Essay in lieu of a Sonata. (c) 1993 Paul DeMarinis

Reflections on "The Edison Effect" - a series of audio installations consisting of electro-optical devices which play ancient phonograph records with laser beams.

My title "The Edison Effect" has multiple references. It refers first to the profound and irreversible effect the invention of sound recording has had upon music, the soundscape, upon the time and place of our memory and sense of belonging. It should also call to mind Thomas Alva Edison's illicit claim to the invention of the light bulb, and his general propensity for copying and appropriation as an emblem of the inherently uncertain authorship of all recorded works. Finally, it invokes a metaphorical allusion to the physical phenomenon known as the "Edison Effect" wherein atoms from a glowing filament are deposited on the inner surface of light bulbs causing them to darken. It was this phenomenon of thermionic emission that, when understood, made possible the invention of the "audion" or vacuum tube. This, in turn, led to the development of sound amplification as well as radio, television and the earliest digital computers. The metaphorical image of the darkening of the light is an ancient one, recurring in the I-Ching, in Mazdaism, and in Shakespeare's oxymoronic "when night's candles have burnt out". Enantiodromic reversal at the atomic level can be used to symbolize opposing primal forces and may serve to mythicize otherwise commonplace occurrences.

Edison's name and face are synonymous with invention, brilliance and technological innovation. As the modern Prometheus, he lured millions toward the light. The light bulb, commonly believed to be his consummate invention, still stands as an iconic exclamation of ideas, innovation - the stroke of genius.1 The discovery of a potentially fatal flaw inherent in the invention - that the light-producing bulbs would themselves darken, causing them to cast shadows rather than light - was perceived by Edison to be a potential bug, a stain upon his brilliant reputation. To compound the paradox with irony, this is the only bona fide scientific phenomenon which bears the inventor's name. Whereas other nineteenth century colossi, such as Tesla, Ampere or Volta had basic units of measure or even third world nations named after them, Edison, universally resented by the scientific community and deemed by them a charlatan and promoter, was grudgingly awarded only this obscure and obscuring "effect" to immortalize his name.

It is often the case that a new medium's first major flaw or contradiction is destined to become its dominant metaphor. The disembodying upside-downness of Della Porta's camera obscura, the shadows created by light falling on Niepce's photographic emulsion producing a "negative" image, the montage necessitated by the frailty and shortness of early celluloid film - these have become the mechanophors which convey the richness and complexity of our experience. No less with the whole of Edison's oeuvre. Like the lightbulb, the phonograph casts its own unearthly shadows upon listening, upon our memory and our sense of time. It is the false and deceptive quality of the voice which emanates from the phonograph or gramophone, compounded by the mindless soliloquy of the of the broken record, which lends its root to our word "phony". The exact repetition of this falsehood ingrains itself in our memories, creating a sequence of recognition, anticipation and fulfillment which is in itself addictive and predictive. Prior to the invention of mechanical recording, references to the now commonplace phenomenon of a tune-running-thru-the-head appear absent from literature.2

The invention, or rather, the discovery, of sound recording and reproduction by Edison came as a shock to the entire world, the inventor included. Edison's reputation had grown as an inventor of electrical miracles - but the talking machine was a simple mechanical contrivance which could have been built successfully several centuries earlier, in plenty of time to skyrocket Bach and Mozart to international stardom. The technological wheels had long been in spin. Beeswax, a medium with a natural propensity for capturing aromatic and sonic essences, was abundantly available. Spring driven clockwork motors with speed governors had been around since the seventeenth century. The theory that sound consisted of mechanical vibratory disturbances, held since Aristotle's time, had been quantitatively studied by Marin Mersenne,

who actually recorded the vibrations of a tuning fork on the surface of brass bar before 1650.

At the time of the phonograph's gestation, Edison's legendary research team had been working furiously on three diverse electrical contraptions. One (a forerunner of our FAX machines) was a machine for copying and transmitting images. Another was a variety of recording telegraph for embossing Morse code. The third was an electro-mechanical device for amplifying voice received over telephone lines - Edison wanted to call it the "telespeacan" - although it couldn't. All three involved a threaded lead-screw moving a stylus which impinged upon a rotating drum. In retrospect, the synergistic serendipity seems obvious: a copying machine, a machine for storing words, a machine for making sounds... but it was not so at the time.

When Edison announced that he could record and reproduce human speech, he met with incredulity. Eminent authorities, including French scientist Sainte Claire de Ville, upon reading announcements of the talking machine, pronounced it a fraud and a hoax perpetrated by a concealed ventriloquist - totally phony. Either Edison's reputation for chicanery had preceded him, or there existed conceptual barriers which made the feat seem more difficult than it actually was. Perhaps the very notion of compressing the vitality of human utterances, of squeezing the flights-of-fancy of musical invention into the unidimensional coffin of machine reproduction was abhorrent on some primal level. Or perhaps, there persisted the stubborn notion that sounds are inherently transitory and must always be synthesized or intoned-anew3 , as in the Futurist intonarumori (- music boxes with an agenda.) The spirit of that doubt is lost forever. Now, as he stood in the shadow of his own reputation, Edison appeared both larger and flatter than life.

Among the cognoscenti, Alexander Graham Bell, Edison's main competitor at the time, was shocked when he heard news of the phonograph - amazed that he had not invented it himself. "It is an astonishing thing to me that I could possibly have let this invention slip through my fingers when I consider how my thoughts had been directed to this subject for so many years", he confided. But Bell had missed by a mile - his researches had been directed toward devising mechanical models of speaking and of hearing. What Edison had created in the phonograph was a mechanical model not of hearing, but of remembering.

A dream of early phonographers was to read with their eyes the wiggly line inscribed by the needle as a lasting trace upon the wax - allowing the illiterate to write, the uncouth to compose, even the spirits of the dead to speak. Such efforts soon proved futile.4 The scopic impulse relentlessly afoot in western civilization appears to have been delayed by almost an epoch. If the nineteenth century had invoked sight alone to comprehend the infinity of space, (superseding the eighteenth century's insistence that space is known by the sense of touch,) a more ancient tactile paradigm persisted in matters of memory, perhaps due to their traditional codings in the form of renaissance spatial-mnemonic systems. Until very recently - the 1980's, - the memorative act of audition still consisted of dragging a diamond stylus, fingernail-like, across a vinyl blackboard. As the needle played, it eroded the memory it touched. Ever so slightly, as the needle touched, the sounds present in the room in which it played were minutely engraved and added to the record.

Edison's earliest efforts were feeble impressions on tinfoil, easily erased by the act of playing them. Indeed, the first recording was so frail it only could reproduce once and then die. Later efforts in wax proved durable enough to be played dozens of times before the effects of the mechanism combined with the sounds in the environment would modify and erase them forever. And still each record was a unique object. The Edison laboratory's earliest cylinders of mass production were created by capturing the sound of an orchestra on twenty or more phonographs - the orchestra's output of a two minute waltz might thus amount to many hundred cylinders per day 5 . By the turn of the century, with the advent of electroplating and gold-molding, many thousands of records could be manufactured, sold, played, enjoyed and worn out before the orchestra would need to reconvene and intone the waltz anew. The escalation of this economic

exercise culminates in the digital compact disc - a consumer item whose durability is adamantine and whose relation to the original soundwaves - thus its use-value - is determined wholly by the ruling taste. The laser touches but fleetingly upon the groove, the impact of its photons abrading no material whatsoever. The rupture is complete. The emancipation of memory from touch has been fulfilled. The age of the palimpsest is over.

1 Notwithstanding Felix-the-Cat's ectoplasmic punctuation marks - insights which could become tools of inquiry or aggression.

2 We do not know if Emily Dickinson's image of the "mind running in its groove" refers to sonic material, nor if Edison drew on her imagery for his inspiration.

3 Such synthesis implies a prior analysis. Inherent in such a notion (which persists to this day in computer music) - is the idea of physical modeling - basically, a proof that the author totally comprehends and thus dominates the system in question.

4 It was not until the last decades of the twentieth century that the visible traces of speech succumbed to human reading, and then to only one human, Victor Zue.

5 The fact that the several phonographs were spread out in the recording studio has made possible the excavation of primitive stereo imaging by combining two or more cylinders from a single "take".

"The Messenger" (c) 1998 Paul DeMarinis

"They were given the choice of becoming kings or kings' messengers. Like children, they all wanted to be messengers. Therefore there are nothing but messengers; they race through the world and, because there are no kings, call out their messages, which have become meaningless in the meantime, to each other. They would gladly quit this miserable existence, but don't dare to because of their oath of office." Kafka1

The Messenger is an internet-driven installation based on early proposals for the electrical telegraph, in particular those made by the Catalan scientist Francisco Salvá. As in many of my works I examine the metaphors encoded within technology, especially lost or orphaned technologies and try to trace their origins, speculating on the way that mechanisms are the repositories of larger unspoken conceptions and dreams. In The Messenger I take the telegraph as a point of departure from which to examine the relationship between electricity and democracy, and how electrical telecommunication technologies have participated in our solidarity and in our isolation, in our equality and our oppression, in the richness of our experience and the uncertainty of our lives.

