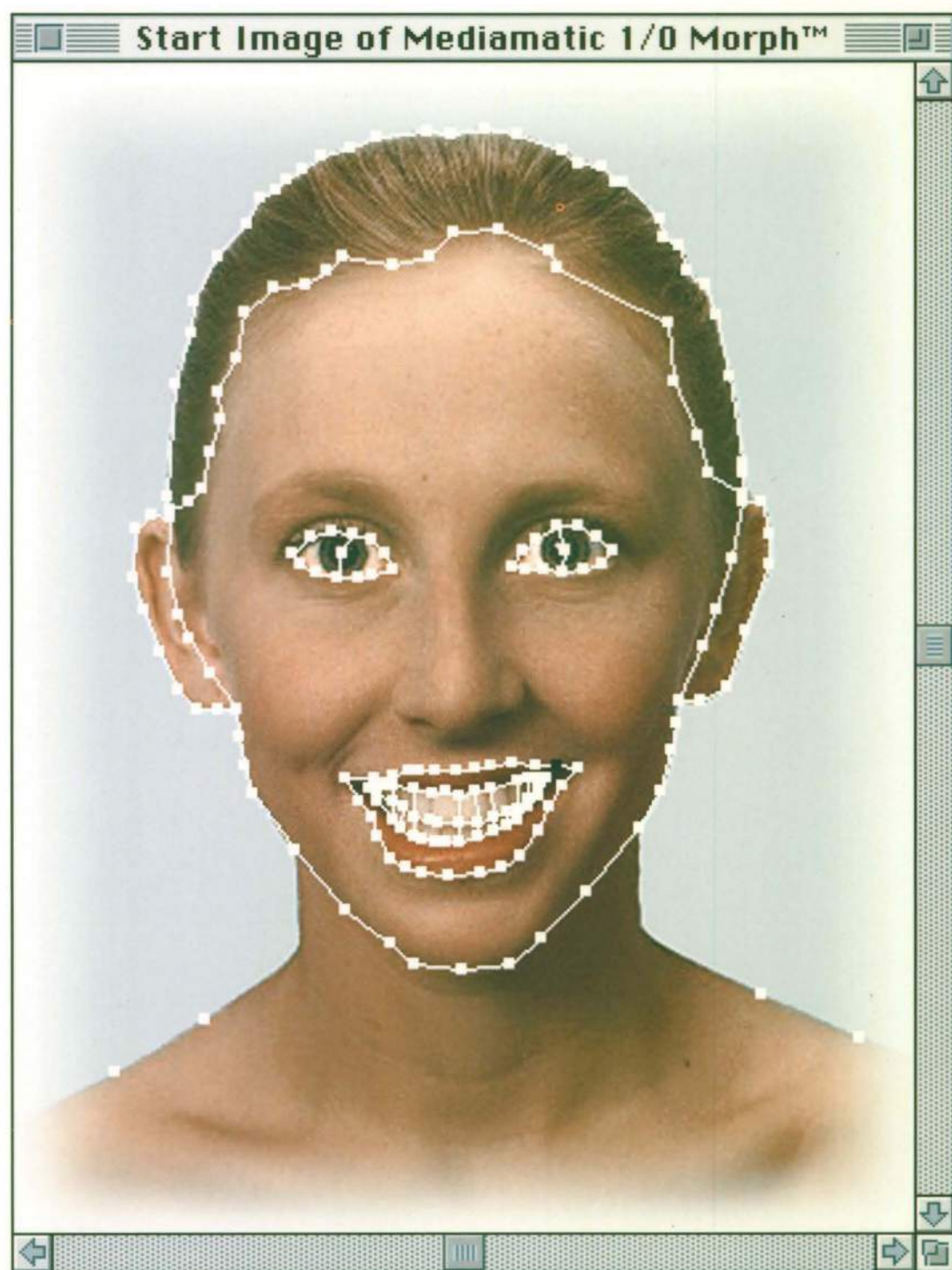
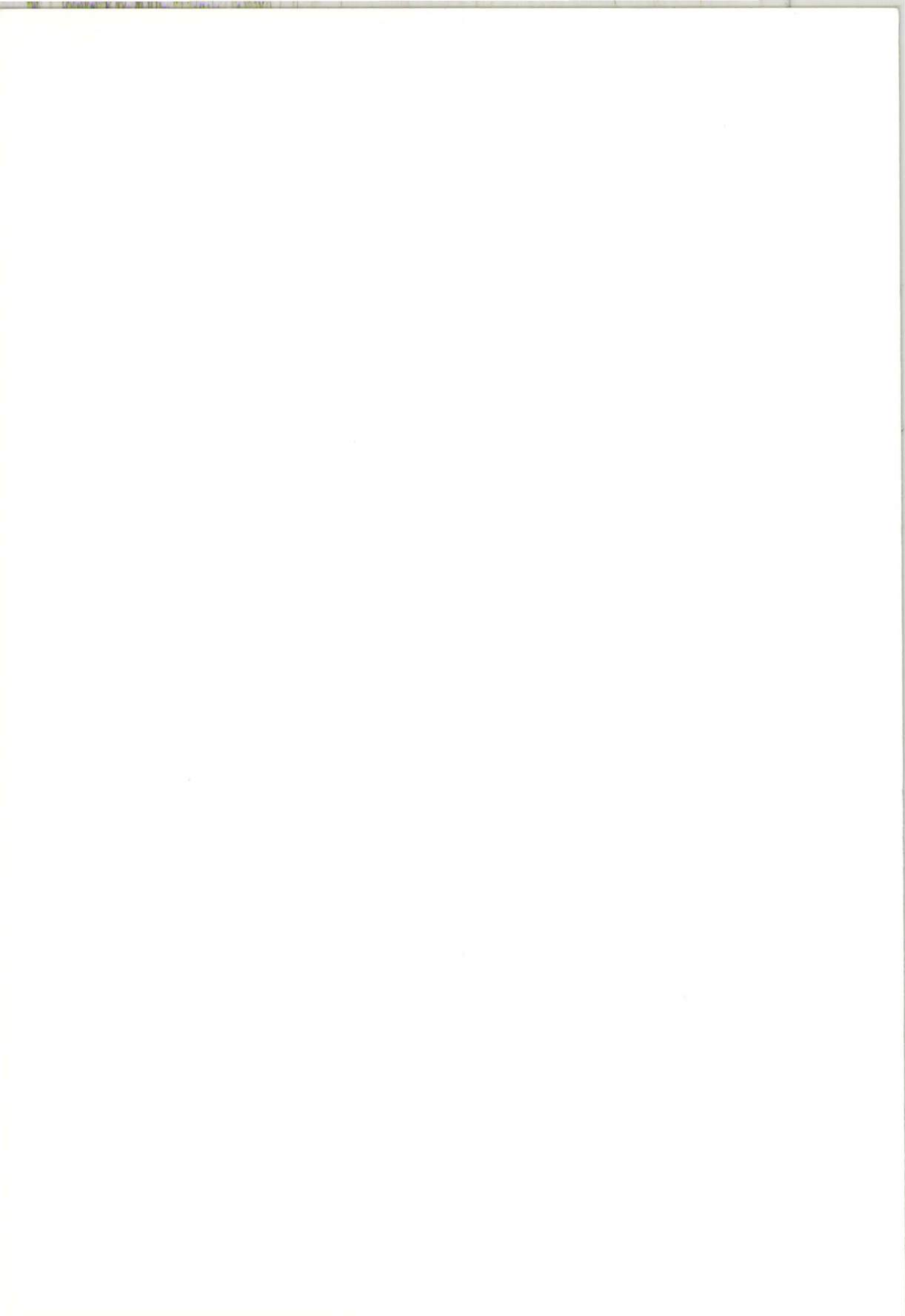




Mediamatic



Vol 7#1 The 1/0 Issue



- 2 **BILWET** *Hardware, Software, Wetware*
- 10 **SHEEP T.** *The User Interface*
- 16 **PAUL GROOT** *Famous Artists School, Famous Writer Tool*
- 21 **JULES MARSHALL** *AI*
- 27 **REMKO SCHA** *Virtual Voices*
- 44 **AVON HUXOR** *Writing the Mind*
- 50 **ARJEN MULDER EN DIRK VAN WEELDEN** *Inleiding in de Ruisletterkunde*
- 54 **BILWET** *De Socialist en zijn Media*
- 57 **JULES MARSHALL** *A Network of Relationships*
- 61 **BERT MULDER** *Rumour has it...*
- 64 *Back Issues*
- 64 *Future Issues*
- 66 **VOLKER GRASSMUCK** *War, Tidal Waves, ISDN and Cyberspace*
- 71 **GEERT LOVINK** *Archeologie van de Computerassemblage*
- 77 **JOUKE KLEEREBEZEM** *Mobilhome*
- 77 **GEERT LOVINK** *Virtual Reality*
- 78 **BERT MULDER** *Versuch einer Geschichte der Rechenmaschine*
- 80 **GEERT LOVINK** *Cyberspace: First Steps*
- 82 **RICHARD WRIGHT** *Computers as Theatre*
- 82 **DIRK VAN WEELDEN** *Hypertext*
- 83 **LEX WOUTERLOOT** *Aetatis Novae*
- 84 **SONJA SNOEK** *Boek voor de Instabiele Media*
- 85 **BERT MULDER** *A Pattern Language*
- 87 **ARJEN MULDER** *Crack Wars*
- 88 **BERT MULDER** *Piazza Virtuale*
- 89 **GER PEETERS** *Het Buitenmediale*
- 90 **PAUL GROOT** *InterCommunication*
- 91 **WILLEM VELTHOVEN** *BitPull*
- 91 **WILLEM VELTHOVEN** *Morph*
- 93 *Calendar*
- 95 *Colofon*
- 96 **NEWSROOM AMSTERDAM**

Mediamatic 7 # 1



page 1



Wie het over Nieuwe Wereldorde wil hebben, maar de virtuele realiteit buiten beschouwing laat, doet er beter aan te zwijgen.

