time that I came to know of the XIII Otolaryngology Conference which was to be held at New Orleans on 26–31 May 1985. The 218-page thick conference programme promised:

Delegates from all over the world will be able to take advantage of the unparalleled educational opportunities offered by the scientific program including plenary sessions, panel discussions, scientific free papers, world film festival, video tapes, scientific posters and technical exhibits. A very large and elaborate technical exhibition, to be

held at the Fontainebleau Hilton Hotel, will display and demonstrate all products and services related to the broad scope of Otolaryngology – head and neck surgery, including drugs, equipment, instruments, and suppliers. This scientific, social and cultural event will be headquartered at the Fontainebleau Hilton – Eden Toc Hotels.

I wanted to experience this ‘scientific, social and cultural’ event. My resolve to attend was strengthened as I observed 3M’s intense pre-conference preparatory efforts. As I noted in my journal, the trip could provide me with an opportunity to meet prospective informants for future reference and to better understand the emerging cochlear implant field and the alternatives being pursued by major players.

Typical of such events, there was a buzzing swirl of orchestrated and emergent events waiting for me at the XIII Otolaryngology Conference. There were formal presentations, informal sessions, private parties and many exhibits. I was enthralled to see the whole field on display and unfolding right in front of my eyes. I could talk to any person in the field and understand their respective positions as they were all present and very much accessible.

Armed with a notebook, a simple open-ended interview protocol and credentials as a PhD student, I approached and successfully interviewed representatives from several stakeholder groups – manufacturers, academicians, patients, ear nose and throat surgeons, and journal representatives. In the process, I quickly became a part of the community and, very soon, privy to many ‘off the record’ discussions on topics such as who was attempting to collaborate with whom, who was getting promoted, who was encountering difficulties, and the like.

My detailed 50-page post-conference report consisting of interview notes, photographs, pamphlets and business cards offers a snapshot of the ‘state of affairs’ as of May 1985. In this report, I noted that ‘each firm has a different product and each claims that its device is *the* product of the future’. I also made a note of the bewildering array of technical jargon that I was bombarded with. I learned that there were choices to be made between single and multi-channel devices, between intra and extra-cochlear implants, between percutaneous and intracutaneous plugs, to say nothing of an array of different signal-processing schemes.

Clearly, there was technological ferment (Tushman and Anderson, 1986) going on for me and everyone else to see. At one level, the proliferation of terminologies during the emergence of a new field simply reflects the proliferation of alternative approaches. At another level, though, it also reflects members’ efforts to garner differential legitimacy for their specific approaches. The ‘multi-channel’ label, for instance, was being used by its proponents to generate an association between their device and emerging ‘scientific theory’ that the cochlea operated with multiple channels of stimulation.

I was aware of the ferment underway even before attending this conference. Nevertheless, the contrasts between the different approaches to cochlear implants became all the more salient as I saw the tradeshow displays in booths allocated to the firms attempting to commercialize cochlear implants (see Figure 2). Contrasts emerge when alternatives are juxtaposed against one another – ‘mutual positioning’ in van Lente and Rip’s (1998) terms. Just as we understand black against white, so too did I begin to understand what it meant to have a percutaneous plug with multiple electrodes using a

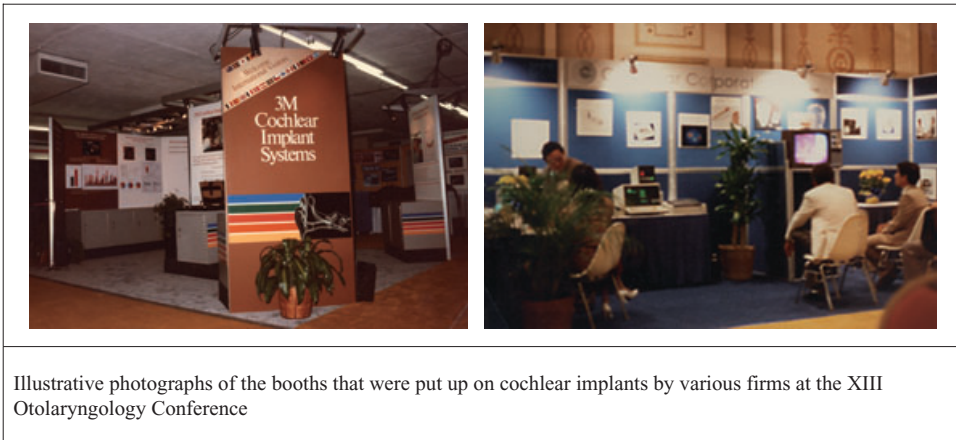


Figure 2. Booths at the XIII Otolaryngology Conference

multiple channel processing scheme when it was contrasted against intracutaneous plugs with single electrodes using single channel processing schemes. Yet, contrasts blur as permutations and combinations across a number of comparisons increase. Indeed, I found that the ambiguity generated by the presentation of multiple incommensurate approaches at the XIII Otolaryngology Conference to be so great that the only way I could understand proponents' positions was to ask them if they themselves would use the specific designs that they were promoting, and, if so, why.

The booths reflected a lot of preparation on the part of these firms. As in a supermarket where the commodities have already been pre-arranged so as to induce customers to buy certain brands over others (Callon et al., 2002), so too were these presentations. Each booth had on display a *mélange* of cathode ray tube screens, testing equipment, clinical data, company logos, pamphlets on cochlear implants, and videos of patients whose lives had changed because of cochlear implants. Present too were company representatives, clinicians from the sites conducting clinical studies, and audiologists, amongst others. It was only through the network of associations between such heterogeneous elements that it was possible for anyone to make sense of the positions being presented. Such is the process of translation.

The sociology of associations that drives this epistemology does away with the distinction between the social and the technical (Latour, 2005). As Law (1999, p. 4) has pointed out, 'actor-network theory may be understood as the semiotics of materiality. It takes the semiotic insight, that of the relationality of entities, the notion that they are produced in relations, and applies this ruthlessly to all materials – and not simply to those that are linguistic'. This view echoes those of the pragmatist Dewey (1997), who states that humans cannot reflect, qualify and extend existing horizons of experience and imagination without interacting with other humans and material objects.

I made it a point to go to the booth set up by 3M's biggest competitor – Cochlear Corporation (also known as Nucleus) – and picked up several brochures. One offered information to patients as to where they could seek reimbursement for this expensive implant. Another brochure offered information on how participants could purchase a

book that had been written by Graeme Clark, Nucleus's collaborator, titled 'The University of Melbourne – the Nucleus multi-electrode cochlear implant'. I also picked up a couple of testimonials from patients – such as from a profoundly deaf 16-year-old boy named Thomas, who after his Nucleus cochlear implantation was asked 'Thomas, can you hear me?', to which he replied 'Yes. I can hear everyone'.