In The Messenger email messages sent from around the world are received by a computer in Galerie Metronom and spelled out, one letter at a time over three fanciful telegraph receivers. The central receiver, a circular array of talking chamber-pots, speaks out the letters in twenty six different voices. Men, women, schoolchildren and aged pensioners are jarred into vocalization when their individual letter is activated. The watery resonance of the metal bowls creates a unique reverb for each voice, disconnecting it from the other voices and from the acoustic space of the gallery. Along the left alcove of the gallery is a chorus line of 26 little dancing skeletons. Each wears a tiny pancho emblazoned with a letter of the alphabet. When each letter of a message is activated, the skeleton jumps, producing a danse macabre as the email messages roll off the internet. In the right alcove the third telegraphic receiver is a line of 26 antique glass jars, each filled with an electrolyte and holding a pair of metal electrodes, one of them shaped like a letter of the alphabet. The electrical currents cause the electrodes to change from shiny metallic to black alternately and to produce hydrogen bubbles. Nowhere does the system possess any memory or understanding of the messages displayed. Unless the signals are observed, written down and interpreted, the installation is the final meaningless terminus for messages that have traveled around the world and died. Related images that come to mind are Babel, the tree falling in the silent forest, the dying cry of the last surviving human. That the phenomenon of the lost or meaningless message has become so frequent an experience in our daily lives is due in no small part to our increasing reliance on electricity as our dominant medium of communication.

Electricity, though observed since ancient times, only became a subject of intense interest in certain enlightened circles during the first half of the 18th century. That the early experimentalists were men of privilege and education is revealed by the materials they used to generate static electricity: fur, amber and sealing wax. That they lived in cold climates, too, was a requisite for the regular observation of the static electricity, for only in cold dry environments can the charge built up by friction accumulate without dissipation by atmospheric moisture. The invention of the Leyden jar, a primitive capacitor, opened up the possibility or accumulating much larger quantities of the electric fluid. Not coincidentally, many of the same individuals who held this keen interest in electricity had economic interests that led them to tinker with social reform as well. Benjamin Franklin comes to mind as a prime exemplar, but others abounded. The story of the electric telegraph is bound up with the story of democracy. Their myths, to this day, prove to be inextricably intertwined.

Democracy and Electricity the two white knights of the modern age, sallied forth on their adventures on some unknown date in the middle of the eighteenth century. In the case of Democracy, Rousseau's "Social Contract" of 1763 provided a sighting of modern democracy in full regalia. Its favored sidekick's first recorded appearance in the role of a messenger is usually dated to 1753, on the other side of the channel,

when a letter from a mysterious C.M. appeared in Scot's Magazine proposing a system of rapid signaling across distances using static electricity. This system consisted of 26 wires, one for each letter of the alphabet, to convey electricity from a Leyden jar at the transmitting end, to 26 pith-ball electroscopes at the receiving end. A charge of static electricity, traveling at the speed of light along the wire, would impart a positive charge to two light balls of pith suspended closely together on threads. The like charge would cause the two balls to repel. The message, spelled out one letter at a time, could be reconstructed on the reception side by assiduously observing all 26 sets of pith-balls for this deflection and noting the sequence of corresponding letters.

In the ensuing decades, waves of exported and homebrewed enlightenment rolled first across Europe, and then around the world. As we follow our knights-errant through their exploits, we read with relish of the brave encounters they make with both the residuum of the old patriarchy and with the new forms of oppression that Juliet MacCannell has termed "the regime of the brother"2 In electrical demonstrations during the ancien regime little distinction was made among the message being transmitted, the path of conduction and the recipient. "On one occassion in a demonstration before the king organized by the Abbé Nolle, 180 guards were said to have been made to jump simultaneously; on another, an entire community of Carthusian monks at Paris, linked together by iron wires, were reported to have made the distance travelled by the shock over 5000 feet (1.5Km)."3 The Czar of Russia, ever interested in news from afar, held great interest in the newly discovered electrical fluid and replicated the French experiments with Cossacks. When news of the electrical telegraph spread to his empire, however, he immediately suppressed it, lest his enemies employ it to foment a conspiracy reaching from Petersburg to Siberia.

The idea of the electrical telegraph tickled many a great mind on its way to realization. Among them was the Catalan scientist Don Francisco Salvá i Campillo. Though something of a sideline for this polymath, his proposals were significant in a number of ways. They are of particular interest because, spanning as they do from the era of the revolution to the defeat of Napoleon, they reflect, in the spirit of their mechanisms, the transitions of social franchise during this period. Salvá's first proposal is similar to the one described in Scot's Magazine. It uses a separate wire for each letter of the alphabet, a Leyden jar to transmit a spark across these wires, but peculiarly, instead of the pith ball electroscopes and indicators, Salvá specifies a number of people, one for each wire. Upon receiving a sensible shock, each of these people, presumably servants, was to call out the name of the letter of the alphabet to which he corresponded. A twenty seventh person, presumably literate, was to write down the message so shockingly spelled out. This is probably the system that Salvá operated between Madrid and Aranjuez in 1798.4 Whether Salvá's abandonment of pith-ball electroscopes in favor of human receivers was due to problems with electrical dissipation in the moister climate of Barcelona, a cheaper labor pool, or the relative ease of transcription of 26 vocal sources into a coherent message are questions that only further researches into his work might reveal. Nonetheless, the scene of a hall filled with the sighs, whispers and moans of humanity being shocked into literacy seems an appropriate and emblematic image for the events of 1789.

Other features of the early proposals for the telegraph are of interest here. That the systems, both C.M.'s and Salvá's, were not necessarily conceived of as bi-directional indicates a historically different ideal of communication than we would judge essential. It is interesting to note that the single example offered in C.M.'s text spells the alphabetic sequence S-I-R, reinforcing the impression that the proposal was a product of the member of the aristocracy. Salvá's prescient proposals for a submarine telegraph, too late to save Spain's rapidly crumbling overseas empire, were intended as one-way communication between Spain and the American colonies. Because there was no code or enciphering, a message received on foreign shores would invariably be spoken in foreign accents, danced by new world toads, decompose foreign waters. Thus the imaginary colonial telegraph office portrayed in The Messenger uses a variety of distinctly Mexican sounds and images to display the messages sent from afar and Mexican imagery

derived from the "Day of the Dead" iconography. In this imaginary colonial telegraph reception hall, messages are received from inaccessible capitals, commands that have lost their meanings. By careful observation and transcription of the sounds and movements we can make out some words and phrases sent by someone to someone, pertaining to what, we cannot discover.

Toward the final years of the 18th century, after Galvani's discovery of animal electricity, Salvá formulated a revised proposal for the telegraph using freshly severed frogs' legs as the indicators. Each leg, when stimulated by the spark, would dance and in so doing, jerk a slip of paper on which the corresponding letter of the alphabet had been written. In the first decade of the new century, after Volta's invention of the electrochemical battery, Salvá proposed a scheme that proves politically correct to this day: electrical current flowing through the wires causes electrolytic decomposition of water, the resulting bubbles of hydrogen serving to indicate the letter selected. There is historical evidence that this last system was actually realized in the early years of the new century, transmitting messages over a distance of several kilometers in 1804. Another thirty years were to pass before the American painter Samuel Morse discovered and solved what was by then a "sweet" problem, building his first working telegraph model on a canvas stretcher. Morse's critical contribution, the code of dots and dashes, not only allowed the transmission of any written message on a single wire, but provided the prototype of a digital metaphor for communication that has reached its apex in our own time.

During the last decade of our own century the internet has been touted as inherently democratic, a tool that unites nations and classes with brotherly shareware, that brings information and tidings of freedom to oppressed peoples yearning to become cheap labor, a force to be feared by dictators. News stories surrounding the internet in regard to freedom of speech issues and popular uprisings in third world nations sound a familiar tune. Democracy and Electricity, the regicide and the king's messenger, have mounted their horses and are once again coming to deliver us. The mechanisms and metaphors of The Messenger may serve to remind us that there is no inherent bi-directionality in electrical communication, that a body can be a telegraph as well as a recipient of a message, that who is transmitting what to whom is often lost in the speed and coded immateriality of electricity.

1 Franz Kafka quoted in Friedrich Kittler Discourse Networks 1800- 1900 Stanford University Press 1990

2 Juliet Flower MacCannell The Regime of the Brother Routledge 1991

3 Margaret Rowbottom and Charles Susskind Electricity and Medicine - History of Their Interaction San Francisco Press 1984

4 C. MacKechnie Jarvis The Origin and Development of the Electric Telegraph in The Electric Telegraph, An Historical Anthology ed. G. Shiers Arno Press, New York, 1977

Exhibition notes for show at "Singuhr" Berlin, summer 2004

My work often traverses the untrodden areas of communication technology where the interplay of meaning, materiality and encoding dance round in figures that suggest the uneasy struggles and yearnings that underlie our officially sanctioned notions of utility, efficiency and consumer desirability. I mean to pose questions about the world we have created , to ask how material devices weave their way into our personal relationships, our understanding of the physical universe and our origins, as well as our notions of possible futures.