JOHAN SJERPSTRA

hardware

In het digitale tijdperk is de mens volgens Bilwet niet langer individu, subject of ego, maar wetware, een 'natte hobbezak' die aan de machine hangt. Gekoppeld aan hard- en software gaat de geest op reis, terwijl het lichaam achterblijft. Maar Bilwet ziet hierin geen slaafse onderwerping aan de technologie: het al-te-menselijke kan altijd kortsluiting maken

Mediamatic 7 # 1



pagina 2

software

♦ *If someone wants to talk about a New World Order without taking virtual reality into consideration, they'd better keep quiet.*

JOHN SASHER

wetware

♦ According to Adilkno, the human being is no longer an individual in the digital era, but wetware, a 'wet bag' hanging on the machine. Coupled to hard and software, the mind voyages while the body remains behind. But Adilkno perceives no slavish subjection to technology: the all-too-human can always short-circuit.

1

◆ Contact between the wet and the dry is a risky business, fraught with dangers. In practice these vary from a glass of juice in the toaster, a finger in an electric socket, a burst water main, to the collision of swelling passions with sober incomprehension. With its thin skin, hard bones and sticky fluids, the human body can be reasonably well defined as a problematic water management system whose boundaries are fluid. This aquanomy is marked again and again by pieces of cloth and scent markers as well as equipped with colorants and an aura of ramshackle social codes. These serve to prevent personal overflows from getting out of hand and to cover up little accidents.

The closer we get to machines, the more wet zones are reclaimed. Depending on how technology approaches the body, boundaries are laid and erotic zones defined. Shifts may be read through clothing fashions, the dress of the poor wet slob who these days goes through life neatly and properly swaddled as a 'Euro-citizen'. At the end of the 20th century we see this thinking bio-pump being slung back and forth, panting and spluttering, between wet and dry, loose and fixed, fleeting and firm, intoxication and reason, static and signal, suddenly functional in the electronic environment. The watering and steaming Mensch factor has shocking effects on the machinery. The unavoidable contact between the wet finger and the keyboard has sparked a technological civilization offensive. Economy comes down more and more to the tightest possible interweave between social structures and electronic circuits.

Until recently, sexual boundaries marked the danger zones. Because of this there had to be, for example, separate ladies' and gentlemen's fashion. This necessity has disappeared, and power is reaching for other means of styling fears and desires, while changing form itself. Fascist power was once a bulwark of sexual metaphors which could be reduced to one's own firm soil and pure, flowing blood. Divisions on grounds of sex and race were intended to destroy hybrids, and had political and military consequences.

Space Suit

The antifascist Cold War which followed lasted long enough for racist and sexist thinking to bleed to death. The body politics of this era, now over, were characterized by the conditioning of the body to the new machines, which were no longer driven mechanically but electronically.

Space travel furnished the basic model for electronic clothing, which, like power itself, has its attractive side as well as its frightening one. The first astronauts were animals, plastered with electrodes to register the reactions of the biological water management system. The futuristic spacesuit, in contrast, glittered and shone as a prototype of the electronic New Order. The cosmic costume withstood the new dangerous conditions and came out shining, offered freedom of movement, provided protection, and guaranteed communication besides. This required a retraining of the body, which no longer came under the regime of religion or politics, but under the supervision of science. Extraterrestrial

space travel, it turned out, was not an invention which would become available to the consumer after a developmental phase, but an experiment to test the body's reactions in an electronic situation under extreme conditions. Here, too, the clothing was not only outward show but dressage, and made it clear to the world population via the media what it means to be connected to a computer. The extraordinary quality of this superhuman performance in extraterrestrial space convinced humanity, the folks left at home, of the resounding success such a sojourn into electronic space could have.

Data Suit

After the explosion of the Challenger and the end of the dream of space, the way was made clear for ordinary mass production of the spacesuit. It has been redubbed the datasuit, with an introductory offer known as the dataglove. This awkward outfit provides the data worker with a fascinating going-out costume, with which he can dress up any location with any identity. It lets him get acquainted in a pleasant and noncommittal way with the new power type of the New Order. The premises of this are as follows: as commuter traffic dissolves and national borders blur, we are entering a clean, dust-free, sterile, medicinal space, which generates its own conception of dirt. Analogous to the danger zones in the era of sexual power, the thing now is the banishment of threats to the electronic condition. Classics like narcotic drugs, stupefying liquors and suffocating hazes of smoke appear as hot items in the reclamation politics which are spreading the New Order worldwide. This politics demands a strict anti-intoxication diet, if you want to ascend into hallucinogenic dataspace. Otherwise you'll lose the necessary concentration, and produce static.

What's new about the electronic condition is the sitting still and the minimalization of biomechanical labour. This fundamental modification in the human water condition, which just like the Delta Plan could only have been realized under Cold War relations, causes a potential adjustment static in the introductory phase of digital hegemony which is combatted by an aerodynamic exercise program. The motorized Citybike as a fashion is an integral component of data policy, and isn't ridden by health devotees in fluorescent spacesuits for nothing. Unlike the profligate yuppies of the 80s, the Euro-citizens of the 90s strive for total moderation: of their own nutritional and media diet as well as in government spending. To them, the subsidy tap symbolizes waste, in flagrant contradiction to their recycling mania and investment sense.

These cosy cocoons enjoy the freedom to stay at home and their greatest concern is the data roof over their heads. Refugees, who can't be traced in the files, are supposed to stay in their own area, otherwise the UN and the EC with their developmental armies will lend them a helping hand. *If you people don't want any humanitarian aid, we'll shoot.* The underlying motive for this military intervention is making global connections, which span the globe like a metastructure, healthy. To facilitate further expansion and innovation, those who

Mediamatic 7 # 1



page 3



Het contact tussen het natte en het droge is een risicodragende aangelegenheid, vol van onvoorziene gevaren. In de praktijk variëren die van een glas dubbeldrank in de broodrooster, de vinger in het stopcontact, een gesprongen waterleiding, tot de zwellende passies die botsen op nuchter onbegrip. Het menselijk lichaam met zijn dunne vellen, harde botten en kleffe vochten kan redelijk goed gedefinieerd worden als een problematische waterhuishouding, waarvan de grenzen vloeïend zijn. Deze aquanomie wordt telkens opnieuw gemarkeerd door lappen stof en reukvlaggen, en voorzien van kleurstoffen en een aura van rammelende sociale codes. Deze dienen ertoe persoonlijke overstromingen niet uit de hand te laten lopen en de ongelukjes te verhullen.

Hoe dichter de Mensch de machines nadert, des te meer natte zones worden drooggelegd. Afhankelijk van de benadering van het lichaam door de techniek worden grenzen gelegd en erotische zones bepaald. Dit is af te lezen aan de modes van de kledij, de aankleding van de natte hobbezak die tegenwoordig als 'euroburger' keurig netjes ingepakt door het leven gaat. Deze zelfdenkende biopomp, die puffend en proestend heen en weer wordt geslingerd tussen nat en droog, los en vast, vluchtig en hard, roes en verstand, ruis en teken, zien we eind 20ste eeuw opeens werkzaam in de elektronische environment. De dampende en waterende factor Mensch stelt het machinepark voor schokkende effecten. Het onvermijdelijke contact tussen de natte vinger en het toetsbord heeft een technologisch beschavings-offensief opgeroepen. Meer en meer komt economie neer op een zo dicht mogelijke verweving van de sociale structuren met de elektronische circuits.

Tot voor kort gaven de seksuele grenzen de gevarenzones aan. Daardoor was er ook sprake van een aparte heren- en damesmode. Deze noodzaak is verdwenen en dus grijpt de macht naar andere middelen om angsten en verlangens te stileren, terwijl de macht zelf ook van gedaante verandert. De fascistische macht was ooit een bolwerk van seksuele metaforen die herleid konden worden tot de vaste, eigen bodem en het stromende, zuivere bloed. De scheidingen op grond van sekse en ras waren bedoeld om de mengvormen te vernietigen en hadden dan ook politieke en militaire consequenties.