Also in the pile was a list of centres performing clinical studies for Cochlear Corporation. Prominently displayed on this list was the California-based House Ear Institute (HEI). By associating and then promoting its relationship with HEI, Cochlear Corporation was developing doubts in the minds of key stakeholders as to the strength of 3M's ties with its key strategic partner, HEI.

'Four years ago, it would have been impossible for any of these other firms to display and promote their products in this fashion without FDA approvals', complained one person from 3M at the conference. From his vantage point, only 3M had earned the right to legitimately provide details about its FDA approved cochlear implant. Indeed, at that time, 3M was the only company to have been granted FDA approval for its single electrode cochlear implant.

3M was not innocent of the self-promotion charges that it was levying against other companies. For instance, prominently displayed on placards at the 3M booth were these messages: 'FDA-approved 3M House system provides real benefits today', and '3M systems preserve options for the future: surgically conservative electrode systems preserve cochlear tissue and surviving nerves' (Figure 3).

As is apparent in these messages and the billboards surrounding them, 3M was trying to capture attention in the present by presenting clinical data gathered in the past and by evoking exciting images of the future. Such a perspective on time is consistent with a narrative epistemology. Specifically, core to a narrative is a phenomenological view of time – attention in the present is shaped by memories of the past and anticipations of the future (Ricoeur, 1984). It is this view of time as experienced that lends a narrative approach such power to attract the attention and the commitment of audiences (Carr, 1986). True to this narrative epistemology, 3M too was attempting to shape the future by focusing on a particular meaning of what it meant to help the deaf.

If we consider the conference setting as the context and the specific messages being promoted by each group as the text, the underlying sub-texts pointed to deep philosophical differences. At the XIII Otolaryngology Conference, these differences had to do with the very meaning of the terms safety and efficacy, two criteria that have to be met to gain FDA approval (Yin and Segerson, 1986). While there was agreement on the need to establish safety and efficacy, the meanings that participants attached to these concepts were fundamentally different. Cochlear Corporation had chosen to pursue the multi-channel device, one that involved a deep insertion of multiple electrodes into the cochlea. Cochlear Corporation viewed efficacy as being able to provide speech hearing to the profoundly deaf. Of concern to those at Cochlear Corporation was the potential for damage to the cochlea when single-channel patients would inevitably have to replace their implants with multi-channel devices to gain speech hearing (Health Technology Assessment Reports, 1986).

In stark contrast, 3M had chosen to develop cochlear implants using a single electrode with a shallow insertion into the cochlea. People at 3M reasoned that such an implant

Safety:	Surgically conservative electrode systems preserve cochlear tissue and surviving nerves
Design Continuity:	Future electrodes, signal processing and transmission schemes are being designed to enhance systems implanted today.
Experience:	The world's most extensive clinical experience in cochlear implants guides the world's most intensive development of new technologies.

Details on 3M's philosophy guiding the development of its single-channel devices

Clinical data displayed by 3M at the XIII Otolaryngology Conference.

Figure 3. Information offered by 3M at the Otolaryngology Conference

would provide the profoundly deaf with a sensation of environmental sounds, but, at the same time, would cause the least amount of trauma to the cochlea. With its message – ‘provides real benefits today’ and ‘preserve options for the future’ – 3M was promoting its difference with those pursuing multi-channel devices, and, in the process, projecting 3M as the ‘protagonist’ in the narrative.

This fight for interpretive dominance between single- and multi-channel devices was also unfolding in parallel in plenary sessions where scientific papers were being presented. Here, theoretical advancements and clinical data were being presented by scientists and researchers from reputed institutions and universities around the world. To

me, a lay person not steeped into the emerging cochlear implant literature, the presentations were only partially comprehensible. However, I saw that others were deeply engrossed and that the presentations evoked many questions from the audience and sparked heated debates. As a social scientist in training, I was not surprised to be witness to these dynamics. What I did find surprising, however, was that there was no mention of the names of the corporate sponsors in the presentations that were made by scientists and researchers. For instance, I observed that Dr House did not mention 3M Corporation even once during his 30-minute presentation despite the intense cooperation between the two. I brought this to the attention of a 3M employee. He informed me that the mention of a company sponsor could easily end up delegitimizing a scientific presentation. Although I accepted this explanation, I was still left marvelling that there were all these billboards displaying company names alongside the devices just a short distance away.

Indeed, at the XIII Otolaryngology Conference, there were at least two types of conversations unfolding simultaneously. In the plenary sessions, a logico-scientific discourse was unfolding (Bruner, 1986) based on clinical data and scientific theorization. In the auditorium, a narrative discourse was unfolding comprising an assemblage of facts, artifices, high potential technologies and high status people (Czarniawska, 1997; Lounsbury and Glynn, 2001; Zilber, 2007). As Bruner (1986) has noted, these two types of discourses try to persuade in different ways. The logico-scientific discourse attempts to convince by appealing to procedures for establishing formal and empirical proof. In contrast, narratives attempt to convince by endowing experience with meaning through 'verisimilitude'. As Tsoukas and Hatch (2001, p. 1006) clarified, 'In narrative, for example, things can be connected by co-occurrence, spatial proximity, formal similarity or metaphor, all types of association that logico-scientific modes of thinking try to eliminate as distractions from the discovery of scientific generalizations'. What I found fascinating was the unfolding of both discourses in parallel.^[1]

The future is contested (Brown et al., 2000) and, in combination, these discourses were trying to persuade field members to pursue one course of action over the others. For instance, to signal its long-term commitment to this field, 3M had also on display information on its 'family of products' that were at various stages of development. Next in line after the 'House' device, for instance, was a device from the University of Vienna developed by the Hochmairs. Although this 'Vienna' device too had been designed around a single electrode, it was to be worn outside the cochlea, not inserted into it. The programme manager from 3M was convinced that such an 'extra-cochlear' orientation would further consolidate 3M's approach towards safety. At the same time, the fact that this device operated with a single-electrode appeared not to compromise its performance. Recently obtained results from clinical studies conducted in Vienna had demonstrated the device's potential to offer hearing speech to the profoundly deaf.

I alluded earlier to the ambiguity that emerges as a number of alternatives are juxtaposed against one another. Such ambiguity is exacerbated with the presentation of emergent data that have not yet been thoroughly vetted by the community. Such was the case with the Vienna device. 3M was well prepared to promote its early clinical findings at the XIII Otolaryngology Conference. A large part of the battle would be won if 3M could convince participants that the safer Vienna device was comparable in performance

to the multi-channel device. 3M was going to go all out to accomplish this. Labelling this as a 'multi-frequency' device (so as to classify this product as a multi-channel device), 3M had prominently displayed the recently obtained 'Vienna' clinical data.