"Firebirds" and "Tongues of Fire" are two companion works that examine a power complex of inter-relationships between fire and language from a diverse variety of technical, historical and metaphorical viewpoints. That speech is made of sound is not always apparent as we speak, listen, read and are transported to the inner recesses of conversation. But electronic media, and the radio in particular reconfigured our culture's perception of the relationship between speech and sound for most of the 20 th century. Surely the transformation of speech into signal, signal into wave, to recording and playback make apparent that meaning is forever cast as sound, sound as signal, signal as noise and onward.

For all its power and terror, the course taken by the political leaders' voice is no less technological. In the end, it is only a wave in the air, a scratch in the groove. Sound with all it's attendant artifacts of recording, transmission, reception, makes this evident.

Each technology of speech transmission has its technical and social requirements for formation, but also its special conditions for reception. The telephone is realtime, bidirectional and intimate; a telephone conversation is an intimacy within the intimacy of the domestic environment; we are still uncomfortable with speakerphones and conference calls. The phonograph allows its reception to be metered and deferred for collective reception in a domestic space. Radio enforces realtime collective reception. There is no object of fixation other than the radiophonic voice itself, save perhaps a grandiose wooden console with silent glowing tubes. Prior to the radio the political speech had remained outside the home in the plazas and conference halls. By speech becoming sound, signal, wave, signal and sound again, home life became politicized. The voice of the leader enters the private domain of the home and hearth.

Imagine the arc of wireless, from its earliest glimmerings in the imaginations of physicists like Branly, Crookes and Lodge, all seriously involved with psychical and spirit communications, through the commercial exploits of Marconi, through the amateur-hacker era when every boy dreamed of a personal communication module that would let him talk with friends and imagined romantic interests across space and the broadcasting of pranks (young boys tapping out false coordinates of the sinking Titanic), the military's monopoly during the first world war, the era of broadcast, the apex of radio in the 1930s when the voices of political leaders entered the communal domestic space of people around the world, thw age of AM radio, rock and roll, and finallythe "wireless" legacy we inherit in our mobile phones and Bluetooth peripherals. This vast nowhere all had to come from somewhere.

Among the early inventors, a lonely and lovesick young man sat in his modest apartments in New Haven in 1904, searching for a breakthrough invention in radio to catapult him to fame and fortune. While tapping his Hertzian key he noticed that the flames of his gas chandeliers would jump and ebb with each transmitted dot and dash. Certain that he had discovered a sensitive receiver for radio waves, he wrote up several patents for devices embodying his discovery. Long before the patents were duly issued, deForest learned that the modulation of the flames was caused not by radio waves, but by the sound of the tapping of his key, thus replicating the discoveries in the 1850s by LeConte and Tyndall. Unperturbed, and possessed by the id��e fixe that the flame must be the sensitive receiver of Hertzian waves, he forged on. Piggybacking on work carried out recently by Ambrose Fleming in England, and earlier by Elster and

Geitel in Berlin, deForest began encapsulating his experiments inside light bulbs, replacing the dancing flame with the glowing filament. By insight or perseverance or blind luck, deForest succeeded in producing, in 1906, the Audion, or vacuum tube, an efficient amplifier that was to make radio the vast medium it later became and usher in the electronic era ��� television, radar, computers ��� that dominated most of the twentieth century. deForest's invention presents us with an intersection in a moment in time ��� 1906, the age of electric lighting, when the flames of candles and gas jets were everywhere being locked up in glass bottles, and at the same time all the words and messages running through wires were leaking out into Maxwellian space as communication became radiant.

The flames of "Firebirds" are a look at the collision of voice, meaning, material inscription and collective space as it existed briefly at that brief moment. That sound can emerge directly from gaseous space, without a solid vibrating elements of the loudspeaker has been a phenomenon studied since the earliest days of electronic technology. In 1924 Lorenz AG of Berlin marketed a ���Kathodophone��� ��� an early form of plasma tweeter, basically a triode opened to the air coupled to a small horn. In the early 1950s S. Klein of France elaborated on this principle and described an electrothermal horn loudspeaker. In 1967 Babcock, Baker and Cattaneo of United technologies Corporation in Sunnyvale published a paper in Nature describing the form of electrothermal transducer used in "Firebirds" a gas flame, seeded with potassium ions, is made to vibrate the air by being electrically modulated by a voltage. As the air around the flame is instantaneously heated and cooled, expanding waves of sound vibration are produced in the air, creating an omnidirectional sound source.

The traces of voice presented iin "Tongues of Fire" hark back to an earlier era, when the manometric flame of Koenig served as a significant advance in phonological studies in the 19 th century. These traces are made by vibrating a flame by placing a speaking tube in proximity to the gas supply. I followed the descriptions frofrom John Tyndall's "Sound" in constructing the manometric capsule, and, following the example of Dayton Clarence Miller later in the 19 th century, adapted an old bellows-camera into a slit scan recording device to inscribe the flame variations on 120 roll Ektachrome film in realtime. These images are the precursors of the oscilloscope traces that follwed, and of the graphical displays now seen in our audio editing software. Again I chose political speech, as much for the familiarity of its cadence as for the reminder it provides of the dangers of fire, friendly or otherwise.

Paul DeMarinis, 2004

"Gray Matter" (c) Paul DeMarinis 1995

Our electronic media may be regarded, in large part, as the outgrowths of nineteenth century laboratory apparatuses designed to isolate & investigate the functioning of human sensory organs. Viewed thus, they fracture the wholeness of sensation in an effort to preserve, replay or transmit over distance the specters of our sensory experiences. But Victorian science, obsessed as it was with isolation, analysis and reduction, had a goofy side too, a far reaching interest in the discovery and creation of chimeras - impossible combinations of two distinct beings, griffins gargoyles etc - both natural and artificial. In particular, the age of the inventor was also the age of the tinkerer, the combiner, the patenter of hybrid forms. No natural zoology could have engendered derby-hat cameras, bicycle hammocks and swearing tops. Perhaps every attempt to reconstitute the sensory wholeness allegedly lost by recording & transmitting media may be regarded as a chimera, the foremost survivor which has been the sound-cinema with its uneasy pact between sight and sound serving to perpetuate a myth of synesthesia. But a host of other teratogeny were, and are, being spawned, tried, rejected and occasionally marketed in a ceaseless attempt to achieve multimedia.

There is a popularly promoted belief that technology drives culture forward, and that our changing relationships to one another, material and informational, are the result of advances made by science and are manifested in the development of new materials, processes and tools. Gilles Deleuze points out the flaw in this thinking: "... technology makes the mistake of considering tools in isolation: tools exist only in relation to the interminglings they make possible or that make them possible." A glance at the incredible variety of possible technologies that have fallen along the wayside serves to support this view.

The present work lurches forward to examine one such forgotten technology - one that failed to acknowledge the rupture between hearing and feeling that is, touching. There is no clear cognitive border between feeling and hearing. Most certainly indistinguishable in the womb, these are the two sensations with which we have the longest continuous experience. The invention of sound recording, initially incapable of reproducing low and palpable frequencies, exacerbated a rupture between touching and hearing that had been building through several centuries of notated music. By the last decades of the 19th century, audible and feelable vibration had become so dissociated that inventors were having a difficult time understanding the relations between waves, vibrations and electrical undulations. A great many chimeric inventions resulted, among which is the telephone, commonly regarded as the work of one man.

Alexander Graham Bell had won his renown as a teacher of the deaf - patients who conveniently manifested the aforementioned rupture by being able to feel but not hear. Bell's teaching methods relied upon lip reading only in part - the greater part of his expertise lay in conveying missed auditory information to his pupils by touching their hands in a defined grammar of strokes. This special knowledge gave him a distinct advantage over the many other inventors racing to formulate and patent what was to be the invention of the century. When the great race was won, Bell was the victor, filing his caveat on February 14, 1875. As bad luck would have it, five hours later that same day Elisha Gray staggered breathless into the patent office with his application for the telephone.

There is no room here for an examination of the trajectories Bell and Gray had followed to arrive at the similar apparatus in 1876. Suffice it to say they were different and in their diversity had given birth to many technological curiosities and chimeras, not least of which was Elisha Gray's "musical bathtub" of 1874. In "Mechanization Takes Command" Siegfried Giedion has pointed out the Victorian era's preoccupation with the mechanization of bodily functions, from weaving and skinning to cooking and bathing. Elisha Gray's fusion of bathing technology with audio technology and playing music is one more chimera ornamenting the den of 19th century monstrosities.

"In late January or early February of 1874 [Gray] heard the refrain of the rheotome issuing from his

bathroom, where he found his young nephew 'taking shocks' to amuse the smaller children. With a vibrating rheotome in the circuit of a primary induction coil, the boy connected one end of the secondary coil to the zinc lining of the bathtub and held the other end in his hand. When the boy's free hand glided along the bathtub lining, it produced a whining sound in tune with the rheotome. Gray tried the effect and found that quick, hard rubbing made the noise even louder than that of the rheotome itself. When he varied the pitch of the rheotome, the noise followed suit."