Ruimtepak

De hierop volgende antifascistische Koude Oorlog duurde lang genoeg om het racistische en seksistische denken dood te laten bloeden. De lichaamspolitiek uit dit inmiddels voorbij tijdvak werd gekenmerkt door conditionering van de lichamen op de nieuwe machines, die niet meer mechanisch maar elektronisch werden aangedreven.

Zo leverde de ruimtevaart het *basic model* van de elektronische aankleding, die net als de macht zelf zowel z'n aantrekkelijke als afschrikwekkende kant heeft. De eerste astronauten waren dieren, beplakt met elektroden om de reacties van hun biologische waterhuishouding te registreren. Daartegenover schitterde en straalde het futuristische ruimtepak als proefmodel van de elektronische *New Order*. Het kosmisch kostuum doorstond met glans de nieuwe gevaarlijke condities, gaf handelingsvrijheid en bood bescherming, terwijl het tevens communicatie garandeerde. Dit vereiste een omscholing van het lichaam, dat niet langer onder het regime van de religie of de politiek, maar onder toezicht van de wetenschap kwam te staan.

De buitenaardse ruimtevaart bleek geen uitvinding die na een ontwikkelingsfase voor de consumenten beschikbaar kwam. Het werd een experiment om onder extreme condities de reacties van het lichaam in elektronische toestand te testen. Ook hier was de aankleding niet alleen uiterlijk vertoon, maar tevens dressuur en maakte ze via de media aan de wereldbevolking duidelijk wat het betekent om aan de computer te hangen. Het buitengewone van deze bovenmenselijke prestatie in de buitenaardse ruimte overtuigde de achtergebleven mensheid van het doorslaand succes dat een verblijf in de elektronische ruimte kon opleveren.

Datapak

Na de explosie van de Challenger en het einde van de ruimtevaart is de weg vrijgemaakt om het ruimtepak in ordinair massaproductie te nemen. Het is omgedoopt tot datapak, met als introductiestunt de zogenaamde datahandschoen. Deze ongemakkelijke outfit biedt de datawerker een fascinerend uitgaanskostuum, waarmee hij iedere lokaliteit met iedere identiteit kan bekleden. Zo maakt hij op een aangename en vrijblijvende wijze kennis met het nieuwe machtsstijl van de New Order. Deze heeft de volgende premissen: terwijl het woon-werkverkeer oplost en de nationale grenzen vervagen, betreden we een cleane, stofvrije, steriele, medicinale ruimte, die zijn eigen opvatting over vuil genereert. Analoog aan de gevaarlijke zones uit het tijdperk van de seksuele macht, gaat het nu om het uitbannen van bedreigingen die de elektronische conditie aantasten. Classics als verdoovende drugs, zatzmakende drank en verstikkende rookniveaus verschijnen als hot items van de droogleggingspolitiek die de Nieuwe Orde wereldwijd doorvoert. Deze politiek vereist een strikt roesdieet wanneer je op wilt gaan in de hallucinogene dataspace. Anders verlies je de nodige concentratie en ga je ruis produceren.

Nieuw aan de elektronische conditie is het stilzitten en de minimalisering van de biomechanische arbeid. Deze fundamentele wijziging in de humane waterconditie, die net als het Deltaplan slechts onder de verhoudingen van de Koude Oorlog gerealiseerd kon worden, veroorzaakt in de introductiefase van de digitale hegemonie een potentiële aanpassingsruis, die bestreden wordt door een aërodynamisch bewegingsprogramma. De citybike als modefiets is integraal onderdeel van het databeleid en wordt niet voor niets bereiden door gezondheidsadepten in fluorescerende spacepakken. Anders dan de verkwistende yuppies uit de eighties, streeft de Euroburgerij van de nineties naar algehele matiging: zowel van het eigen voedsel- en mediadieet als van de overheidsuitgaven. De subsidiekraan is voor hen het zinnebeeld van verspilling, die in flagrante tegenspraak staat met hun recyclingwoede en rentabiliteitszin.

Deze knusse cocooners genieten van de vrijheid om thuis te blijven en hun grootste zorg is het datadak boven hun hoofd. Vluchtelingen die niet in het bestand zijn op te sporen, moeten in hun eigen regio blijven en anders mogen *vs & bc* met hun ontwikkelingsleger daar een handje bij helpen. *Als jullie geen humanitaire hulp willen, gaan we schieten.* Achterliggende inzet van deze militaire ingrepen is het gezond maken van de globale verbindingen, die als een metastructuur de wereld omvatten. Om verder te kunnen expanderen en innoveren dienen de uitgeschakelde datalozen zich koest te houden en op hun plaats te blijven. Desnoods worden hun getto's in eigen stad en hun afge-

Mediamatic 7 # 1



pagina 4

♦ are switched-off and dataless must keep quiet and stay in their own places. If necessary their ghettos and their written-off social wastelands are sealed shut by electronic security.

European Hallmarks

Hardware, software, wetware are the three forms which the human/machine can take in the era of the New World Order. This trinity possesses its own geographical and historical coordinates. The hardware on which we play out all our culture and communication comes from Japan. The programs which make it possible for us to read, see and hear all this precious data come from the United States. And finally, the role of Europe is to deliver the necessary cultural products for shipment. Wetware's task is to cough up culture, which will be run on the Japanese hardware with the help of American software. In this international division of labour, what is expected of Europe is that she properly administer the legacy of Bach and Beethoven, maintain the paintings of Rembrandt and Van Gogh, and extend the Shakespeare-through-Beckett theatre tradition into the future. This is just as true for the media art which has appeared over the last few decades. The Europeans must figure out what things of beauty can be coaxed out of all this new equipment, for there is little pleasure to be derived from the functional use of the technology. Art is only charmed into being when the equipment is connected to the history of art, to philosophy and literature and those typically human character traits which have become European hallmarks. This is the lot which the Europeans, after so many blunders in this twentieth century, have called down upon themselves. Wetware means that we are condemned to making culture which avails itself of technical tools which have been designed by others. This need not be a subordinate position. On the contrary: a great deal is expected of us! What, after all, is a laptop computer with a word-processing program without all the wonderful stories that are written on it? Or a synthesizer without experimental compositions?

Human Remnant

Wetware is a body attached to machines. Wetware means that we have long been connected to the machines surrounding us; something which, as in the case of television, affords us a great deal of pleasure. If it's up to wetware, submission to the machines, as predicted by Orwell's 1984, need not be so dramatically represented. It need not result in slavish submission, for wetware has a secret weapon up its sleeve: its (all too) human traits.

The nickname 'wetware' is an homage to the do-it-yourselfer who tries to make the best of things but always forgets the instructions. Flaws are deployed to safeguard dignity. Through ignorance, the urge to sabotage, and unbridled creativity, technology always goes haywire; from these accidents the most beautiful freaks spring forth, and after aesthetic treatment are effortlessly declared art. To wetware the user is not a remnant or something suppressed, but a born hobbyist

who can hook together any old or new media into a personal reality, where an error message is at the beginning of a long series of resounding successes. The term wetware was coined by Rudy Rucker. He defines it as a collection of technological innovations: chips which are implanted in the brain, organ transplants and prostheses that replace or extend bodily functions. Unlike Rucker, Adilkno considers the wetware idea not as a following phase to upset the wobbly self-image yet again after the revolutions in hard- and software, but as the 'human remnant' who stays behind as the extensions go on longer and longer trips.

At the end of the twentieth century, the autonomous individual trying to bring his gushing fears and desires into balance has come to stand in the shadow of the technological imperative. Managing or throwing open the channels appears to be dictated to a high degree on the available equipment. Wetware is conscious of this dependence and thus sees itself not as a potentate that rules over the machines, but as a watery appendage that must adjust as well as it can to the digital conditions of electronic data traffic.

Acknowledgment of the technological a priori should not be confused with the hype which always arises when a new system comes on the market. The buzz generated by the new equipment creates an amnesia that results in a familiar pattern: the short-term effects of a technology are overestimated, while the long-term effects are given short shrift. It is characteristic of wetware to soak in a bubble bath of simulacra, and lose sight of the military prehistory of communications technology and of the nefarious plans being hatched by technocrats and marketing divisions. Wetware lets itself be easily fascinated and is not so quick to criticize when something new presents itself. We have become accustomed to the continual introduction of new products and techniques. A cycle is slowly becoming apparent: after a phase of rumours and spectacular presentations, the first lucky few get to show off the gadgets, and critics have a free-for-all. Only then can there be acceptance by society and a market large enough for capital to be interested.

Virtual Reality

The new technologies cunningly present themselves in the form of fashion and then fade into obscurity. This has recently happened with Minitel, video phones and mind machines. At the moment it is 'virtual reality's' turn to make technological dreams material. Until now vr has been no more than one big flood of rumours for wetware. The global village where the techno-artists live has been turned upside down for a few years now: something big was supposed to happen...a megasystem was on its way that would nullify and engulf all media productions manufactured up to now, and suckle on wetware like no other medium before.

In the 'out-of-body' experiments conducted in high-tech laboratories, vr has been described as a *doorway to other worlds*. The distance between us and the screen becomes nil and we enter a 'mental environment.' vr is the *ultimate human-computer interface* (Rheingold) which encompasses all bodily movements and requires not

Mediamatic 7 # 1



page 5



schreven sociale woestijnen dichtgesmeerd met electro-nische bewaking.