Only now do I realize the importance of the classification battle that was underway so many years ago (see Bowker and Star, 1999) for the importance of classification in emerging fields). The single electrode devices that 3M was pursuing had unfortunately become associated with a single processing scheme. Technically, this need not be so. A single electrode can have multiple processing channels depending on the signal processing scheme used. But, as the label stuck, and as 3M noticed that others were promoting the multi-channel devices (based on multiple electrodes) as *the* device of the future, 3M too tried to demonstrate that it had a device under development that could provide multiple-channel stimulation. Only, it would not have been legitimate for 3M to use the term multi-channel. Consequently, the Vienna device was promoted as a multi-frequency device – part of an emerging multi-channel set and yet different from it.

I presume that similar fights for classification occur in other emerging fields. Such fights would be manifest in the form of categories and sub-categories, each vying for interpretive dominance. What exactly is the difference between a mild-hybrid, full-hybrid, plug-in hybrid and a muscle-hybrid, for instance? As Wacquant (1992, p. 14) clarified about Bourdieu's reflexive sociology, 'systems of classification constitute a stake in the struggles that oppose individuals and groups in the routine interactions of daily life as well as in the solitary and collective contests that take place in the fields of politics and cultural production'. The ambiguity that is generated may be a reflection of the emergent stage of technology development. At the same time, such ambiguity may also be 'strategic' (Eisenberg, 1984) as it allows individual firms and field members an opportunity to keep options open to accommodate emerging stakeholder demands.^[2]

In addition to these public trials of strength, there were also very private attempts at translation underway. For instance, 3M had organized several private video sessions around its Vienna device to influence critical constituents such as members of media, prominent people from the FDA, important surgeons and others. At one of these sessions, Inge Hochmair, the project leader from the University of Vienna, dropped in to report that conference participants were questioning the credibility of the clinical data that had been generated with the Vienna device. According to Inge Hochmair, there were 'rumours that it is easier for a patient to understand the German language as compared to the English language'. Later, I came to know that representatives from two firms developing multi-channel devices had taken objection to the data being presented by 3M on the Vienna single-channel device. These representatives suspected that exaggeration was at play.

Certainly, such conversations might unfold anywhere. But, in a conference setting, they take on greater significance as they occur in a forum designed to dramatize and amplify. Nowhere else could I have found such a confluence of high status people and high potential technologies trying to shape the future. The conversations that flow, like the one that I encountered, are unstructured and nonlinear. Lacking closure, they capture speculation about what is happening in the midst of lived experience. According to Boje (1991), such conversations (ante-narratives as he calls them) direct attention to the speculative, the ambiguity of sensemaking (Weick, 1995) and guessing as to what is

happening in the flow of experience. They answer the question 'What is going on here?'. Often, these conversations are never recorded in proceedings or videotaped. Yet, they continue to shape the overall discourse in the field and become a part of a larger emerging zeitgeist.

Prior to my stumbling upon this set of conversations, people at 3M had informed me that 3M's competitors were the ones who were exaggerating. Indeed, I too had noted the possibility of such exaggeration at play in my field notes where I recorded that clinical data that was being presented at the conference by the proponents of the multi-channel approach were 'based on very few patients implanted and that [such data] put the single-channel device at a disadvantage [because 3M had implanted a larger number of patients with its single-channel device]'. But, now, I found that 3M was being accused of exaggeration by its competitors. What was going on?

As I probed deeper, I came to understand why each firm considered the others to be exaggerating when, in fact, there were merits to the claims being made by each. Based on my interviews with researchers from independent testing institutes, I came to realize that firms were simply enacting their genuinely held beliefs. For instance, because of the previously established belief amongst participants, it was difficult for those pursuing multi-channel devices to conceive that 3M's Vienna single electrode device could provide open set speech recognition as did multi electrode devices. On the other side, single-channel proponents were not willing to accept the results of patients with multi-channel devices based on the testimonials of a few star patients. Lacking the tests, samples and the authority from the FDA to conduct randomized tests with the devices being offered by competitors, each firm was prematurely concluding that the others were exaggerating. In short, there were epistemological reasons as to why each group thought that others were exaggerating.

This particular insight led me to embrace the concept of 'symmetry' in the study of emerging fields.^[3] What is fact and what is fiction is defined by self-referential loops between artefacts, metrics and beliefs (Garud and Rappa, 1994).^[4] Because of such self-referential loops, different members of a technological community may pursue fundamentally different approaches and may view their own data as being correct and true even as they believe that others are exaggerating. For 3M, others were making exaggerated claims. For others, 3M was making exaggerated claims. Indeed, the meanings attributed to concepts such as safety and efficacy could only be understood when these concepts were implicated within specific networks of actors, artefacts and metrics (Callon, 1986; Latour, 2005).

Symmetry also implied that I had to track both successes and failures in real time (Bijker et al., 1987). I did not know at that time who would win the battle that I was witnessing. To this point, the significance of an event cannot be understood readily in real time, but must be weighed against the overall flow of events over time. For instance, in 1984, FDA's approval of the single-channel device was a positive event for 3M and a negative one for competitors. Yet, over time, FDA's approval of 3M's single-channel device paved the way for the approval of the more complex multi-channel devices once the safety of cochlear implants as a product class had been established. In sum, symmetry implied that I had to maintain neutrality on the interpretation and significance of unfolding events.

AMERICAN SPEECH LANGUAGE AND HEARING ASSOCIATION CONFERENCE

In what ways did the XIII Otolaryngology Conference shape the dynamics of the emerging field? It was a forum where emerging data and philosophical positions were presented by firms in a public setting in a manner that heightened participants' sensitivities to differences resulting in the generation of claims and counter claims that led to accusations of exaggerations. For the proponents of each perspective, these dynamics led to a strengthening of resolve and an escalating of commitment to 'prove what had been promoted'. In sum, there was an intensification of rivalry because of what had transpired at the XIII Otolaryngology Conference.

I decided to go to yet another conference. Why not let the bits and pieces of the field come to me all at once rather than go to them one by one? I was presented with an opportunity to do so with the American Speech Language and Hearing Association (ASHA)^[5] conference, to be held on 13–15 November 1987 in New Orleans. By this time, I was sufficiently aware of the many issues surrounding the emergence of the cochlear implant field. One issue, for instance, had to do with the differences in the approaches and the evaluation metrics being used by the single- and multi-channel groups to evaluate the safety and efficacy of devices. I wanted to gain a better understanding of the source of this controversy and why it was so difficult for field participants to arrive at a consensus despite FDA processes to establish the safety and efficacy of all medical devices.

Since the XIII Otolaryngology Conference, the situation had changed dramatically for 3M (Garud and Van de Ven, 1992). No longer was 3M approaching this conference as a victor possessing the only FDA-approved device. Cochlear Corporation too had been granted FDA approval for its multi-channel device and there appeared to be significant momentum building in its favour. To the extent that this support solidified, 3M would have to abandon its programme.