[IMAGE OF MUSICAL BATHTUB]

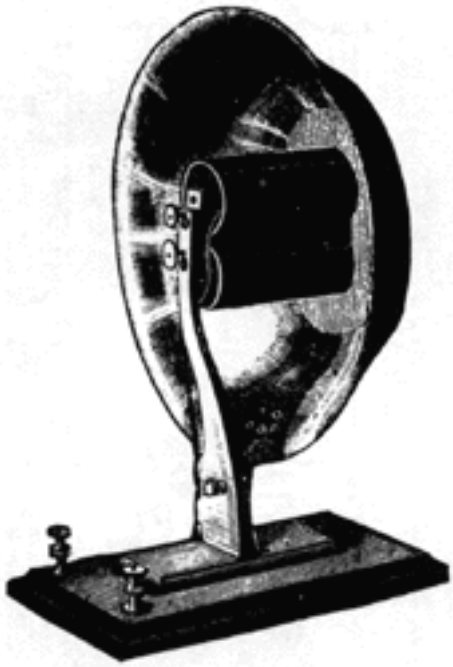
By some obscure and little studied phenomenon, a vibrating electrical field seems to modulate the coefficient of friction of our skin, so that when we bow across an electrified surface with our fingers, we excite mechanical vibrations. These mechanical vibrations, suitably coupled, give rise to audible sounds. I discovered this phenomenon, as Gray did, quite accidentally in 1976, and I'm sure other people run across it every day. In a sense, Gray's discovery was likelier than ours, being as he was much closer to the era of Benjamin Franklin and Mary Shelley, when electricity, life force and neural sensation were believed to consist of one in the same fluid.

As we stroke the wires of "Gray Matter", we both feel as texture and hear as sound the faint electrical stirrings within the wire - melodies, scales, creakings and glissandi inhabit a world in which touch and hearing are for a moment unified. This phenomenon may someday find a fit to the structure of our relations - perhaps as electrically definable surface textures, audio communication in a vacuum, or other applications. But for now it languishes in the backwater of the culturally inappropriate, insignificant and obscure.

{IMAGE OF WASHBASIN RECEIVER]

Several pieces in this collection are based on Gray's later version of an electrical sound maker. Using a more familiar electromagnetic design, it was a direct forerunner of the familiar loudspeaker and became part of Gray's telephonic apparatus of 1875. Of interest to me is that it retains the connection to bathing apparatus in the form of a washbasin. Wisdom aside, one wonders, had Gray beat Bell to the patent office, if our telephones might not "ring", and if we might not enter the washcloset to speak afar, stroking small tin tubs as we listen.

My thanks to Xerox PARC for their support in the development of this work, and to Eiko Do Espirito Santo for her assistance in preparation of the sound materials.



The washbasin receiver

"The Lecture of Comrade Stalin at the Extraordinary 8th Plenary Congress about the Draft Concept of the Constitution of the Soviet Union on November 25, 1936" (c) 1998 Paul DeMarinis.

During a visit to Tallinn in 1995 I found a set of twenty 10-inch 78 rpm records of a speech by Joseph Stalin in a junk store. Together with Paul Panhuysen, the set was purchased and divided between us with the agreement that we would provide each other with DAT tapes of the disks in our possession. In addition we agreed that we would create independent works based on the material and at some point in the future, make an exhibition or project together of our resulting works. I have created a number of pieces from the material including visual objects, kinetic sculptures and sound compositions. All these works carry the identical title, "The Lecture of Comrade Stalin at the Extraordinary 8th Plenary Congress about the Draft Concept of the Constitution of the Soviet Union on November 25, 1936" so there is some confusion about the exact identity, as well as the medium of, my work - perhaps my own paranoid response to a potentially monstrous presence lurking in these grooves.

Stalin was rarely recorded and even less frequently were his recorded words, even his greatest wartime speeches, released as audio documents. While myriad printed volumes of his writings survive, translated into more languages than even The Watchtower, Stalin's voice seems to be hiding somewhere behind rather than within the bright-red bound volumes. With good reason, conjecture historians: his thick Georgian drawl, the kind of thing that would be an outright asset to an American politician, made him feel like a foreigner in the Kremlin1. As a tyrannosaurus among dictators, flourishing in the age of the great dictators - great vocal personalities, like Hitler, Mussolini, Churchill & Roosevelt who performed like brilliant stars on stage, on radio, and in film - Stalin is something of a vocal mystery-man. No one seems to remember the grain of his voice. When we listen to the arid forty2 sides of his 1936 release the reason becomes apparent: Stalin's voice is quiet and mumbling. Short utterances are like uninhabited islands somehow lost in a sea of embarrassing pauses, now filled in by the oceanic roar of cheap Soviet bakelite.

The occasion of this speech was of particular significance, given on the eve of the ratification of the Soviet Constitution - in his day referred to lovingly as the "Stalin Constitution." The speech of November 25, 1936, amid the show trials and purges, represented something of an imperial coronation standing, as it does, midway between Kirov's assassination and Bukharin's last plea. Within this speech Stalin declared that the Soviet Union had now passed from the state of socialism into communism. If this news reached Highgate Cemetery in London, it is certain that much in-grave rotation resulted. This hardly Marxian pronouncement was, in effect, a call to total agrarian collectivization and a rationalization for the wholesale liquidation of the kulak class and persecution of the intelligensia. This speech was broadcast throughout the Soviet Union and heard by everyone. It announced Stalin's brutal hegemony after years of bloody purges, his triumph as the defining force of Soviet communism. The full recording was released as a boxed set so that frequent re-broadcast and listening could indoctrinate the masses in the new cult of personality that was to endure until Stalin's death in 1953.

The Lecture of Comrade Stalin at the Extraordinary 8th Plenary Congress about the Draft Concept of the Constitution of the Soviet Union on November 25, 1936 uses a variety of sound materials alongside and in combination with Stalin's own voice. Other voices from the spirit realm herald the openings and closing of doors in the various sections of the work. Birds and birdlike whistles, deriving both from the Kaluli spirit world and from formant-glides extracted from Stalin's own voice, serve to convey his presence at a safer, more abstracted distance. Musical ghosts also abound both in the form of thematic quotations and as "morphed" samples. These are combined with and replicated within Stalin's voice by a variety of digital analysis/resynthesis techniques. In most cases karmically if not historically wed to Stalin's voice, they derive from musical sources associated with the dictator.

If Stalin's voice, like Lina Lamont's, was a weak point in his stardom, voice was also central to Stalin's inner identity. As a young seminarian in the Orthodox church, Joseph Djugashvili was known for his fine

singing voice. On the closer listening that computer analysis affords, melodic movements are heard within the short mumbled phrases that are perhaps ghosts of the Georgian liturgical music he once sang. Echoes of the earnest young seminarian, singing with avowed devotion, are heard in the earlier parts of the work.

Stalin's renown as a music critic stems from his review, in Pravda under an assumed name, of Dmitri Shostakovich's opera, Lady Macbeth of the Mtsensk District in 1936. The opera's plot concerns a murder spree by a bored bourgeois housewife, Ekaterina, and her lover Sergei. Anecdote has it that Stalin's abrupt departure from the opera mid-performance was due to his moral indignation at certain "erotic" trombone glissandi that accompany Sergei's penile detumescence. Other readings of this decisive departure are possible, though. The victims of the lover's crimes are small landowners and the blood on Ekaterina's hands smells a lot like that on Stalin's after the mass exterminations in the Ukraine in 1932. The Pravda article nearly cost Shostakovich his life, and made him especially vulnerable to official criticism for the rest of his career. Strains from his musical penance, the 5th Symphony, composed immediately after his fall from grace, also find their way into these grooves. Elvis too, the inheritor of the WWII dictatorial-oratory-become ballad, involves himself insidiously throughout the work. As a Hollywood version of Sergei, he mingles climactically with Ekaterina's ecstasies and stands in as Stalin's radiophonic double.

Of course we might wonder about Stalin's private tastes in music. An intriguing mention is made by Yugoslav envoy Milovan Djilas in Conversations with Stalin. He describes a very tense late night meeting that took place at Stalin's dacha on the eve of Tito's split with the USSR early in 1948.

"...before we began to disperse, Stalin turned on a huge automatic record player. He even tried to dance, in the style of his homeland. One could see that he was not without a sense of rhythm...

Then Stalin turned on a record on which the coloratura warbling of a singer was accompanied by the yowling and barking of dogs. He laughed with an exaggerated, immoderate mirth, but on detecting incomprehension and displeasure on my face, he explained, almost as though to excuse himself, "Well, still it's clever, devilishly clever."3

An automatic record player? This was perhaps the large RCA console given to Stalin by Harry Truman, but the record described would seem totally contrary to the ruling Soviet musical tastes. Indeed, could such a record have been produced and disseminated in the late 1940's in the USSR? Perhaps, like the phonograph, it was an import. And the import that leaps to mind on reading Djilas' description would be "Il Barkio" recorded by Spike Jones and His City Slickers in 1947. A soprano, accompanied by piano, starts singing a credible version of Arditi's "Il Bacio," only to be first interrupted by, and then willingly accompanied by, the City Slickers howling and barking like a pack of dogs. This notion of Stalin-the-Spike-Jones-fan is unprovable but tantalizing. No doubt, he'd heard Donald Duck sing Spike's greatest hit, "In Der Fuehrer's Face."