Europeesch Waarmerk

Hardware, software, wetware zijn de drie gedaantes waarin de mens/machine in het tijdperk van de Nieuwe Wereld-orde verschijnt. Deze drie-eenheid bezit eigen geografische en historische coördinaten. De hardware waar wij al onze cultuur en communicatie op afspelen komt uit Japan. De programma's die het mogelijk maken dat wij al deze dierbare data kunnen lezen, zien en horen, komt uit de Verenigde Staten. De rol van Europa tenslotte is de benodigde culturele produkten aan te leveren. De taak van wetware is het opheffen van cultuur, om die op de Japanse hardware met behulp van de Amerikaanse software af te spelen. In deze internationale arbeidsdeling wordt van Europa verwacht dat zij het erfgoed van Bach en Beethoven goed beheert, het schilderwerk van Rembrandt en Van Gogh voortzet en de rode draad in de theatertraditie van Shakespeare tot Beckett naar de toekomst verlengt. Dat geldt evengoed voor de mediakunst die in de afgelopen decennia ontstaan is. De Europeanen moeten uitvinden wat voor moois er allemaal uit al die nieuwe apparaten getoverd kan worden. Uit het functioneel gebruik van de techniek valt namelijk weinig plezier te behalen. Er wordt pas kunst te voorschijn getoverd wanneer de apparaten aangesloten worden op de kunstgeschiedenis, op de filosofie en de literatuur en de typisch menselijke karaktertrekken, die tot Europeesch waarmerk zijn geworden. Dat is het lot dat de Europeanen, na zoveel miskleunen in deze 20ste eeuw, over zich hebben afgeroepen. Wetware geeft aan dat wij veroordeeld zijn tot het maken van cultuur, die zich van technische middelen bedient die anderen hebben ontworpen. Dit hoeft geen ondergeschikte positie te zijn. Integendeel: er wordt een hoop van ons verwacht! Wat is immers een laptopcomputer met een tekstverwerkingsprogramma zonder de mooie verhalen die daar op geschreven worden? Of de synthesizer zonder experimentele composities?

Mediamatic 7 # 1



pagina 6

Restant Mens

Wetware is een lichaam dat aan machines hangt. Wetware geeft aan dat wij allang zijn aangesloten op de ons omringende machines, iets waar wij, zoals in het geval van de televisie, nog een hoop plezier aan beleven ook. De onderwerping aan de machine zoals Orwell die in 1984 voorspelde hoeft, als het aan de wetware ligt, niet zo dramatisch te worden voorgesteld. Ze hoeft niet te resulteren in slaafse onderwerping, want de wetware heeft een geheim wapen achter de hand: zijn menselijke, al te menselijke eigenschappen. De geuzennaam 'wetware' is een erbetoon aan de knutselaar die er het beste van probeert te maken, maar altijd weer de instructies vergeet. De onvolkomenheden worden ingezet om de waardigheid te waarborgen. Door onkunde, sabotagegedriften en een ongebreidelde creativiteit loopt de techniek altijd weer in het honderd en uit deze ongelukken spruiten de mooiste gedochten voort, die na een esthetische behandeling moeiteloos tot kunst worden verklaard. Voor wetware is de gebruiker geen achterblijfsel of onderdrukt wezentje, maar een hobbyist-van-huis-uit, die alle oude en nieuwe media aan elkaar weet te knopen tot een personal reality, waarin de foutmelding aan het begin staat van een lange reeks daverende successen.

Het begrip wetware is een uitvinding van Rudy Rucker. Hij vat wetware op als een verzameling innovaties op technologisch gebied. Zijn begrip van de wetware verwijst naar chips die in de hersenen worden geïmplant, naar orgaantransplantaties of naar prothesen die lichaamsfuncties vervangen danwel uitbreiden. Anders dan bij Rucker beschouwt Bilwet het idee wetware niet als een volgend stadium, dat na de revoluties op het vlak van de hard- en software nogmaals het wankele zelfbeeld omverwerpt, maar als een 'restant mens' dat achterblijft terwijl de *extentions* steeds verdere reizen maken.

Het autonome individu dat zijn stromende angsten en verlangens in balans probeert te brengen, is aan het eind van de 20ste eeuw in de schaduw komen te staan van het technologisch imperatief. Het beheersen danwel opengooien van de kanalen blijkt in hoge mate te worden gedictieerd door de beschikbare apparaten. De wetware is zich van deze afhankelijkheid bewust en ziet zich dan ook niet als een potentiaat die over de machines heerst, maar als een waterig aangehangsel dat zich zo goed en kwaad als het gaat, dient aan te passen aan de digitale condities van het elektronisch dataverkeer.

Het erkennen van het technisch apriori dient niet te worden verward met de hype die telkens ontstaat wanneer een nieuw systeem op de markt komt. Door de roes die de nieuwe apparaten genereren ontstaat een amnesie die resulteert in de bekende wetmatigheid dat de korte-termijneffecten van een technologie worden overschat, terwijl de lange-termijneffecten over het hoofd worden gezien. Het is eigen aan de wetware zich te laten onderdompelen in een bubbelbad van simulacra, zodat hij/zij het zicht verliest op de militaire voorgeschiedenis van de communicatietechniek en op de snode plannen die technocraten en marketingdivisies uitbroeden. Wetware laat zich dus gemakkelijk fascineren en komt niet zo gauw met kritiek zodra zich iets nieuws aandient. Het is eerder zo dat men gewend is geraakt aan het voortdurend introduceren van nieuwe produkten en technieken. Langzaam tekent zich een cyclus af: na een fase van geruchten en spectaculaire presentaties, volgt een kopgroep die met de gadgets mag pronken, terwijl de kritiek ruim baan krijgt. Pas daarna kan sprake zijn van maatschappelijke acceptatie en een markt die groot genoeg is om voor het kapitaal interessant te zijn.

Virtual Reality

De nieuwe technologieën presenteren zich listig in de gedaante van de mode om vervolgens in de vergetelheid te geraken. Recentelijk gebeurde dit met minitel, beeldtelefoons en mind machines. Op dit moment is het de beurt aan de 'virtual reality' om de technologische dromen van materiaal te voorzien. Voor de wetware is vr tot nu toe niet meer dan één grote geruchtenstroom geweest. Al een paar jaar staat het globale dorp waar de techno-artisten wonen op z'n kop: er zou iets groots staan te gebeuren... er zou een megalysysteem op komst zijn dat alle mediaproducties die tot op heden zijn gefabriceerd nietig verklaart, in zich opneemt en als geen ander *suckt* aan de wetware.

In de 'out of the body' experimenten, die in de high-tech laboratoria worden gedaan, wordt vr beschreven als een *doorway to other worlds*. De afstand tussen ons en beeldscherm wordt nihil en we betreden een *mental environment*. vr is de *ultimate human-computer interface* (Rheingold) die alle lichaamsbewegingen in zich opneemt en niet enkel vraagt



◆ even fingers nimble enough to operate a keyboard. VR (potentially) takes possession of the whole body in order to let the mind travel as far as possible. While all the senses, in the maximum state of titillation, are undertaking exhausting expeditions, the physical body remains behind in the 'non-virtual world'.

Because all VR efforts are focused on the conquest of the sixth continent, the part that stays behind is temporarily overlooked. But then the wetware factor reports back and returns to its own 'tele-existence' as a 'human bug'. This is the instant at which wetware actually takes on form. Despite hysterical stories of the instantaneous omnipresence of the zapping body in the live broadcast and the dissolution of locality as a natural milieu for the process of ego formation, the media user still stands up at regular intervals to grab a beer or take a piss.

These moments of absence from the media do not occur in the cyberspace myth. In it, the body is in fact an abandoned station, and life is tantamount to data travel and digital immortality. Wetware finds this a fascinating thought, but laughs loudly, because something always gets in the way. The wet *Mensch* recognizes himself for the first time as an equal counterpart to the immaterial sphere. The wetware story begins as soon as it is clear that technology cannot live with or without the human.

Cyberspace

After the presentation of VR, a Babylonian misunderstanding arose over what the consequences of this next techno-revolution would be. The first report: that the cyberpunk world portrayed by William Gibson would come true. Succeeding reports told us that the matrix à la Gibson, where the most intense hallucinations could be had, was still fiction: virtual reality in its infancy was nothing but a simple computer animation of a building or landscape in which you could rather jerkily look around. But even this disillusionment, which was reserved for the few who had gotten the chance to wear the VR helmet and the dataglove, could not squelch the hype. By publicly distancing himself from the evangelizing of Timothy Leary and other electronic cowboys of the VR business, Gibson narrowly prevented his term 'cyberspace' from being tacked onto assorted carnival attractions. By Gibson's definition, cyberspace is more a neo-space where social fiction about human and machine unfolds than the name of a new technology. The first commercial applications were simply much too clean for the sopping cyberpunks.