There was, however, one possibility that could revitalize 3M's efforts. Because of its short electrode insertion, the single-channel device that 3M had pursued would potentially cause fewer traumas to an individual's cochlea, and therefore might be more appropriate for children whose cochleas were still growing. Those pursuing single-channel technologies argued that such a device would make it possible to bring children into the hearing world faster than if they were to wait for a multi-channel device. Indeed, 3M had an application pending with the FDA seeking pre-market approval for devices to be implanted in children. The ASHA conference could provide the necessary forum to solidify the rationale for the FDA to grant its approval. The stakes were high for 3M.

I made extensive preparations for this conference. For instance, ahead of the conference, I called up the people I wanted to meet. This time, it was much easier to set up meetings. People wanted to meet me as they thought I knew something. There was an unexpected bonus from all my pre-conference preparatory work. During the course of my phone conversations, I found out about new issues that otherwise I would not have so readily stumbled upon. For instance, I could infer the importance that different groups were according cochlear implants by noting whether or not their representatives were planning to attend the conference. I also found out that some programmes (such as Storz)

were planning to shut down and exit the field. All of this was valuable data that I used later to write a description of the emergence of the cochlear implant field.

I identified the critical issues that I wanted to understand. This list helped me refine and focus my interview protocol. Specifically, I would request conference participants to compare single- and multi-channel technology. In addition, I would ask them to describe how evaluation metrics had evolved and assess the extent to which standardization had occurred. I would also inquire about critical events – such as anticipated legislation, firm exits, new scientific findings and trial results – that might affect the ongoing emergence of the field.

At the conference, my open ended protocol yielded insights on the extent of the rift between multi- and single-channel groups. Firms had not only chosen to commercialize devices with different attributes, but, at the same time, had embraced different evaluation criteria as well. For instance, 3M/House researchers continued to measure a patient's ability to understand environmental sounds. In contrast, researchers at Nucleus/Melbourne employed tests that measured a patient's ability to perceive speech and tracked improvements in speech recognition over time. Moreover, different groups had also developed unique ways for selecting patients. For instance, given their objectives to impart speech hearing, it made sense for firms pursuing multi-channel technology to select 'highly motivated' profoundly deaf candidates as patients. In a similar vein, it made sense for those who wanted to provide only environmental sound recognition to randomly sample the entire pool of the profoundly deaf. There were differences in the statistical approaches that firms had used to analyse and report performance as well. The single-channel group had chosen to look at performance improvements at the group level based on randomly selected patients. Others, such as Nucleus, had developed approaches that reported within-subject improvements before and after implantation.

Although field members were aware of these differences, they were made all the more salient by the presentations that were made by researchers from universities that were not developing cochlear implants, and so did not have a direct stake in either the single or the multiple channel device. In their presentations, these researchers noted the difficulties associated with comparing and contrasting the performance of different devices as each embodied different philosophies and evaluation criteria. Indeed, the difficulties that they confronted in comparing the different devices offered insights to a central question driving field emergence – Where does ambiguity come from? The cochlear implant case showed me that the presentation of scientific data involving different metrics, technologies and beliefs at conferences can endogenously increase rather than reduce ambiguity.

One of the biggest challenges in conducting comparative tests arose from the differences in the signal processing schemes adopted by firms. For most part, consistent with the number of electrodes involved, the two main camps had employed signal processing schemes that could process either one or multiple channels of information. Yet, such strategies had created great confusion. As Karen Berliner of the House Ear Institute explained:

We [3M/HEI] lost the battle as people began thinking of single electrode as single channel. But there is a distinction between channels and electrodes. A single electrode device can function as a multi-channel device. Scientists, based on their theories,

thought that the multi-electrode device must do better. HEI allowed this perception to get around and then it was too late. We lost the battle.

As I listened to the participants at this conference, it became clear to me that the very meaning of what it meant to help the profoundly deaf was at stake. The single-channel group wanted to provide a prosthetic device that would allow the deaf to continue to operate functionally in their own world yet become a bit more functional in the hearing world. The multi-channel group, in contrast, wanted to bring the profoundly deaf into the hearing world.

Despite such heterogeneity in beliefs, there was emerging consensus amongst participants that the number of patients seeking implantation was not increasing as projected. The post-lingually deaf who might have been interested in such prosthetic devices were not forthcoming as third party insurance payment did not as yet fully cover the costs involved. Moreover, there were aesthetic reasons for the rejection of the devices. Most importantly, though, significant improvements had yet to take place in the technology itself for the 'market to crack open'. Dr Simmons from Stanford explained the logic behind this sentiment:

Our devices (at the moment) cannot provide 100% hearing. The best device right now can only give 40–50%. Imagine if you were trying to understand what I was saying if you could only pick up half the words that I was saying. You would go crazy and then would give up.

Because of such imperfect performance, the congenitally deaf were rejecting cochlear implants as they felt 'handicapped' in the hearing world with such a prosthetic device. Yet, there appeared to be dwindling corporate intent to fund the development of cochlear implants to its next logical level. Corporate representatives explained that each time the FDA would approve a device for commercial sale, a 'campaign of misinformation' would limit the number of patients for that device as prospective patients 'self-selected themselves out'. In sum, there were all these micro forces conspiring to prevent the field from emerging.

The children's market offered a ray of hope. Yet, controversy on safety surrounding the implantation of cochlear implants in children threatened to create problems. For instance, through the conference grapevine, I came to understand that not all conference participants shared 3M's views on safety. One clinician informed me: '3M has heavily publicized the safety issue and has created indecision in the otologic community by raising issues about insertion trauma'. Another clinician added: 'There is much controversy as to what may be happening to tissue damage. Is the technology beneficial over the child's lifetime? The otologic community is concerned'. In short, there was a growing perception amongst field participants that 3M's message on safety was proving to be a bottleneck by preventing the rapid growth of the field.

Controversy seemed to emerge over the efficacy of cochlear implants in children as well. Despite the momentum in favour of the multi-channel device, emerging clinical data threatened to reopen up the debate between single and multi-channel approaches. Specifically, clinicians at the Central Institute for the Deaf (CID), an independent clinical

centre, had just then completed a study of 12 children using the single-channel device that showed that it might be possible to for children using the single-channel device to hear speech. In her scientific presentation, Jean Moog of CID stated:

Last year, we had suggested that the single-channel was not appropriate. This year, we are suggesting that it is appropriate and that different children need different kinds of devices.

This assertion was challenged immediately by a question from the audience. 'How were the patients chosen?' asked a clinician. It became clear that the results presented reflected the performance of the 12 best patients from a total of 150 children who had been implanted. Privately, the clinician who asked the question informed me that the test batteries used by the CID were not appropriate and that the performance of the star patient that the House Ear Institute had been promoting could be attributed to the patient's learning that would have occurred because of the repeated administrations of the test. In response to Dr Moog's presentation, another proponent of the multi-channel approach told me:

If children can do so well with single-channel devices, how much better would they be able to perform with a multi-channel device? Children are so plastic and so eager to learn.