The first presentation of this work was in 1996 as part of a week of performances with Merce Cunningham Dance Company's "Events" at the Joyce theater in New York. In advance of the series I had described the "morphs" between samples of Stalin and Lady MacMtsenk to the Village Voice's dance critic. On the afternoon before the second "Events" performance, the company director approached me, saying "we have a problem..." It had occurred to me that the soviet-realist strains that survived the onslaught of Lemur and SoundHack might sound a tad too retro for Merce, but this wasn't the case. Rather, Shostakovich's ghost, in the form of a New York lawyer who looks out for his estate, wanted royalties paid for the use of the samples. For a moment I felt relieved that it wasn't Stalin's ghost, with a gun to the back of my head. Later it occurred to me that maybe Stalin, tyrant of the century, murderer of millions, doesn't have a lawyer looking out for his interests - or does he? For that matter, who collects the royalties for Mein Kampf?

The six minute and sixty-six second piece presented here is a combination of various fragments from an hour long work of the same title. The speech and other sonic materials were analyzed, combined and resynthesized by a variety of digital audio tools including SoundHack, Lemur and MSP.

1 "Death to the Russians!" was, claimed Stalin's Politburo crony Anastas Mikoyan, the brooding Georgian's customary toast during the

late Forties. Witnesses for the Defence - Testimonies concerning Shostakovich's attitudes to the Soviet regime by Ian MacDonald

2 At 3 minutes a side, 40 sides is still a whopping 2 hours long.

3 Conversations with Stalin by Milovan Djilas, Harcourt Brace & World, New York

Artist's talk delivered at International Conference on Auditory Displays, Palo Alto, CA Nov 3, 1997

Much of my recent work examines the archaeology of sound recording in an effort to explore the hidden dimensions of technology and culture as they intertwine within and among our perceptions of sound, memory and communication.

(Brief adlib on Music as a Second Language, Edison Effect, Gray Matter)

In his "Ninth Bridgewater Treatise Fragment" of 1838, Charles Babbage, commonly cited as an ancestor of digital media, portrays a world filled with non-dissipative sound waves. Each sound, as it is created, propagates amongst the hard Newtonian billiard balls of matter, adding to an eternal din from which the cosmic maker, at the end of his creation can discern every act, word and deed. By this eternity-windowed FFT, it is assured that no good will go unrewarded at the end of time, and no evil unpunished. The atmosphere is in effect, a cosmic recording medium, and the hush we hear in still air holds, encoded, the words of all time.

The invention of the phonograph a few decades later presented a different set of observations: That of multiplying sounds. And not merely as direct copies. The earliest phonographers discovered that when they recorded a sound that, upon playback, three sounds were heard. The first sound they heard, was of course, the sound they intended to record, perhaps with some distortions but always faithful and accurate enough to satisfy - for a while. In fact the similitude of the first faint scratchings on foil and wax were so startlingly faithful at the time that Edison was accused of perpetrating a hoax when the sound-writer was displayed in Paris in 1878.

The second set of sounds heard coming from the horn of the phonograph were the inadvertent sounds of the environment, which rode along unnoticed during the recording process. These sounds had been little noticed before, and simultaneously presented a set of problems to be solved and the discovery of a new world to be explored - the vast variety of sound art, soundscape, sound sculpture and sound design which have been discovered in this century and are still being charted. As far as the solution of the problem of interfereing environmental sound, the relative isolation of the recording studio and the absolute numerical isolation of direct synthesis often cause their sounds to go begging when it comes to combining or contexting them with other sounds.

But a third sound was heard as well - the sound of the recording apparatus itself and this presented both a subtler set of problems and a new and paradoxical sort of territory of its own. The rumblings of the mechanism, too, register upon the wax, and the texture and grain of the wax has its own raspy voice, a voice that sang along with every diva and accompanied every chance sound passing by the microphone. Surface noise, channel noise, the song of long ago and far away, presented a gift in disguise to the recordist and artist alike. This noise is an audible indication that information is being sent. In effect this "noise-floor" is the sound of silence of any given channel.

Theodor Adorno noticed the new role that surface noise was taking in the sound cinema as a backdrop for continued attention and suspended disbelief and coined a term for it - Horspielstreifen, or hear-strip, "the delicate buzz during a film of recorded silence whose purpose it is to subliminally confirm the presence of a reproduction underway, thereby establishing the minimum existence of some type of presence." (Kahn)

In earlier times silence had to be created before music could fill it. In various musical cultures, a variety of sounds and figurations assumed the role of creating the presence of silence - The omnipresent drone of the tamboura in Indian music is an example. In western classical music, the Alberti bass served European

music well this role for over a century, and its variations were still at work in the century that created mechanical recording.

EXAMPLE 1 (opening of 2nd movement Beethoven's 6th)

With little variation, the bourdon basses, the quiet repetitive figures, and pianissimo trillings created and sustained an artificial background of figurative silence while keeping the listeners rapt in attention.

With the advent of surface noise and channel noise as an omnipresent musical experience, these representations of silence gradually disappeared. That is , they became foreground features of the music and took on a life of their own. Many examples can be heard in works of the so-called minimal music style of Glass others.

Popular music continued compressing, normalizing and filling every moment and crevice of the groove with sound, perhaps in order to suppress a feared existential confrontation with the surface noise. At the same time, almost in opposition, classic and academic circles elevated a new, idealized acoustic silence to the very highest position in the pantheon of sounds. The work and writings of John Cage come immediately to mind. The various (and ambiguous) meanings he ascribed to the word silence in his writings, as well as his very ambivalent position on recording itself (ref. to Yasunao Tone's article) attest to the continuing discomfort composers and sound artists were having with the sounds of surface noise . It was, so to speak, "a scratch that no needle could itch."

The role of surface noise and channel noise became, in our century, analogous to the sfumato that DaVinci describes in his treatise on painting - a smoke or haze layered over distant areas in the painting to increase the perception of a space separating them from the foreground subjects. These continuous noises served as a kind of sonic perspective and also as a measure of realism, as in detections of insertions or deletions in recorded documents (ref. white house tapes) or forensic evidence - e.g. the confirmation of multiple shots in Dallas.

The understanding and interpretation of surface noise, due to its many and unspoken roles, can give rise to spurious readings and strange illusions.

In the 1970's a recording emerged of an obscure classical pianist, an old and forgotten virtuoso playing in a long lost style. What everyone commented on when hearing this disc at the time was the pianists tone - that when Nyiregyhazi moved from pianissimo to fortissimo the piano seems to leap forward 80 feet into the audience. Gregor Benko, the writer of the record's liner notes attests:

"Using an inadequate cassette machine, Terry had recorded the performance, and now insisted I hear the tape. Nyiregyhazi's playing came as a revelation. Although the tape was a miserable recording, it hadcaptured enough to suggest that Nyiregyhazi posessed a bigger tone tone than either Hoffman or Horowitz. I was stunned." (liner notes IPA 111)

The Liszt "Legend" Nyiregyhazi plays titled "St. Francis of Assisi Preaching to the Birds" is constructed along classical pre-phonographic lines - the high pianissimo trills serving to describe and represent the silence of the forest and the singing of birds. The recording, made by an amateur, is buried in noise - both environmental and surface noise - abundantly provided by nearby traffic and the electronics of a cheap cassette recorder.

(I should point out a 4th recorded level of sound is present here as well - the "autobiographical" sound of wear and scratches that this particular copy of the vinyl record has acquired during its years in my library.)

EXAMPLE 2

Liszt Legend excerpt 1

The pianist plays along for a while. When at last the theme is announced and fortissimo octaves appear, we hear the effect mentioned as his magnificent dynamic range.

EXAMPLE 3

Liszt Legend excerpt 2

On a closer listening, it appears that the "tone" effect is due, in part at least, to a cross cultural reading of the background and surface/channel noise. The 1970's vintage amateur cassette recorder, likely equipped with an AGC circuit. responded to the quiet opening passages, those representing silence, by increasing its gain - and thus magnifying both the ambient noise of the hall and the channel noise of the microphone preamplifier - a mechanical attempt to reduce the amount of "surface noise " in the form of tape-hiss. When the fortissimo octaves begin, the AGC circuit reduces the gain to keep everything within the window of the cassette's dynamic range. This had the effect of compressing the dynamics of the recording. Apparently, the record producer chose to correct this act of mechanical compression to recover the dynamics indicated by Liszt's score, lowering the volume of the pianissimo and raising the fortissimo to plausible listening levels. Thus we are left with a double set of cues - the quiet passages being muffled and distanced by the cloak of noise, and the loud passages emerging from it in relatively naked brilliance. Thus the pianist's apparent commanding dynamic range results from the simultaneous application of two very different readings of the noises that accompanied recordings in the age of analog.

I have elsewhere coined the term "mechanophor" to denote an artifact or side-effect of technology that rides along or accompanies the signal in a media channel but acquires an independent meaning for us. In this case, the surface and channel noise have become metaphors of distance in a sonic space.