The first VR systems are already in operation on Wall Street, in the arcades of the amusement industry, in medical laboratories, in architects' offices and at NASA. These are not especially places where techno-artists, hackers and cyberpunks tend to have admittance. Thus, for wetware VR remains no more than a fleeting item about which exciting science fiction and hefty volumes are written and critical documentaries are aired. So far the public market is nowhere to be found.

To reassure the folks in the street, John Barlow, head of the consumers' association Electronic Frontier Foundation, has proposed to stretch the definition of VR

and bring it closer to the people by defining already existing electronic data traffic as part of cyberspace. He is trying to achieve a legal breakthrough by declaring this new imaginary zone free from copyright. Since, according to him, cyberspace is transnational, an international constitution for information ought to be drawn up.

Now that computer hackers in the United States are followed by the CIA and the FBI, are slapped with hefty fines and are getting locked up, association with the world of virtual reality looks like an attractive option for hauling the hacking movement out of a repressive corner. Barlow's reasoning blames the problem on a fundamental lack of understanding about the current technological developments on the part of the authorities. Big names from the software world ought to call a halt to criminalization. But the question is how much we can expect from their end. Dreams of a great coalition between the upcoming VR giants and cyberpunks seem a bit naive. Even inside the small world of the VR pioneers, a tacky war is raging over copyrighting of the names given to the homemade projects. On the Electronic Frontier, big capital and military interests silently recede into the background.

Human Flaw

Is it wetware's task to fill VR with European *Kulturgut*, as Jeffrey Shaw has done in his *Legible City*, where he connects the Dutch bicycle to the city maps of European cities like New York and Amsterdam via VR? This classic wetware strategy turns high-tech into art again by splicing the newest medium to a quaint, ecological and sweaty means of transport. The continental approach to technology always has an eye for the funny sides of the Human Flaw. For if the human bug is not treated with respect, the buckets are poised ready to cool off the new medium. The new monsters must not be understood as a threat from outside, but made to dance in the new space. William Gibson articulated this insight in the phrase, *There's weird shit happening in the matrix*, and had Voodoo Loa trot through cyberspace on a horse.

A more realistic approach is the idea of virtual sex: safe as well as filthy. You have to understand the pornographic dimension of a medium to be able to make it a success. The Dutch telephone company had to conclude that its introduction of the teleconference was a flop, until this same switchboard connection on the 06-partylines' made the wildest fantasies reality. The question immediately popped up in virtual reality too: was sex good there, and which body parts get the nicest stimulation? Wetware won't get excited about a slicker design for the personal cognitive cluster. What's important is whether mistakes can be made in virtual reality and what kind of Faustian and/or Dionysian chain reactions they cause. Culture is always the consequence of decline, decadence, clumsy manoeuvres and misconceptions. Technology must establish itself inside it, and not make out to rise above it in order to magically evoke the Higher. Only then can there be a fusion between wetware and its hard- and software.

translation LAURA MARTZ

Mediamatic 7 # 1



page 7

om behendige vingers die een toetsenbord kunnen bedienen. VR neemt (potentieel) het hele lichaam in beslag om de geest zo ver mogelijk te laten reizen. Terwijl alle zintuigen zich in opperste staat van opwinding bevinden en uitputtende expedities ondernemen, blijft het fysieke lichaam tegelijkertijd achter in de 'non virtual world'.

Omdat alle VR-inspanningen gericht zijn op de verovering van het zesde continent, raakt hetgeen dat achterblijft even buiten zicht. Maar dan meldt de faktor-wetware zich en keert terug als 'human bug' in de eigen 'tele-existence'. Dit is het moment waarop de wetware als gedaante überhaupt verschijnt. Ondanks de hysterische verhalen over de ogenblikkelijke alomtegenwoordigheid van het zappende lichaam in de live-uitzending en het oplossen van de lokaliteit als natuurlijk milieu voor het ik-in-wording, staat de mediagebruiker nog altijd regelmatig op om een biertje te halen of te gaan pissen. Deze momenten van afwezigheid uit de media komen in het cyberspace-mythe niet voor. In feite is daarin het lichaam een verlaten station en staat leven gelijk aan datatief reizen en digitale onsterfelijkheid. Wetware vindt dit een fascinerende gedachte, maar moet daar erg om lachen, omdat er altijd iets tussenkomt. De natie Mensch herkent zichzelf voor het eerst als gelijkwaardige counterpartner van de immateriële sfeer. Het wetware-verhaal begint zodra duidelijk is dat de techniek niet zonder, maar ook niet met de mens kan.

Mediamatic 7 # 1



pagina 8

Cyberspace

Na de presentatie van VR is een Babylonische spraakverwarring ontstaan over wat deze volgende technorevolutie teweeg zal brengen. De cyberpunkwereld die William Gibson al eerder had geschetst zou werkelijkheid worden, was het eerste bericht. De matrix à la Gibson, waarin men de meest intense hallucinaties opdoet, bleek in de daarop volgende berichten voorsnog fictie te blijven: virtual reality in de kinderschoenen was niet meer dan een simpele computeranimatie van een gebouw of landschap, waarin men nogal schokkerig om zich heen zat te kijken. Maar zelfs deze ontzuivering, die bleef voorbehouden aan een enkeling die de kans had gekregen de VR-helm op te zetten en de datahandschoenen aan te trekken, kon de hype niet de kop indrukken. Doordat Gibson zich publiekelijk distancieerde van het evangelisatiewerk van Timothy Leary en andere electronic cowboys voor de VR-business, verhinderde hij op het nippertje dat zijn begrip 'cyberspace' aan diverse kermissattracties werd geplakt. Volgens Gibson is cyberspace eerder een neo-ruimte waarin zich sociale fictie over mens & machine afspeelt, dan de naam voor een nieuwe technologie. De eerste commerciële toepassingen waren gewoon veel te clean voor de soppende cyberpunks.

Inmiddels werken de eerste VR-systemen op Wall Street, in de arcades van de amusementsindustrie, in geneeskundige laboratoria, architectenbureaus en bij de NASA. Dat zijn niet bepaald plaatsen waar techno-artisten, hackers en cyberpunks toegang toe hebben. Voor wetware blijft VR daarom niet meer dan een vergankelijk item waarover spannende science-fiction en zware boeken worden geschreven en kritische documentaires worden uitgezonden. De publieksmarkt is voorsnog nergens te bekennen.

Om de goegemeente gerust te stellen heeft John Barlow, de voorman van de consumentenbond Electronic Frontier Foundation, voorgesteld de definitie van VR op te rekken en

wat dichter bij de mensen te brengen door het reeds bestaande elektronische dataverkeer ook te beschouwen als cyberspace. Hij probeert een juridische doorbraak te bereiken door deze nieuwe imaginaire zone vrij te verklaren van copyright. Aangezien volgens hem cyberspace transnationaal is, zou er een internationale grondwet voor de informatie opgesteld moeten worden.

Nu de computerhackers in Amerika achterna gezeten worden door de CIA en de FBI, fikse boetes moeten betalen en achter slot en grendel gaan, lijkt de verbinding met de wereld van virtual reality een aantrekkelijke mogelijkheid om de hackbeweging uit de repressieve hoek te halen. In zijn argumentatie gooit Barlow het op het fundamenteel onbegrip bij de autoriteiten over de technologische ontwikkelingen die gaande zijn. Grote namen uit de softwarewereld zouden de criminalisering een halt toe moeten roepen. Maar het is de vraag hoeveel we uit deze hoek kunnen verwachten. Het dromen over een grote coalitie tussen de opkomende VR-giganten en cyberpunks doet naïef aan. Zelfs binnen het kleine wereldje van de VR-pioniers woedt een ordinaire oorlog om het trademarken van de namen die aan de zelfgebouwde producten worden gegeven. Het grote geld en de militaire belangen verdwijnen bij de Electronic Frontier dan ook geruisloos op de achtergrond.

Het Gebrek Mens

Is het de taak van wetware om VR te vullen met Europees Kulturgut, zoals Jeffrey Shaw gedaan heeft in zijn *Legible City*, waarin hij de Nederlandse fiets via VR aansluit op de plattegrond van Europese steden als New York en Amsterdam? Deze klassieke wetwarestrategie maakt opnieuw van high tech kunst door het nieuwste medium kort te sluiten met een oubollig, ecologisch en zweterig verkeersmiddel. De continentale aanpak van techniek heeft altijd oog voor de lollige kanten van het Gebrek Mens. Want als de *human bug* niet met egards wordt behandeld, staan de emmers klaar om het nieuwe medium een beetje af te koelen. De gedochten moeten niet als bedreiging van buitenaf worden begrepen, maar in de nieuwe ruimte aan het dansen worden gebracht. William Gibson vertaalde dit inzicht in zijn spreuk: *There's weird shit happening in the matrix*, en liet de Voodoo Loa te paard door cyberspace draven.