Again, these exchanges are representative of the conversations that unfold at conferences that result in shaping the perceptions of key players. At the ASHA conference, it was evident to me that participants were using the occasion not just to gather information, but to also push their own technologies. At the same time, however, there appeared to be a genuine effort on the part of participants to understand why the field was not growing as anticipated.^[6] Participants recognized that the heterogeneity that they themselves were generating in their efforts to build and promote their own approaches was generating ambiguity that was dampening the widespread acceptance of the technology.

THE NIH CONSENSUS DEVELOPMENT CONFERENCE

The ASHA conference solidified in the minds of field participants that the emergence of the field was being stymied by a vicious circle (Masuch, 1985) driven by incommensurability of approaches. Indeed, newly emerging clinical data on the viability of single-channel devices in children could open up a political debate on the relative merits of the single- and multi-channel devices for children. And, given the ambiguities generated by a lack of common standards for the selection, testing and reporting of clinical data, such a debate, once opened, would not be easily resolved.

It is to address these issues that the NIH decided to organize a 'Consensus Development Conference on Cochlear Implants' on 2–4 May 1988. Co-sponsoring the conference was an array of institutional bodies including the National Institute of Neurological and Communicative Disorders and Stroke and the Office of Medical Applications of

Research, the National Institute on Aging, the National Institute of Child Health and Human Development of the National Institutes of Health, the Food and Drug Administration, and the Veteran's Administration. One could not help but be impressed by the number of institutions that had lent their names to this event, thereby adding legitimacy to any consensus statement that would emerge. The programme abstract offered this as the purpose of the conference:

Since the development of cochlear implants in the 1960s, more than 1000 patients – children and adults – have been implanted with a variety of devices. *Controversy exists on several issues, including determination of appropriate candidates for implantation, selection of a single-electrode or multi-electrode device, suitable pre-implantation and post-implantation assessments, and rehabilitation procedures.* The purpose of the conference is to reach agreement on important issues in cochlear implantation. The conference will bring together a wide variety of specialists in otolaryngology, auditory anatomy and physiology, rehabilitative audiology, speech and language pathology, pediatric otolaryngology, psychophysics, and other relevant fields. After a day and a half of presentations, a consensus panel will then formulate a draft statement responding to the following key questions: Who is a suitable candidate for a cochlear implant? What are the advantages and disadvantages of the different types of cochlear implants? How effective are cochlear implants? What are the risks and limitations of cochlear implants? And, what are the important directions for future research? (emphasis added)

As this paragraph highlights, the NIH sponsors such conferences when they perceive that there is controversy that cannot be resolved through market forces. Rather than set the specific agenda, the NIH, instead, sets the stage for the scientific members of an emerging field to generate a 'consensus'. The presence of such controversies in the emergence of bio-medical devices is apparently not rare. Between 1977 and 2006, the NIH has organized 148 Consensus Conferences. As the NIH (1988) reports:

The Consensus Development Program (CDP) is an unbiased, independent, evidence-based assessment of complex medical issues and is conducted by the National Institutes of Health (NIH). The purpose of a CDP conference is to evaluate the available scientific information on a biomedical issue and develop a statement that advances understanding of the issue under consideration and will be useful to health professionals and the public.

As I look back at my detailed 90-page report on the Consensus Conference, two observations stand out. First, I noted 'I seem to be reaching data saturation. The approach I must now employ is to identify gaps in the data that I already have and ask people for specific missing information'. I also noted that 'preparatory work for such a trip is time consuming but essential'. I must have spent 4–5 days contacting different people on the phone prior to my trip. For instance, I contacted scientists, otologists, and representatives from commercial firms, as well as the NIH, FDA, and other government bodies responsible for funding implantation.

As before, the conference setting offered me unique access to participants. For instance, Blair Simmons from Stanford informed me that the first cochlear implant could be traced to a covert CIA operation to implant microphones into cats' ears to serve as devices that could record conversations surreptitiously. Beyond this seemingly trivial fact, I reconfirmed, through my interviews, that controversy was still alive as different players continued to use different approaches to evaluation of cochlear implant safety and efficacy.

My discussion with Dr House, the cochlear implant pioneer who had worked closely with 3M, is illustrative of the committed passion that continued to fuel the ongoing controversy. It was clear that Dr House truly believed in the single-channel device. As he forcefully stated: 'the Nucleus [Cochlear Corporation's] device is not appropriate for children. It is not practical to 'map' this device for young children. And, furthermore, their device is too bulky. In the case of the House device, you don't need to map. You can do it with threshold levels'. Even as late as 2003, Dr House (2003) continued to defend his choice of the single channel device, noting:

The saga of cochlear implants has long been dominated by the conflict between clinical observation and theory. As you read this monograph, it will become clear that my viewpoint is strongly shaped by clinical observation. To put it another way, I admit to considerable distrust regarding unsupported statements which disagree with what I can see unfolding in my patients' lives.

At the NIH Consensus Conference, I wondered how a conflict that had been brewing for so many years would be resolved in a matter of three days. The conference was set up to accommodate upwards of 300 researchers to interact and attend plenary presentations made by experts from the field on topics such as 'historical overview', 'candidate selection', 'types of implants', 'clinical effectiveness', 'risks and limitations' and 'children selection'. Overall 23 presentations (not including the opening and closing sessions) were to be made over a period of a day and a half.

Unlike the first two conferences that I have described, the discourse at the NIH Consensus Conference was designed to be mainly logico-scientific. At the same time, though, intense sensemaking (Weick, 1995) processes and negotiations were unfolding backstage, even as scientific papers and clinical studies were being presented front-stage. Specifically, a group of 14 eminent panellists had been charged with the task of sifting through all the data and arguments to come up with an overall statement about cochlear implants.

Although I tried, I could not gain access to observe this group in action. Having been excluded from the *sanctum sanctorum* of decision making, I could only piece together some of the processes that must have transpired. The panel, a group of eminent researchers, scientists and clinicians, all with either a PhD or MD, and from neutral institutions, met on several occasions to generate a consensus statement. To facilitate this process, they first drafted a 'scribe's copy' (see Figure 4) – essentially a document that panellists had drafted to act as a 'single negotiation text' (Raiffa, 1982). Such a text allows the different members of a discussion to grapple with a set of complex issues so as to reach a resolution. I was informed that the panellists had split