Within the last 10 years we have all experience a loss of hearing,in a sense, with the demise of surface noise brought about by digital recording media. Any sound that is born naked into the world in the isolation of the studio or the parentage of algorithms and electrons is fated to remain naked forever. The music industry's tendency has been to smear a little reverb or chorusing on these sounds and assign them a stereo position to suggest their participation in a fictive acoustic space. Still they sound audibly uncomfortable mingling with the other sounds born in the hoary world of acoustic reality.

With realtime communication, too, the loss of channel noise is being felt. We observe people connecting cheap and hissy wireless telephone sets to their crystal clear fiber optic lines, perhaps in an attempt to recover some of the lost distance between their ear and the mouthand tongue of their correspondent. In analog times we used s/n ratio along with distinct noise coloration to discern how far nested in a communication network we were. It's possible to reach someone's voice mail greeting and think it is the live person because there is no change of noise level when the message comes on. Formerly, we would hear the tape hiss of the message machine added into the channel noise of the telephone line, letting us know subliminally that we were moving deeper into the system.

A recent digital audio plugin, the Steinberg"Grungifier" adds a variety of vinyl-type distortions to sounds. It's original intention, as a cloaking device for appropriated samples in the hiphop industry, was broadened to include stylizing original material in retro fashion, and a recent note in Stereophile magazine reports it use at low levels by audiophiles to sweeten the sound of their digital CD's. (Oct 97 issue)

The serendipitous dimensionality engendered by the artifacts of mechanical recording has dissappeared from our digital media, leaving a void where silence once was heard. Its usefullness as a cue to distance,

time and association has become a stylized retro-effect and is ultimately of limited use. It is perhaps the time to consider again how to compose silence, how to give it an artful presence without depending on the conventions and artifacts of lost analog media.

Interview by Shun-ichi Shiba 1997 published in ICC Journal (Japanese translation only)

1 (artistic career)

First we want to ask about your career. Could you give us your brief career

as an artist (and musician)?

I grew up an artist in a science family. My father was a scientist and we learned the basics in the course of daily life, doing chemical experiments in the kitchen, reassembling the bones of a chicken after dinner as an anatomy lesson and so forth. I began playing with batteries and wires at the age of 4, and with the piano soon after. I didn't understand the difference between science and art and so connected the wires of the piano together with my other wires. I had a short-wave radio and would often stay up late at night listening to the electronic noises it made. I thought they were the music and language of some faraway lands. About age 14 I became intensely interested in the arts, and music in particular. My studies in science did not stop - the educational system was replete with math and science in the wake of sputnik - but my fantasies, my interests drew away from science. I was fortunate to study piano with an amazing teacher, Hazel Hart, then in her eighties. She was very conservative musically, but taught me to trust my own artistic intuition. At university I studied music, film and philosophy. Film with filmmaker Paul Sharits, who was a very wild guy and a Fluxus artist. In music I began to make experiments assembling sounds on tape and had the good luck, starting in 1968, to be allowed to use the facilities of the Center for Contemporary Music at Mills College during off-hours. A few years later I attended CCM a graduate student, still undecided whether to pursue a visual art or music career.

In my second year I began to build electronic circuits. Integrated circuit op-amps were just becoming available on the surplus market, and there were a variety of cookbooks loosely circulating that allowed anyone with some basic concept of electricity to build their own analog synthesizers. I made a few synthesizers myself culminating in "The Bitter Melon Synthesizer" - a collection of oscillators, filters, noise sources, and mixers that was built into a wooden box scavenged from a Chinatown vegetable market. I wanted to emphasize the everyday nature of integrated circuits. I had a realization though, that made me disinterested in the synthesizer, in the very idea of the "general purpose tool" or designing instruments. I began to create electronic circuits which were, in themselves, compositions or works of art. The very first was "The Pygmy Gamelan" of 1973, a small circuit which responded to the electrical fluctuations in its neighborhood by improvising 5 note music. I started doing installations of 6 to 12 of these circuits, just letting them respond to whatever happened. In 1976 I bought my first computer, the Kim-1, a 6502 processor running at 1Mhz with 1K of RAM, and began programming in machine language to control my analog synthesizers at first, and then to make sounds itself. Within a few years the Apple II had appeared and I used one to create "The Music Room" at the Exploratorium, an interactive musical environment in which 5 people could jam on 5 electric-guitar-like controllers to make some very enjoyable music together. In the mid-80's I worked a lot with DSP on specialized processors from Texas Instruments and created realtime processing software for many of my pieces that use speech as the point of departure. Throughout I have continued to work both in performance and installation - oftentimes ideas that come from one part of my work feed into the other in interesting ways.

2 (Robert Ashley)

In your early days, you worked with Robert Ashley. Could you give some

about his influence on you? (You seem to have some parallel with him such

as speech melodies...) Please tell us if there is any other person who made

big influence on you.

At CCM I began study with Ashley, who was coming from a very different place than I had experienced up to that time. I was freshly arrived from the midwest, and in many ways very naive. Ashley's seminars were a real awakening for me. He taught us not only about making pieces, but about surviving as artists. His work at that time was moving away from the very innovative ensemble performance ideas of the Once Group and toward pieces conceived for video. He was also working with his voice in a new way, and his thinking had a very profound influence on me at that time with regard to speech melody.

In 1974 Ashley asked me to work with him on a piece - "In Sara, Mencken, Christ and Beethoven There Were Men and Women", based on a poem by John Barton Wolgamot. The poem has 127 stanzas, each consisting almost entirely of proper names of artists and writers held together with a sort of grammatical cantus firmus. Ashley had recorded each stanza in one breath and spliced them all together to create a single vocal line that went on without pause for 45 minutes. In approaching the problem of how to make an accompaniment for this, we decided to use acoustic features of the voice itself to generate the accompaniment. I used a large bank of tunable high-Q filters to detect certain pronounced resonances in Ashley's voice, the idea being that these would necessarily delineate certain vowel harmonies the poet had created. Using what now seem the primitive means of analog synthesizers(envelope followers, triggers, sequencers and oscillators), I devised the 7 tracks of musical accompaniment to Ashley's voice in that piece (Cramps CRSCD 103)

About this same time I met visual artist Jim Pomeroy, who had just finished the graduate program in art at UC Berkeley - we had totally different backgrounds but shared an interest in technology and discovered that we were converging on many of the same areas of interest - performance, electronics, interactive installation. We started to collaborate on various events in underground venues which have since been transformed into legitimate "alternative spaces". In 1976 we created our first performance with a computer-based interactive environment , "A Byte at the Opera". We used my Kim-1 computer to control various devices that evolved a "lunar landscape" by extraterrestrial means, and tectonically from within. Pomeroy was an excellent teacher as well as artist and I credit him in large part for making me aware of the many developments in visual arts.

Also starting in 1976, I also had the good luck to work with David Tudor on his large sound installation "Rainforest" and through him I became familiar with the very elegant work of Takehisa Kosugi. "Rainforest" was a large installation that drove sound through large found objects of metal, wood and other materials to process the sound acoustically. Its sculptural dimensions inspired me to get out of the electronic box and work with a broader range of materials. Several visual artists (John Driscoll and Bill Viola) collaborated on this project and this also expanded my sense of the sculptural in sound. Later on, in the late 70's I collaborated with fellow composer and electronics experimenter David Behrman on several projects, including "Sound Fountain" and "She's-a-Wild." And Frank Oppenheimer influenced my thinking about art in public spaces and about interactivity.

3 (speech melodies)

You have been strongly interested in language and speech. Could you give

some thoughts about the underlying philosophy in "Music as a Second

Language" (1991) and other projects?

The feeling of music in language appeared to me quite early. One experiment we did with my father was to hold down the damper pedal of the piano and sing a note into it, to hear the sympathetic vibrations. I

spent many days shouting all sorts of words and sentences into the piano to hear the music they made. Also I remember falling asleep, in June 1956, with my parents and sisters quietly talking in the room, and hearing their voices transformed into the whistles of large birds. This is the central image in my piece "Beneath the Numbered Sky."

In most of my speech melody pieces I used found voices, rather than recording voices in the studio. Although this presented big problems technically - my pitch tracking did not work well with a lot of echo or background noise - it was the only way to get authentic speech melodies. Studio recordings of actors, or worse, nonprofessionals made with the idea of speech-music in mind tend to have a very false sound. By rummaging through the bins of cassettes at junk stores I was able to dredge up a wide variety of material spoken by hypnotists, evangelists and salesmen - convincing voices that carry a great deal of melodic and rhythmic content. Too, this brought me in contact with a broad variety of material that I never would have known about had I hired an actor to read, for example, a poem of Eliot.

4 (technical details)

The sleeve note of "Music as a Second Language" CD reads, "I have treated

speech melodies as musical material. By a process of computer analysis and

resynthesis I extract the melodic line of spoken language, involve it in a

variety of compositional transformations, and apply the result to digital

musical instruments." Could you give some technical details of this process? (We heard that you are using MAX.)