Een realistischer aanpak is het idee van virtual seks: zowel safe als heel smerig. Je moet de pornografische dimensie van een medium vatten om er een succes van te kunnen maken. Zo moest de Nederlandse PTT constateren dat hun introductie van de teleconferentie een flop werd, totdat dezelfde technische schakeling via 06 als partylines de meest woeste fantasieën werkelijkheid liet worden. Ook bij virtual reality dook onmiddellijk de vraag op of het daar prettig seksen is en welke lichaamsdelen dan het aangenaamst geprikkeld worden. Wetware raakt niet opgewonden van een mooier design van het eigen cognitief cluster. Van belang is of er fouten kunnen worden gemaakt in virtual reality en wat voor Faustische en/of Dionysische kettingreacties deze veroorzaken. Cultuur is altijd het gevolg van verval, decadentie, onhandige manoeuvres en wanbegrip. Techniek moet zich daarbinnen nestelen en niet pretenderen er bovenuit te stijgen om het Hogere tevoorschijn te toveren. Pas dan kan een fusie tussen de wetware en z'n hard- en software tot stand komen.

1922. Parijs. In een hotelsuite springen de stoppen bij het aansluiten van de fotolampen en Man Ray maakt het legendarische portret van de vrouw met de ogenparen. Zo'n driekwart eeuw na de uitvinding van de fotografie brengen deze ogen plotseling weer de magie van de donkere kamer terug. Deze toevallige vondst van Man Ray zou een ikoon van een tijdvak worden. De fotografie werd nogmaals uitgevonden. Nu eens geen bewust conformeren aan de schilderkunst, zoals bij het retoucheren, maar de vrije hand bieden aan de techniek. De negentiende-eeuwse retouche werd eindelijk ingeruild voor de twintigste-eeuwse beeldtaal. Hoeveel stappen zijn sindsdien gezet om tenslotte het gebied van het *PhotoShoppin* te bereiken?

Hier zien we de experimenten van de avant-garde-generatie die inmiddels een sfeer van nostalgie oproepen. De spleetsluitervertekeningen van de tiener Lartigue, de dubbelbelichtingen van Frederick Sommer, het gevonden fotomateriaal uit de collectie van Sándor Kardos. Al deze voorbeelden op de fotopagina's in deze *Mediamatic* hebben misschien oorspronkelijk hun leesbaarheid te danken aan de cubistische experimenten van Picasso, vandaag de dag lezen we ze echter vooral als herkenbare experimenten in de digitale vormgeving.

De afgebeelde oude foto's staan tegenover de digitale beeldbewerking. Ondanks het feit dat de digitale beeldbewerking alles mogelijk lijkt te maken (waarvan de *Mediamatic* de laatste twee jaar overtuigend bewijs heeft geleverd), bereikte men in vroeger tijden soortgelijke effecten. Verwoede donkere-kamerexperimenten, toeval of gebrek aan materiaal zorgden voor resultaten die juist in hun naieve technische manipulaties een verbeeldingskracht demonstrenen. Op deze foto's ligt de glans van de historische verworvenheid die absoluut niet te evenaren is, of zelfs maar te benaderen. Het patina van een artistieke ingreep die vaak niet eens als zodanig bedoeld is.



Mediamatic 7 # 1



page 9

♦ Paris 1922. The fuses blow when Man Ray turns on his lamps in a hotel room, resulting in the legendary portrait of the woman with two pairs of eyes. Three quarters of a century after the invention of photography, these eyes suddenly re-evoked the magic of the darkroom. Man Ray's chance discovery was to become the icon of an epoch. Photography was re-invented. For once, conscious conformity to painting was abandoned (as for example in retouching); technology was given a free hand. The nineteenth century 'retouche' was exchanged for the twentieth century language of images. How many steps was it from there to finally reach the realm of *Photoshopping*?

These are the experiments of the avant-garde generation: experiments that now evoke nostalgia. The teenager Lartigue's cleft-shutter distortions, Frederick Sommer's double exposures, found material from the Sándor Kardos collection. All of these examples in the following pages of *Mediamatic* may owe their original readability to Picasso's cubist experiments, but today it is mainly as recognizable experiments in digital design that we read them.

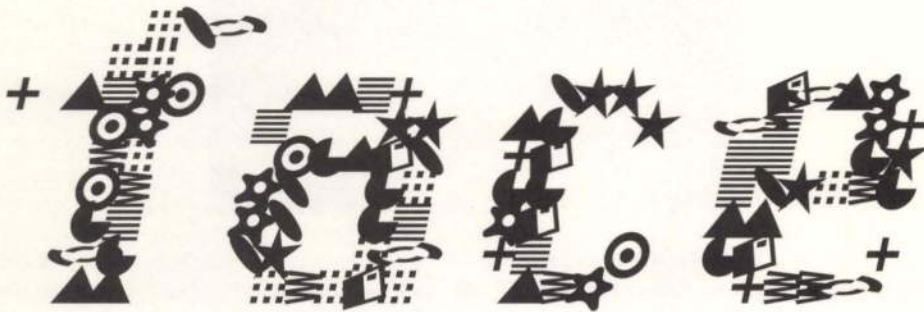
These old photographs form a counterpart to digital design. Though digital image processing seems to make all things possible (*Mediamatic* has produced conclusive proof of this in the preceding two years), similar effects were achieved in earlier days, too. Furious experimentation in the darkroom, coincidental or flawed material produced results whose power lies precisely in the naivete of those technical manipulations. The lustre of historical achievement lies upon these photos; it cannot be equalled or even approached. The patina of artistic manipulation often not intended as such.



Mediamatic 7 # 1



pagina 10



Urban legend has it that in 1982 Steve Jobs (creator of the Apple II, Macintosh and next computers) was wondering through that Disneyland for programmers, the Xerox PARC computer research centre, when he saw a strange set of experiments in graphical presentation of digital information. Nine years later Apple is suing Microsoft over it, the Unix world is split over which one to use, and even IBM is selling a mouse with every computer. The user interface has come from nothing to dominate computer culture.



◆ It's ironic that a user interface is just a sophisticated lie. It's a lie in the sense that when you click on an icon and drag it the last thing you are doing is talking to a machine on its own terms. Yet this feels so natural how could such a thing be created?

The words a computer is a machine which represents everything as ones and zeros has become some kind of super-mundane Western mantra, a verbal icon repeated so often as to lose all meaning, to the point where artists like Laurie Anderson in her film *Home of the Brave*, use it to point out a hi-tech nothing. Like some hyped-up Zen shaman free-basing mathematics, Alan Turing (gay suicide hyper genius, the James Dean of the computer world) realised that combinations of ones and zeros (the ubiquitous bits) could be made to represent numbers, words, pictures, sounds — even dynamic models of a dog's digestive tract. This is not such a great revelation to those who know that you can combine red, blue, yellow and white paint to create any colour, or who regularly organise patterns of 26 letters and a space to make most of the Western world's literature. Its simplicity is its strength.

Each computer executes a small number of machine instructions, each instruction (such as adding two numbers), is represented by a number like 28. With 32 switches it is simple to encode each instruction. In theory the digital world could be entirely controlled by flicking 32 switches on or off. To see the results of your actions all that is needed are 32 lights. Like being told that Tolstoy dictated *War and Peace* to his secretary using semaphore flags from a nearby mountain. Seymour Cray, a minor hacker deity and creator of the world's fastest computers, is rumoured to have 'toggled' his first operating system like this on a very early computer. But no one likes sucking information through a straw, and the user interface's purpose is to widen that straw.

For a computer's form to follow function then a computer would be a black box with 32

lights and 32 toggle switches on it. A computer, however, is a truly general purpose machine, it has no function inherent in its design any more than a typewriter has a novel style it is best at. This results in a function with no form — a vacuum filled by the user interface, which steps into the gap between human and machine, translating the actions of one into the terms of the other. While doing this, the user interface rolls like an M1 tank, over every precept of good design. Form and function are from the program's view completely divorced. Apple's *User Interface Guidelines* recommends the use of metaphor: *Window as Paper* or *Icon as File* or *Screen as Desktop*. With metaphor, it is possible to eliminate the time taken to form the mental model of the job, at the expense of being 'true' to the material.

Ornament

Like modernists, many programmers dislike the retrospective analogy. We don't, they explain, ride in *horseless carriages* but in cars; neither do we listen to *wireless radio*. If we accept these objects as themselves, they demand, do programs have to pretend to be something else? It is also argued by people like Ted Nelson that the use of metaphor holds back the design of software which is truly new and has no real-world analogy.

Programs too are positively baroque in the amount of ornament they have. In no sense of the word can they be considered streamlined. On the contrary: users are constantly waiting for more feature ornaments to be put in. Like many people, I spend a large part of my office life, staring at a screen, yet of all the items in my office, the lines on the screen are subject to the least amount of true design debate.

Although the window/mouse based user interface defined the term, each curious stage of growth of computers has been linked to a revolution in the user interface.

From toggles (Stone Age), to punched cards with holes for numbers (Bronze Age), to typewriters which accepted commands from a keyboard and printed out the result (Classical), to the character screen which could send a stream of text to the screen (Baroque) to the window and mouse interface (Modernist?) typified by the Mac, to the Futurist penbooks and goggle-based virtual reality.