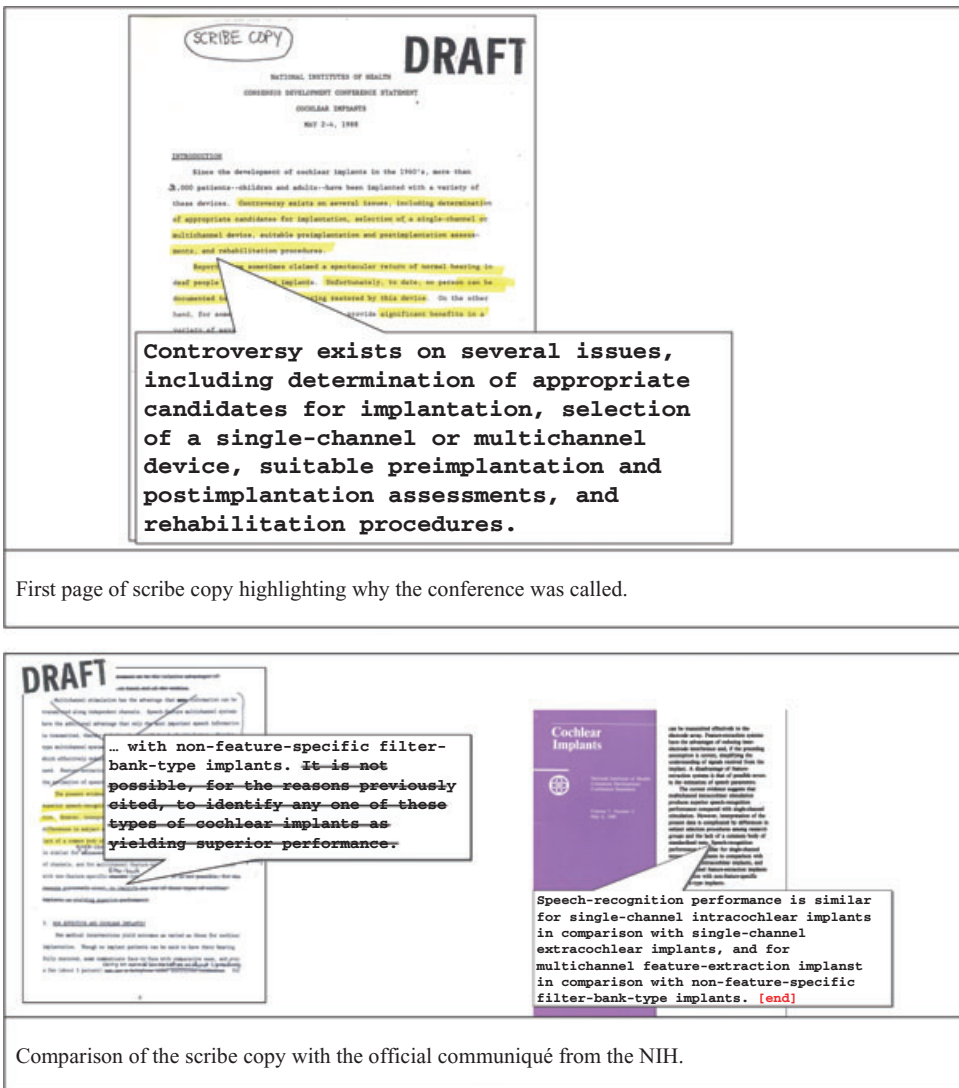


Figure 4. Scribe's and final copy of the consensus statement that emerged from the conference

up into groups, each group addressing one of the sub-topics that constituted the charge to the group as a whole.

I did get hold of two versions of the scribe's copy. One had handwritten notes and edits, and by comparing this with the final document, I could visualize that the consensus statement must have emerged through a process involving the circulation of text amongst panel members. By comparing the copy with all of its handwritten notes and edits with the final official communiqué, I could infer and reconstruct some of the key points that must have been negotiated by the panellists. For instance, one paragraph in the scribe's copy reads as follows:

The present evidence suggests that multi-channel stimulation produces superior speech-recognition performance compared with single-channel stimulation. However, interpretation of the present data is complicated by differences in subject selection procedures among research groups and the lack of a common body of standardized tests. Speech-recognition performance is similar for extra-cochlear and intra-cochlear implants with the same number of channel, and for multichannel feature-extraction implants in comparison with non-feature-specific vecoder type implants. ~~It is not possible, for the reasons previously cited, to identify any one of these types of cochlear implants as yielding superior performance.~~

I have struck out the last sentence to highlight what was scored out by hand in the scribe's copy. Apparently, some member of the panel had thought that it was important to include a statement on the indeterminacy that still existed in comparing the performance of the different devices. Yet, someone else on the panel had felt that a bona fide consensus could not include such a statement. Whatever the politics of the situation, the final official communiqué from the NIH Consensus Development Conference makes no mention of this last contentious line.

In sum, the most interesting part of this conference had to do not with what had been said but with what had been left out of the final communiqué. In a matter of three days, a controversy that had dogged the development of the cochlear implant field for decades had been brought to a close. An audiologist, present at the conference, debriefed me as to what had happened.

The scientific community wanted to reduce dissonance on the path members ought to pursue . . . the emergence of the multi-channel approach as the preferred path is an indication of the efforts to reduce dissonance.

Indeed, it appears that the consensus statement, while imposing no legally binding constraints on participants, had considerable influence on the field. 3M eventually closed down its single-channel cochlear implant programme. In 1990, I attended the 'Second International Cochlear Implant Symposium', where I observed little if any presence of the single channel camp. More recently, in 2003, I contacted a surgeon who had been a panellist at the 1988 NIH Consensus Conference. In her opinion, NIH Consensus Conferences are organized to objectively apply the 'rules of good science to sort through the mass of publications'. In her recollection, the 1988 conference had been organized because 'promotion' by companies was generating scepticism about cochlear implants within the scientific community. One of the tasks of the panel, according to this person, was to sift through the claims to determine which ones were factual and which ones were not.

'Why did the multi-channel device prevail over the single-channel device?' I asked. According to this person, the multi-channel design had won out because it had a 'ring of science' attached to it even though the evidence supporting its superiority over single-channel devices, at that time, had not been overwhelming. These observations provide a rhetorical explanation as to why single-channel devices lost out to multi-channel devices – an explanation that goes beyond the 'material' benefits of the technology. Although scientific discourses can also be construed as a narrative, those who subscribe

to a scientific discourse have little patience for narrative forms that do not explicitly build upon the lingua franca of science (Czarniawska, 2004; Lyotard, 1979). The scientific discourse around which the multi-channel device was couched certainly appealed to those at the consensus workshop.

Regardless, the consensus statement that had emerged, although not legally binding, did possess the power to shape real decisions – what Anand and Jones (2008) label as the ‘transformation of symbolic value’. According to the person I interviewed, those who continued to implant devices that were at odds with the consensus statement faced exposure to malpractice lawsuits. If one were to plot actual implantations, NIH funding, patents granted, and research publications before and after the Consensus Conference, she suggested, one would probably see a significant decline in all of the activities associated with single-channel devices.

In 2003, I also contacted the Director and Deputy Director of the Office of Medical Applications of Research (OMAR) that manages NIH Consensus Conferences. They explained that Consensus Conferences are organized when controversy continues. It is their role to provide a forum for the objective dissemination and debate of accumulated scientific data. Rather than shape the direction of a field, OMAR’s role is to ‘modulate’ field dynamics (see also Rip, 2008). They pointed out that outcomes from conferences can have a ‘ripple effect’ because consensus statements are immediately picked up by mass media and trade journals. They could not comment specifically about the 1988 cochlear implant Consensus Conference as they had not been present.