The works documented on "Music as a Second Language" (1991) employ a variety of technical effects. For the realtime speech analysis and synthesis and pitch tracking, I wrote the core software in assembly language on the TI TMS320 series of DSP chips, between 1985 and 1989. I based my analysis on the Linear Predictive model because it was then computationally possible in realtime, a necessity for performance. For control and composition I used the MAX language (initially a pirated version of the IRCAM version) starting in 1988. In many of the songs, the original voice is recorded on a cassette and during performance I fed this signal into the DSP, which sends analysis data over MIDI to MAX. I use MAX to process those data and send them back to the DSP for resynthesis, and also to MIDI controlled synths to create the accompaniment. After the intense period of software development in assembly language for fixed-point DSP, I decided not to write any major code for them until they were floating-point and there were efficient high level compilers for them. That time has now arrived, but so far I have only been using SuperCollider on the Power PC for signal processing. I think the future of speech-music with computers lies in additive synthesis. Even though this model bears absolutely no relation to the workings of the human voice, it holds enormous potential for making musically plausible transitions from recorded material to abstract sounds. A work in progress which I presented parts of in "Events" with Merce Cunningham last year uses Lemur for analysis and resynthesis of the voice of Joseph Stalin.

5 (Edison Effect)

Could you give some thoughts about "Edison Effect," one of the most famous

projects you ever did, especially its basic philosophy?

In 1986 I was fooling around with a laser I had just built, and decided to try playing an LP with it. I didn't have a photodetector, though. It was the middle of a snowy night in upstate New York and the nearest

RadioShack was 6 hours away. So I wired a spare EPROM to an audio amplifier, (reasoning that silicon exposed to light emits electrons,) trained the beam of the laser onto the disc and moved the EPROM around until I could hear the music in the record. Over the next 3 weeks I wrote down a large number of designs for pieces based on this possibility. I began what I initially called the "Laser Disk" project in January 1987, converting the laser and detector optics from a surplus supermarket bar-code scanner for the job. Using some stepper motors controlled by my PC, I was able to position the beam accurately, play the record forward and backward, access parts randomly and repetitively. Analog recording had just died, so the territory was very fertile. During the years 1988 to 1993 I created the almost 20 pieces that comprise "The Edison Effect."

These pieces treat the transformation of sound by the recording medium. As I have pointed out elsewhere, early phonographers discovered that when they recorded a sound that three sets of sounds emerged from the phongraph when the record was played back. The first was the intended sound itself, usually a voice or musical instrument. Second were the environmental sounds, present but unnoticed at the time of the recording. The phonograph helped make people aware of these sounds and led on the one hand to studio recording practices and on the other to the whole field of environmental sound-art. The third sound the early phonogrpahers heard was the scratching and rumbling of the machine itself, inextricably registered along with the sound it was supposed to faithfully preserve. Unlike the environmental sounds, these sounds would not exist if the recording had not been made. I call this the shadow of the technology, and it is this shadow world that I examine in "The Edison Effect."

Like most of my works in the last decade "The Edison Effect" concerns itself with the re-deployment of human sensory apparatus within the recording media. In earlier times, all sensation was thought to be based on touch. The experimental apparatuses of the 19th century shattered that unity and gave rise to the earliest devices of media technology - the cinematograph, the telephone and the phonograph. The central image in "The Edison Effect" is of the fusion, or conflation of looking and listening. The beam of a laser for me is much like the visual ray that was, in ancient times, believed to emit from the eye permitting the viewer to see by touching with his eyes. It's interesting that this extromission theory was advanced by the Greek philosopher Plato. This totally alters the meaning he must have intended by his famous "allegory of the cave!"

6 (Gray Matter)

Could you give some about your recent project, "Gray Matter" (1995)?

Can it be said a speculation on alternative development of sound technology?

"Gray Matter" too, extends this notion of touch and explores a very strange phenomenon discovered by the inventor Elisha Gray. In these pieces the viewer must interact with a vibrating electrical field to create the sound. It is slightly painful to do this, and also imparts to the body a palpable vibration, very different from listening to a loudspeaker. I stumbled across this phenomenon in 1976 but only recently learned that Gray had discovered it in 1874. We must remember that this was 2 years before the telephone and 20 years before the loudspeaker. Electricity had never made any sounds yet, save thunder, the crackle of sparks and the clicking of the telegraph key. Gray noticed that when he drew his hand, connected to the interrupted current of an induction coil, along the zinc lining of a bathtub, that the tub would resonate at the frequency of the interrupter. This was the first electrically transduced sound, and Gray based his invention the "musical bathtub" on it. The fact that it requires living human tissue in constant motion was perhaps less of a drawback then, since all other sources of music at the time required drawing, scratching, bowing or blowing bits of dead animal, vegetable or mineral substances across each other - that's what's happening in a Brahms symphony, after all. But less than a year later, Gray had improved his invention. With the "washbasin receiver" he had created the first step toward the modern telephone - an

electromagnetic coil and a permanent magnet conspired to move the tin diaphragm of a common household washbasin in synchrony with electrical vibrations. The fact that Gray stuck with bathing apparatus for his devices seems amusing today, but as Siegfried Giedion has pointed out in Mechanization Takes Command , all aspects of the human and animal body were being subjected to analysis and subsequent technification during the Victorian era.

7 (Victorian science)

You mentioned "Victorian science" in your essay on "Gray Matter" (c)1995.

What is "Victorian science" and what are the differences between today's

science?

In the 19th century science took the mathematical tools of the18th century and applied them to the whole world, in particular to the world of nature and the human body. There occurred a kind of dissection in which each of the sensations was divided away from the others - where, as I mentioned earlier, touch had been the unifier of human perception, now vision, in particular binocular vision, and hearing in the matter of the sensations of tone, were split apart into separate fields of inquiry. This happened not only with perception, but with all bodily functions - even bathing, as we learn from Siegfired Giedion was scrutinized. It was only natural that Victorian science, in turn, would try to forge a crude sort of synaesthesia and I refer to these primitive efforts at fusion of function at "chimeras" and I use this word in a particular sense, that of a creature that is a blending of two often incompatible beings. The proliferation of inventions that combined improbable technologies offers many insights about the cultural meaning of science and mechanization. It is only because we are too close to similar developments in our own information culture that we fail to see the amusing absurdity of so many of them, and the real cultural aganda they serve.

8 (sound recording and reproduction)

Could you give some general thoughts on sound recording and reproduction,

one of the biggest invention of Victorian science?

It is hard to imagine, little more than a century after the fact, what a radical departure the recording of sound was. That one single device could capture, store, and reproduce the vast repertoire of music, of natural sounds, left the civilized world in shock. The first wave of reports of the phonograph range from akin to witnessing a miracle to declaration of fraud. In particular they focus on the recording of the spoken voice, and for a variety of reasons: the ease with which the voice registered on the first, primitive machines; the importance of the voice for preservation of exact communication; and what was then a timely issue - communion with the dead. before this time it had been thought that in order to reproduce speech some simulation of the human vocal apparatus was needed - a sort of mechanical talking head - and these had indeed been demonstrated with varying degrees of success. They emerged at the end of the 18th century from the seedy world of automata and mechanical musical instruments into the venues of carnivals and freak shows- personally, I feel a kind of esthetic revulsion at such things. But the phonograph showed that the most intimate and individual tremors of the vocal folds could be recorded, multiplied and played over, even the words of the greatest statesmen and philosophers. It was no modest goal that Edison proclaimed ten years later when he set out to make the cinematograph, that it would do "the same for vision that the phonograph did for sound." The last century has revealed a host of technologies that replay sensations for us and each one is based not on making a semblance or physical or visual imitations of things as we know them in everyday life, but in recording the abstracted signals that

science understands our perceptions are based on.

9 (invention)

It can be said that you are an inventor. (e.g. installations, instruments

and devices for performance, and we heard that you invented many devices

for Mr Ashley.) Could you give some about this? Do you think what is the

meaning of invention in art and science?

My pieces deal, in part, with the way technologies mediate the relationship of people to their memories and to question the situation of technology in our lives, the mythos of technology The fact that I use technology itself to delineate these themes means that I must develop alternate or sometimes "impossible" technologies. Without overly stressing the apparent impossibility of making a hologram of a record play the music in the record's groove, or making a clay pot recording of a voice, or making a bathtub make music, I must admit the many of the technologies in my pieces did not exist when I set out to make them. I have had to invent them. It is an important requisite of my art that the pieces actually work. I wouldn't be comfortable with a piece that created an illusion by conventional means. For me the real illusions are the ones that still mystify even when the technology is revealed and explained. Nor would I be satisfied if the works stopped there. There are many other cultural and personal themes woven into them.

10 (science and art)

Could you give some general thoughts about the relations or interactions of

science and art?

Before the 19th century science had very little impact on life and culture. Our cultures' myths of creation and origin - how the world came to be and where we came from - were based on ancient legends about heroes and gods. During the course of the last 200 years these myths have been replaced by new ones created by science - the Big Bang, evolution, DNA.

Art is a response to belief and acts as a consolidating force within culture. It gives place, time, image and sound to myths. But the myths of science are not content to be represented by picture, poems and symphonies. The scientific revolution threw away the idea that things were connected by appearances and replaced it with the idea that things are connected by how they work. Thus the artist's role is to animate with the imagination the way things work.