With every step in the evolution of computers, each user interface creates its own culture. The Soviet-style bureaucracy of the mainframe, the mythical suit and tie mini/pc power user, the sandals-and-ponytail Unix guru, to the arty-craftsy yuppie 'creative' icon pusher of today. Each culture of users, however, normally misunderstands the other. Indeed, if the near fanatical 'flame wars' that appear on Newsnet are representative, the user interface is the source of most computer friction and politics.

An argument that took place on the Internet bulletin board in the area concerned with computers and Macintoshes (comp.sys.mac) began when one IBM PC user announced that Macintosh computers were harder to use than PCs. His point was that menus, while helpful to beginners, are really cumbersome when you want to repeat a known command. The flame war¹ that ensued took several weeks to die down, the conflict only concluded when someone pointed out that menus on a PC, which are a list on the screen of words to be selected from, are quite different from the pull down menus on a Mac. Macintosh's menus are available at all times, PC menus tend to prevent any further action until a choice is made.

What seems to be missing in all their arguments is that although the underlying computer is largely identical, no user interface deals with the machine on its own terms. Unless you are presented with 32 switches you are dealing with something which is interpreting your actions into machine terms. Each user interface,

Mediamatic 7 # 1



page 11

¹ A flame war occurs when replies to public electronic mail become very abusive. Each response is responded to by more than one party and the responses become more arbitrary. Net folklore recounts of a time when the capacity of the Net was exceeded and the network crashed after one 'netter' announced that he didn't think that Kate Bush was very good.

◆ no matter how crude, is little more than a lie. The bigger the lie, the better (more useful) the computer. The root of this point lies in Doug Engelbart's (inventor of the mouse) description of the computer as *a tool for thinking with*. If we are a tool-using animal, then it can be argued that we are shaped by our technology as much as we shape it. The user interface is mirrored as the tool we use to think about the problem. Take the BASIC programming language, for example: its function is nearly identical to that of the Lotus 1-2-3 spreadsheet. The reason that 1-2-3 is on a million desktops is that the spreadsheet provides visible rows and columns of numbers — a concrete view of abstract quantities and a metaphor to help deal with them.

A successful interface makes the abstract concrete. This is exemplified by the success of desktop publishing programs like PageMaker over text formatting languages like *tex* (pronounced Tech). *tex* is a powerful system but it relies on the designer knowing what the output of a command will be. PageMaker lets the designer see a simulated page and exercise judgement over its design. When a computer is involved, the user interface defines how we approach thinking about problems. Clearly the interface is quietly becoming a part of world culture.

Object Oriented Programming

This ties in with the original thinking about what the window-based user interface was concerned with. Alan Kay, the leading thinker at XEROX PARC when Steve Jobs walked through, started not from machine convenience or programming necessity, but from psychological comprehension. Kay based his ideas on the work of Jerome Bruner's re-evaluation of Piaget's stages of intellectual development in children. As Kay identified, *Our mentalium seems to be made up of multiple separate mentalities with very different characteristics. They reason differently, have different skills and*

often are in conflict. Bruner identified a separate mentality with each of Piaget's stages: he called them enactive, iconic and symbolic... (they) are still some of the strongest ideas for creating learning rich environments (in: Brenda Laurel (ed) *the Art of Human-Computer Interface Design*, 1990, p.195).

The human mind experiences thinking on these three levels — doing (playing with something), images (pictures let us recognise things), symbolic (letting us tie long chains of reasoning together), Kay reasoned. Computers traditionally have only worked on the symbolic level using written (symbolic) text. *In other words, because none of the mentalities is supremely useful to the exclusion of the others, the best strategy would be to gently force synergy between them in the user interface design*, Kay announced.

Kay's thinking at XEROX PARC was a revolution, deliberately abandoning the historical legacy of previous software. As such, it divorced itself from the computer industry's self image of engineering, a move which was to alienate the traditional computer world for a long time. This also led to the legendary symbolic rejection of traditional chairs at PARC in favour of bean bags (see Nelson's excellent *Computer Lib* for the full story).

Kay replaced the notion of the user with the image of a child. He wanted to build a computer that would be appealing to children. A by-product of this child-centred approach was the creation of 'object oriented programming', currently the most popular and powerful programming methodology at our disposal.

Kay's weakness was in rejecting the past and being in no hurry to build the future (many of his ideas have still to be explored). Xerox never managed to exploit the far-reaching thinking they invested in. Inventing a user interface which worked on an enactive and iconic level left a system which was very hard to sell, being so hard to describe in words. Like a picture, the user

interface had to be experienced to be understood. This slowed down it's introduction into an industry which sees everything in MBs, megabytes and MegaFlops.

The original innovations at XEROX PARC were determined by an ideology seeking expression in technical terms. Kay's group were quite willing to imagine systems which were as yet unbuildable, yet correct in terms of their user interface. The central guiding design behind the Xerox research was an information device called a DynaBook. This design was outlined in about 1971, yet the first implementations are only just being built today. The core idea behind the DynaBook or Go Corp's PenPoint (Byte, Feb 92), was that mass literacy came into being when the printing press was invented. Before then, books were so expensive that they had to be locked to desks and people had to take turns sharing them. This is similar to the situation today where computers are tied to desks and people regularly share the computer for doing specific work on. With the invention of the printing press, books became cheap enough for mass access, and their size was reduced so that book and reader could be liberated from the medieval library.

Both DynaBook and PenPoint are designed to be a commonplace object, sharing similarities with a notebook. It is envisaged to be a flat A4 page, to interact with it all that is needed is a pen. PenPoint reads hand writing converting it into text and provides editing facilities based on familiar actions like crossing out (deleting), circling and pointing (moving). It also handles communication with a network transparently via radio or infrared link to other computers, databases and co-workers. The PenPoint system is based on the notebook metaphor: there are no applications or windows, only pages, within which frames can be arranged. Each frame can be text, picture, spreadsheet, equation editor or anything that can be drawn in. The frame is the closest the PenPoint comes to an (now obsolete) application. Each frame

Mediamatic 7 # 1



pagina 12



♦ can be edited with a pen, text can be entered either by writing with a pen or by plugging in a keyboard and typing. Each page has a tab at the side to allow quick access to other pages and the front page of each notebook contains an automatically updated index of items.

Groupware

The original work at Xerox PARC aimed to make computers more useful to individuals. By combining computers into a network or by linking them together by telephone, it is possible to make a computer which extends the reach not only of the individual, but the group. Software for groups (groupware) can be a lot more than just electronic mail. Ted Nelson's *Xanadu* hypertext project could be seen as groupware with a user group the size of the earth's population. The Xerox PARC *Rooms* research explores this area of using the computer as a medium between users. In the 'room world' the desktop (the screen with menus, icons and windows on it) becomes a *room*. Like the rooms in a house, each room has a specific function: one for working on electronic mail, another for writing reports, another for working on experiments.

At the top of the screen is a miniature map of all the rooms belonging to those co-workers sharing the same network. By clicking on the miniature room, it expands to become the current room. A room can be shared, allowing users to use the computer as a blackboard to communicate with. Work such as writing or drawing can be discussed and edited at the same time as using the phone.

The primary groupware at the moment — electronic mail — improves communication to the extent that you can easily spend several hours a day reading and responding to electronic mail and bulletin boards such as Newsnet. This can lead to 'information overload', a term first used by American Airforce pilots to explain why they tended to switch off most of their electronic

gadgetry after take off. The solution Brenda Laurel suggests is the notion of an 'intelligent' agent, like the 'man in the machine' of the Disney film *TRON* (screenplay by Bonney MacBird, Alan Kay's wife). The idea of the agent is that you are helped in your work by something as natural as an assistant. Such a 'secretary' could prioritise mail and even search for items which may be of interest to the user (who need have no knowledge of how the search is being carried out or what database the information is stored in).

'Intelligent' agents extend the idea of mixing artificial intelligence with the user interface pioneered by work by the likes of Bard Myers. His *PERIDOT* was a drawing program backed by an expert system which looked for repeated activities, such as drawing a line, then asked *How many times should I repeat this line?* Using *PERIDOT*, it was possible to design your own user interface by simply demonstrating what the consequences of an action should be. Already there are simple commercial implementations of such ideas in computer aided drafting (CAD) programs such as *Ashlar Vellum*, in which as the cursor moves through the drawing, text messages appear where any logical relation is observed by the assistant (Centre of Circle, end point of the line, etc). This bypasses the cumbersome commands necessary to constrain the line used by other CAD programs.

Alan Kay's current work on agents is centred on children in the *Vivarium* Project. Here the agents are not only 'intelligent', they are also 3-D. Using a powerful military flight simulator, Kay and MIT's Media Lab have designed an underwater reef with which children can experiment with computerised ecosystems. Kay's work bridges the divide between making computers merge into everyday life — like *PenPoint* — and making everyday life merge into computers — such as virtual reality.

Phone-Based User Interfaces

While the media hype has followed virtual reality, there are a

number of unapproached questions about how the virtual world will represent the digital world in the machine. As Brenda Laurel, interface consultant to Apple Computer said: *Some of the old problems that faced us when we were designing human-computer activities without eye phones remain: How do people and systems understand each other? How can the actions of both be shaped and orchestrated?* (Laurel *Computers as Theatre*, Addison-Wesley 1991).