DISCUSSION

What can we learn about conferences as field configuring events from these descriptions? Each instance that I have described here highlights a different facet. For me, the XIII Otolaryngology Conference best illustrates how conferences serve as venues for the enactment of technologies by firms. The ASHA conference highlights how conferences offer forums for field members to make sense of what is happening. And the NIH Consensus Conference highlights the socio-political dynamics involved in achieving institutional closure.

Conferences as Venues for the Enactment of Possibilities

I began the article by pointing to conferences as prime venues where associations are made. Traditionally, associations in business settings are places where representatives from firms come to exchange information, make sense of complex field dynamics and, perhaps, to seek agreement. Whereas this was true of the cochlear implant field, I also observed a different dynamic at play as field players associated with high status organizations and high potential technologies competed to win the allegiance of field members. Specifically, the dynamics that unfolded at these conferences were not necessarily driven by agreements and consensus, but rather by disagreements and clashing interests.

The XIII Conference was characterized by such disagreements. Cochlear implant players were attracted to this conference not only because of symbolic similarities (they

all saw themselves as players in the ‘cochlear implant’ field), but also because of deep philosophical differences. And these differences arose because of the different networks of associations that characterized each approach – the beliefs, the metrics and the technologies involved (Garud and Rappa, 1994). In other words, key players in the emerging field congregated at the XIII Conference to establish and sharpen their differences given the symbolic similarities between their approaches. It was here that one could see ‘trials of strength’ (Latour, 1987) unfolding as differences were magnified and contrasts were established.

Thus, conferences are not just clearing houses for information. Rather, they also serve as prime venues where field participants can potentially be persuaded as to the virtues of one approach over the other (see also McInerney, 2008). In this sense, these conferences are similar to other field configuring events such as automobile races (Rao, 1994) and Grammy awards (Anand and Watson, 2004). Outcomes of such tournaments can critically impact ‘mind’ and ‘market’ shares of the firms involved even though there may only be a tenuous link between the beefed-up race cars that win auto races and the cars that the common person is likely to buy.

There is one critical difference between auto races and the XIII Otolaryngology Conference that I attended. In the former, the criteria for what constitutes victory – speed, for instance – have already been defined and it is against such criteria that contestants are measured. In contrast, in the case of cochlear implants, there were no commonly agreed upon criteria for measuring safety and efficacy. Indeed, the XIII Otolaryngology Conference was a venue where the fight was on to institutionalize the very meaning of what it meant to help the profoundly deaf and the specific metrics against which performance ought to be measured.

Consequently, such field configuring conferences are better described as ‘meta-races’ – criteria for victory are being negotiated even as the tournament is unfolding, thereby generating ambiguity endogenously. In such meta-races, firms do not necessarily ‘remove doubt’ by sharing a lot of information with their audiences (Lampel, 2001). Instead, firms try and ‘generate certainty’ through ‘dramaturgical presentations’. Each perspective attempts to persuade by bringing within its fold high status people and high potential technologies as the battle unfolds to win the hearts and minds of participants. In the cochlear implant case, for instance, firms framed their presentations at the XIII Otolaryngology Conference so as to sway others even when clinical data had not yet solidified and when it was not even possible to compare the different devices.

These observations highlight the differences in perspectives between a sociology of associations (Latour, 2005) and neo-institutional sociology (DiMaggio and Powell, 1991). In neo-institutional sociology, actors will imitate one another in the presence of ambiguity. But, a sociology of associations perspective suggests that ambiguity that is generated through the juxtaposition of alternative frames will generate more ambiguity. Consequently, rather than focus on isomorphism, a sociology of associations recognizes that phenomena are constituted through the interactions of actors with multiple and often conflicting frames, each vying for legitimacy (see also Aldrich and Rueff, 2006; Hargrave and Van de Ven, 2005). Moreover, rather than continuity that is generated by deeply taken-for-granted institutionalized rules, a sociology of associations perspective

draws attention to the fragility of seemingly stable social structures. As each position is a complex combination of artefacts and humans all stitched together to provide one overarching account, even a small change in one of the elements that constitutes a net of associations can set in motion a cascading effect that can shift the locus of agency from one part of the network to another (Garud and Karnøe, 2004). From this perspective, change is the constant and it is stability that has to be achieved – not the other way around (Tsoukas and Chia, 2002).

Conferences as Venues for Sensemaking

As the ASHA conference suggests, contestation that was part of the XIII Conference is not the only driving force promoting field emergence. There was dissension at the ASHA conference as well, but this time, participants were trying to come to grips with the self-defeating dynamics that their differences were generating. In short, this conference was driven by a quest to find similarities, given differences.

It was at the ASHA conference, for instance, that I heard about field-wide concerns that 3M's approach to safety was generating. 3M's continued insistence that a deeper insertion of electrodes could result in irreversible cochlear damage made it particularly difficult to proceed with the more advanced multi-channel speech recognition processing systems that required deeper insertion of electrodes. Participants at the ASHA conference openly shared such concerns.

The problem was magnified by a 'campaign of mis-information'. Each time a cochlear implant device would be ready for clinical trials or for pre-market approvals by the FDA, claims and counter-claims would erupt, confusing both the otologic community and prospective patients. It became clear to the participants at the ASHA conference that this campaign of misinformation was enabled, in part, by the lack of standardization of metrics for the selection, testing, and rehabilitation of implant recipients, as well as the reporting of clinical data. The multiplicity of metrics was making it possible for different factions to offer their own 'facts' as the truth.

At the ASHA conference, participants also re-engaged in an earlier debate between clinical data and theory. The CID's new clinical data suggested that it might be possible for some children to gain some degree of speech hearing with the single-channel device. Such findings appeared to be at odds with the emerging theoretical position that speech hearing could only be generated by multi-channel stimulation using a deeply inserted multi-electrode.

I only revisit these strands of conversations at the ASHA conference to provide readers with a sense of how ASHA participants attempted to sort through the complex set of issues at play. I walked away from the ASHA conference with several conclusions. First, despite differences in approach, participants were in broad agreement as to the dynamics driving the slow acceptance of cochlear implants as an established practice. Second, most players wanted to reach some sort of closure on these issues in order to move forward. And third, there appeared to be no natural or emergent mechanism for such closure to occur through market processes. In short, the field was caught up in a vicious circle (Masuch, 1985) that could not be resolved by the uncoordinated actions of individual players.

Conferences as Venues for Achieving Closure

As I have described earlier, the NIH Consensus Conference generated a 'consensus'. Specifically, the conference legitimized and solidified the multi-channel approach over the single-channel approach. Addressing the reasons for this outcome when a consensus could not otherwise be obtained can further add to our theorization on conferences as venues for the configuration of emerging fields.