Germane to my own work, however, a discussion of the relation of technology and art is also interesting. I think of technology as having a dual-being. It is simultaneously a dream, or product of our dreams, and the medium in which our dreams are exchanged and elaborated. By the first part, I mean to say that I think of technology as a meeting ground where our dreams - what we imagine or would want to be - meet the daylight realm of the physical world . That is, they encounter and are born into the laws of physics. To extend the metaphor, a seashore on which the dreams that surge within the ocean of our human imagination are tossed up on the shore of hard physical functionality. The second part is easier to say because it has been said before - that technology is also the exchange medium of our dreams - the movies, T.V., etc. Much has been said about the vast power for abuse of this aspect - the "ruling taste" so to speak.

To disentangle these two functions of technology is difficult. One could , of course, stand aside and take an anti-technological approach. I have chosen what is perhaps a more difficult path - to use technology

itself to express and investigate this dilemma. I try to do this by standing technology on its head. Exploring alternative technologies, using physical principles that have not found any place in the dominant technology, re-connecting the dream and the mechanism. Thus, phonograph recordings in holograms and clay pots; music made by stroking electrified bathtubs. Stood on their heads, the technologies reveal absurd aspects in the manner of pataphysics or bachelor-machines, but inasmuch as my pieces actually function, they also reveal some part of the original - the dream - that lies beneath the technology.

Part of my examination concerns the site of a given technology - it's place in the domestic scene, workplace or some exotic site. For example, does telecommunication technology belong in the parlor or the bathroom? Alexander Graham Bell thought the former, Elisha Gray the latter. Do electric wires and water pipes belong together? Big questions.

The promise of technology enabling us to be conscious masters of our experience, overlords of the material world is long past. We have more the impression of being swallowed by our own doing. We're now so deep into this dream - it's all enveloping. It generates and mediates our every next step. For example, we rely on satellite data and broadcast forums to make decisions on rain-deforest-ation and ozone depletion caused by our technologies. There is no way out, but we are hopefully capable of an occasional lucid moment within our dream where we can savor and marvel at the whole process even as we are swept away by it, that being the nature of our experience.

11 (current and future plans)

Please tell us about your current and future plans.

I have a whole sheaf of projects that deal with these themes, extending them to other areas of technology. In particular I'm now preparing a project using water as an acoustic gain medium, and several pieces dealing with the prehistory television, the first of which ("Blind Snaxe Grind Apes") was presented earlier this year at the San Jose Museum of Art. In addition, I am at work on a new piece of music for CD based on the voice of Joseph Stalin that will be realized with additive synthesis. The only problem with making my living as an artist is that it's necessary to be very project-driven. Although I am able to work full time on art, it takes a very long time to fully elaborate a whole theme because I must prepare individual pieces on a demand basis. The researching and inventing involved take a lot of time, and most often museums and art dealers aren't willing to take the risk commissioning new works. It's a real trick to convince them.

Surface Noise on the DeMarinis Effect (c) 1994 Douglas Kahn

From The Edison Effect - A Listener's Companion on Apollo Records ACD 039514

I don't know who first said it but the idea of invention was itself invented. It had been so thoroughly invented that, by the time of the early avant-garde, artists and writers such as Jarry, Roussel, Apollinaire, Duchamp had built parts of their art on complex parodic renderings of the culture of invention. Their main source was the science and technology of the 19th century whose eccentricity has often been more interesting than its legacy within the arts. This eccentricity was due largely to the fact that no boundaries had yet been erected against such things as spiritism and the everyday, thus: Edison's attempts to build a machine to communicate with the dead and Elisha Gray's musical bathtub. The artists were in their turn responsible for bringing such eccentricity into an intelligently poetic, critical and humorous context, a relationship between art and technology that has become increasingly pertinent with the ongoing saturation of media technologies at our end of the century. However, although ideas of artistic originality and inventiveness are often interchangeable, none of these artists could be called inventors. Paul DeMarinis is different; he is well versed in both artistic sensibilities and technological demands. His inventions reinvent invention yet once again.

If the repetition inherent in inventions reinventing invention sounds like a skipping phonograph needle, it is for good reason. DeMarinis too finds footing in 19th century technology, in his case with that most archaic modern means of reproduction--the phonograph. Archaic because the mechanical means and materials needed to make a phonograph had existed long before its invention. This technological oversight took on millennial proportions at the time, with people wondering especially how a recorded Word or two from Jesus would have transformed the present. Is it just a coincidence that the first word recorded by Edison was "Mary", or is this stretching things a bit too far? Nevertheless, you can hear Mary stretched out on a cylinder on this disc just as you can hear even more ancient sounds inadvertently inscribed into clay, perhaps while turning a pot. Word is that an archaeological dig is now taking place to search for the thunderous contents of Moses' tablets. This is one of the effects of DeMarinis going back to Edison's phonograph: it plays back all recorded time.

The phonograph earned Edison his "halo effect", i.e., he was thought to be in a state of grace unable to do wrong, a luminous countenance ironically not earned by his purported invention of the electric light. Edison's "Edison Effect", however, muted his halo as surely as it darkened his light bulbs. Although he had arrived at the phenomenal foundation of modern communications technologies such as sound amplification, radio, television and computers, he was unable to recognize it as such. DeMarinis's "Edison Effect", on the other hand, capitalizes on this big blunder by using the illegitimate offspring of contemporary media technologies made possible by the "Edison Effect" to haunt the past, playing phonography back through itself, replacing the stylus with a laser, stone with light.

What we hear here is phonography resuscitating itself in two directions, old and new technologies breathing life into each other's operations, and all this air exchanging explains some of the hiss heard on this CD: it is the atomized grit of phonographic surface noise floating in the air that has caused the wheezy asthmatic sheen of the synthesized voice. And those other noises? There is a pitted, scratchy sound resulting at the same time from a surface rut and a Geiger counter, both of which formed the background of the post-war vinyl generation before they grew up into that other counter culture. The radiation of sound from the speakers was matched by the background radiation of above-ground testing and brightly colored Fiesta Ware plates used for summer meals. A decade or so later the sun shined again with the signature sound of keyboard synthesizers like the Yamaha DX-7; Ron Kuivila calls it "that sun-drenched sound" for its superficial spectral sheen and for the Southern Californian sunscape that housed all the studio musicians who industrially piped the sound out into the air. When DeMarinis loops such sounds repeatedly through old and new audiophonic technologies and back again the noise becomes

exaggerated and approaches an oxymoronic sound: the essence of mediation.

Invoking such sounds is necessary for understanding sound in general. They may seem marginal but they are the little difference that makes all the difference. Frying, scratching, scraping, clicking, buzzing, rasping, wheezing, hissing. What is Barthes' famous "grain of the voice" but a minutely meaty rasp produced by breath lasciviously raked across the laryngeal folds? Yet he insists that this is enough to distinguish greatness among singers. Adorno's Horspielstreifen, or hear-strip, the delicate buzz during a film of recorded silence whose purpose it is to subliminally confirm the presence of a reproduction underway, thereby establishing the minimum existence of some type of presence. Film music falls into this category as well. Although it may routinely provide the affective substance of human emotion and historical grandeur, if it gains too much attention it destroys the cinematic pact that sustains it; in this respect, it is music not-to-be-listened-to. Finally, the delectation of the underheard, whether they be small sounds or overtones, has been the stalwart tactic of experimental music in the second half of the century.

It is understandable that the post-vinyl generation would form complex sensibilities toward the insolences inherited from Edisonian wax and tin. Is it that vinyl's bump-and-grind erotics, its hill-and-dale peripatetic adventures have valorized the surface noise created by the phonographic storage in the dustbin of history by producing such miniature mimicry of human bodies? Or is this a plea for a sex life and a different travel agent?

When vinyl was king simple surface noise was noticeable as noise per se only after numerous repeated plays and thereby tolerated, if not relished, for reasons of love. Buying a used record with too much noise meant an inability to enter into a mutual maturation and poignant decay that comes with age. Vinyl was thus the most life-like mineral there was, sharing the same time frame as humans, aging naturally like plants, animals and domestic appliances. Compact discs, on the other hand, inhabit a truly alien archival time frame. You will have been dead, rotten and forgotten; the earth will be unrecognizable and perhaps uninhabitable, but even the crassest commercial drivel will survive, shimmering in the toxic sun, on compact disc. This is the new myth: Icarus flew close to the sun with his wax wings; the frying sound of surface noise heralded a plunge into the sea, not in defeat but as a means of case-hardening into a CD, locking in an unearthly material transcendence based upon its proximity to light. Time that will not die are not what memories are made of. Why in the world would you purchase such a thing?

With this recording and The Edison Effect in general, DeMarinis has given a good answer to Kuivila's imperative to find a position somewhere between the mindless sound of Cage and the soundless mind of Duchamp. It was the former who produced Varese-like glissand with test-tone records in Imaginary Landscape No. 1 and the latter who used the turntable for his roto-reliefs. DeMarinis has invented a track in-between and focused a laser on it.