A productive line of inquiry has to do with the selection context that a specific conference setting establishes. The fact that the NIH, an institution that embraces science as its lingua franca, was the primary sponsor of the Cochlear Implant Consensus Conference implied that a logico-scientific approach to theorization would have an advantage over other alternatives. In this regard, the proponents of the single-channel approach were at a disadvantage in comparison to those pursuing the multi-channel approach. To recapitulate, the former had chosen to take modest steps in order to gain an understanding of the science behind hearing. The single-channel device was designed to make it possible for the deaf to continue being functional in their own culture even as they derived some benefits in the hearing world by gaining access to environmental sounds. In contrast, proponents of the multi-channel design aspired to provide the profoundly deaf with speech hearing. Yet, as many have noted (cf. Blume, 2000; Lane, 1992), such an aspiration would result not necessarily in bringing the deaf into the hearing world, but in rendering them handicapped in both the hearing and the deaf worlds. And yet, the multi-channel device was accorded differential legitimacy at the NIH consensus development conference because it had a 'ring of science' to it and even though the science around hearing had yet to solidify.

Many have asked me about the appropriateness of this outcome. The notion of symmetry that a sociology of associations requires prevents me from categorically identifying the superiority of one device over the other. This is because the relative superiority of any device becomes intertwined with the metrics involved in establishing performance. And, as I have already mentioned earlier, conferences serve as prime venues for the contestation and emergence of criteria by which what is the best is to be measured.

I can, however, comment upon the 'translation' processes that unfold at such conferences. At the cochlear implant NIH Consensus Conference, for instance, translation occurred as the proponents of the multi-channel device were able to connect their device with a logico-scientific discourse to a greater degree than could the proponents of the single-channel device. A scientific rationale within a scientific setting can act as a powerful rhetorical closure mechanism. Translation processes could also be seen in the way in which the consensus statement emerged. As I have described earlier, this outcome was characterized not only by the circulation of text amongst participants (the scribe's copy for instance), but more importantly, by the suppression of certain other texts from the official communiqué (most notably, the omission of those few critical sentences that could have perpetuated ambiguity in the field).

Ventresca and Mohr (2002) have pointed out that texts are sedimentations of the conversations that unfold within organizations. Similarly, the NIH conference call and the final statement that emerged are sediments of the rationale for the NIH Consensus Conference and what was accomplished. However, had I not attended this conference,

I would not have gained access to the scribe's copy. And, without this scribe's copy, I could not have realized that the final consensus statement had been hammered out by deleting a sentence that highlighted fundamental differences that existed between the proponents of the two approaches. In short, at least in the case of cochlear implants, paying attention only to the official NIH documents would have obscured the disagreements that existed behind the 'consensus' that emerged around cochlear implants.

Today, almost 18 years since the NIH Consensus Conference, there is renewed interest in cochlear implants. Perhaps there have been dramatic changes in the technology. In the interim though, the device has languished, kept alive by grants. It is not clear to me whether or not cochlear implants could have gained faster acceptance if events had progressed in a different sequence.

CONCLUSION

From these observations, I would like to suggest that conferences, such as the ones that I attended during the emergence of the cochlear implant field, are not independent entities, but rather are embedded events within a larger flow of field unfolding activities. Each conference is but an occasion for the emergence of a provisional synthesis of the tensions that are produced as different logics clash (see Farjoun, 2002). And, with these provisional syntheses, new dialectical forces are generated.

What is it about conferences that makes it possible for these dynamics to unfold? Conferences, by their very nature, are holistic events designed to foster non-linear interactions at the boundaries of interaction as small worlds collide.^[7] If the whole field were to be contained in a nutshell, a conference would be its most likely manifestation. Consequently, conferences that facilitate the meeting of individual minds and the pressing of personal flesh are more than mere aggregations of events unfolding during emergence of a field. In such settings, the compression of time and the intensity of interactions across boundaries that are broken can generate a shift in order (Chiles et al., 2004) that may not have happened otherwise. As a result, conferences always hold the potential for emergent unanticipated outcomes. They make it possible for streams of events to intersect, amplifying certain dynamics while dampening others.^[8]

Literature on how a collective generates a consciousness can extend our understanding of these processes (see also Oliver and Montgomery, 2008). For instance, literature on high reliability organizations (Weick and Roberts, 1993) draws attention to the notion of heedful interrelating whereby such a collective consciousness is generated. Those who have studied jazz (cf. Hatch and Weick, 1998) have pointed to musicians 'getting into the groove' to produce music that is emergent through interactions. Complementing these insights are others from literature on narratives. If we consider the conversations that unfold at conferences as stories (Boje, 1991), then our sense-making of these stories after the fact (Bruner, 1986) generates a narrative that configures emerging fields.

These are all lines of inquiry that can be productively employed to draw deeper insights into a sociology of associations at venues such as conferences. Reciprocally, a sociology of associations perspective offers organizational scholars with an expanded view to understand the emergence of organizational fields. Mainstream organization

literature embraces an epistemology that views the emergence of a collective consciousness as being driven by dynamics that generate similarities given differences between actors. The question that many in this literature attempt to address is – Given differences, how can a group prevail through trying times? In contrast, a sociology of associations perspective entertains the possibility that interactive dynamics that occur during field configuring events such as conferences can also be driven by differences given similarities. That is, members of a field come together during such holistic occasions not necessarily to agree, but to disagree with one another and, in doing so, define and redefine the field in dynamic ways.

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NOTES

- [1] See Czarniawska-Joerges (1995) for a discussion as to how and why these two approaches can be collapsed.
- [2] I thank the editor of *JMS* for this suggestion.
- [3] The notion of symmetry has generated a heated debate within the sociology of science community. Here, I can only direct you to Bloor's (1999) paper and Latour's (1999) reply.
- [4] See also Munir (2005) for a discussion on the 'social construction of events'.
- [5] The American Speech Language and Hearing Association is the professional, scientific, and credentialing association for more than 127,000 members and affiliates who are speech-language pathologists, audiologists, and speech, language, and hearing scientists in the United States and internationally.
- [6] These findings are broadly consistent with those reported by Zilber (2007), who examined use of stories at a high-tech conference held in Israel after the dot-com crash of 2000. She found that actors, while constructing a shared story of the crisis that strengthened the established institutional order, also told a counter-story of indictment, blaming other groups for the crisis and calling for changes in the institutional order.
- [7] See Gibbert and Valikangas (2004) for a review about boundaries and innovation, and Watts (1999) for the notion of small worlds.
- [8] The possibility of critical emergent events at these conferences is bound to place significant demands on researchers tracking industry emergence. Upfront preparatory work is essential for any conference visit to be productive. Not only must researchers be steeped into the dynamics of what has already transpired within an industry, but, in addition, must be open to understanding and incorporating new emergent events. In short, researchers have to become bricoleurs in their own right (Meyer et al., 2005).

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