In the struggle over the technology, the structure and behaviour of the virtual world has not been addressed beyond William Gibson's original description of cyberspace as *A consensual hallucination (...)* *A graphical representation of data abstract from the banks of every computer in the human system. Unthinkable complexity. Lines of light ranged in the non-space of the mind, clusters and constellations of data. Like city lights, receding (...)*. (*Neuromancer*, 84) XEROX PARC is showing imaginative uses for three dimensions. The work of Stuart Card, Jock Mackinlay and George Robertson uses three dimensions to produce tools like the *Perspective Wall*. The *Wall* is a year planner where the current week is large, with great detail, but as the year on the wall moves off into the distance the information gets smaller (using perspective) giving an overall view of the year or month as well. The *Cone Tree* document organiser, is a similar to the Macintosh desktop, but with tree's leaves representing documents. As a branch or the trunk is rotated, new documents come into view.

The pursuit of virtual reality has, however, stimulated research in to other aspects of user interface technology. The NASA Ames Virtual Environment Workstation (*VIEW*) has experimented not only with goggles-and-gloves virtual reality but is pushing into speech recognition technology — a bottomless pit for research funding ever since the last big craze for Artificial Intelligence in the 60's. It is a simple but mistaken

Mediamatic 7 # 1



page 13

◆ assumption to make that if a computer could 'hear' a word then it can understand sentences like *write a report about last years sales figures*.

There are several difficulties in making a computer interpret the changes in air pressure that we call sounds, identifying the words, then in taking the words and interpreting the meaning behind them. Spoken and written text contain too many ambiguities that can only be resolved by context (a knowledge of the world). Given a limited artificial context it is possible to produce a computer with the sophistication of a dog in it's ability to respond to commands (SIT; ROLL OVER).

Current programs such as Articulate Systems Inc.'s *Voice Navigator II* respond to single commands which appear on the main menu such as NEW, SAVE. The central area for research is the attempt to interpret continuous (no need to pause between words) speech independently of the speaker. The long term goal of this kind of voice recognition system is phone-based user interfaces. While it would be difficult to do a drawing on such a computer, it would complete the alienation of telephone answering machines, airline reservation desks and sex chat lines.

The dataglove lends a hand crossing into the virtual world. By interpreting the relative position and movement of the gloves it is possible to determine what gesture the user is making. The virtual world could respond to this gesture or transmit it down a phone line. Currently, only simple gestures are interpreted; pointing in a virtual world by convention makes the VR user fly in the direction that the hand is pointing. The danger is that the stylised gestural conventions are held over into real life. Already there are reports of heavy VR users being unable to walk across the room with out pointing first.

Modifying Behaviour

Currently VR is a ghost world: touch something, and your hand passes through it. Force feedback

systems either restrain the hands movement or provide reactive force against the pressure applied. MIT Media Lab's Berth Marcus, Tskuba University and Florida University's John Studhammer have experimented with such force gloves and force joysticks. These force-feedback devices respond to the hand's movement with an opposite force of their own. As well as adding another sense to virtual reality, these devices will be built into tele-robots, allowing manual workers to work in an oil rig, space station or other hazardous environment from home, or so it is claimed. The ability to measure pressure has already been put to commercial use by tablet pen manufacturers such as Wacom Inc. to built digitising tablets which respond to pressure, like normal pens and brushes.

The logical extension of the sense of touch is, as Ted Nelson described, 'tele-dildonics'. *Though the marriage of virtual reality technology and telecommunications networks, you will be able to reach out and touch someone — or an entire population — in ways humans have never before experienced. Or so the scenario goes* (Howard Rheingold, *Virtual Reality*, Summit Books 1991). Although I have not heard of any research trying to make this a reality, it does elicit the greatest public interest in the potential of VR research.

While visual interfaces have been around for some time, ambient sound feedback is based on the observation that video game players score less when the sound is turned off. Sound is seen as an addition rather than a replacement to a window based user interface. We Interpret background sounds to help us make sense of our environment — which helps to explain why wearing a Walkman tends to make the listener feel more cut off from the world around them. NASA's VIEW project experimented with this, as did Apple's experimental sonic finder, an extension to the Mac's iconic file 'Finder'. When a file was selected, the Mac would play a slight thump sound with it's pitch changing according to the size of

the file selected. Similar sounds were played when icons were dragged, trashed or opened.

In the longer term, computers will be able to perceive users in order to further understand and modify their own behaviour. Nippon Telegraph and Telephone and Stanford University are building sensors which detect the user's brain waves. Processing the brainwaves would allow the user control, or at least let the computer guess, what command was coming next. By having a simple television camera attached to the computer it would be possible for computers to look at the face of the user and guess what emotional state (happy, sad, bored) the user was in. Again, the applications on the computer would have to be capable of modifying their behaviour to match the users state of mind.

The QWERTY typewriter keyboard was created in the 1890's, the arrangement of the keys being designed to slow typists down and stop the keys from jamming. Today, when typewriters and computers don't jam, we still live with the same, slow QWERTY layout. Bad design, like the command line interface of DOS, becomes ossified into the culture.

By creating a user interface based upon an interaction (choosing an item from a menu), images (windows, buttons) and symbols (find dog and replace with god), Kay opened up access to the machine for thinking with to a larger audience. Symbolically launched in 1984, the Mac removed the computer from the hands of the elite data processing managers to a larger audience. In doing so, it also increased the impact of computers on normal work culture. The development of machines like V.T and PenPoint show that the user interface is still evolving. The danger is that lack of debate, an acceptance that *that's what the computer wants*, will ultimately mean that QWERTY user interfaces will be fixed and restrictive in only a few years time. At least we are not pushing 32 switches any more.

Mediamatic 7 # 1



pagina 14



Mediamatic 7 # 1



page 15



Famous Artists School,

♦ *or: the hankering after a configured system for the Apple
and other rhetorical reflections*

Mediamatic 7 # 1



pagina 16

♦ In Mediamatic 6 #1, Paul Groot reported on his first experiences with a word processor and his struggle with the McHugh. As a sequel to these first impressions, he will review here MicroSoft's Word5 for Mackintosh, discuss the Windows' CD-ROM version of Iconclas Browser (Is each writer his own rhetorician?) and reveal the background to some of the poems from *config.sys.*, his own book of poetry which is soon to be published.

Famous Writer Tool



I

◆ The Word5 user processes texts. It is as if he writes a text whose realization primarily depends on the terms laid down by the programmer. The Word5 user does not write a text, but rather loses himself in the keyboard references and the menus. He is primarily the reader of a programme. It is irresistible to descend into the deeper spheres of keyboard and menus. The design and the editing of his own texts force him to submit to the stand-by syntax and commodity semantics included in the accessories, to resign himself to an overall grip on the material. Because how can he resist the electronic temptations of the keystroke which will land him in a major dictionary in a way he had always only thought possible in *Alice in Wonderland*?

The word processor replaced the East German typewriter, still only kept in play with needle and thread, which had mainly exerted its ideological ascendancy in the unnecessary amount of energy it took to operate the keys. Word5 brought the weight of levity. And Word5 on Apple's PowerBook has proved to be, above all, a precision mechanic of the mind. Only a concert pianist or a chess player can really master the subtle switches in the extensive supply of individual choices. An electronic sound box, a stringently fixed and consistently reacting electronic brain with a user-friendly mouse, a parasitical manipulator to make the pressing commands easy to swallow. Word5 provisionally crowns the word processor as a manipulator, an assailant, a representative of bad taste. The ideology of the free word wrapped up in the rational design of word processing, testing the methods of literary writing with the help of rhetorical commands and instructions. *Famous Artists School* became *Famous Writer Tools*.

II

In every Word5 user, there is a hidden opponent who thinks of himself as the devil's advocate. He looks up to the user of the MS DOS WordPerfect, the natural

counterpart of the Word5 in Apple PowerBook. WordPerfect in MS DOS has always ignored the aesthetic challenges, the submission of word to image has never happened there. WordPerfect, as an MS DOS sign-controlled method, does perhaps in the end deserve preference over Word5. Word5's GUI (Graphical User Interface) design is in fact the natural enemy of the ideal word processor, in that it navigates according to mouse commands instead of typed codes. WordPerfect allows the algorithmic sequences — products of logic and mathematical beauty — to be recalled textually, as if it was a musical score which you can play by heart after a bit of practice, something like an impromptu by Chopin or one of Sati's bagatelles. (The ideal dream image: zoom in from 1:1 to 1:16, a ramification which can be extended to the power of 16 in all directions.) What WordPerfect does not give in reality, it holds in potentiality. Those who only write in ASCII files, and have never mixed the BMP, CGM, DRW, PCX, PIC, TIFF, WMF or other graphic formats, have a totally different idea of word processing than that of a Word5 user. Reading techniques such as Cortazar's, in *Hopscotch*, in which the chapters are read in an order other than the printed one, an order determined by the reader himself, are a thorn in his flesh. However, the structure of Word5 also shows commitment to the characteristic textual principle. But because of the mouse-controlled operation, the user is fettered and intimidated by the compiled intelligence crowded into the programme.

III

How many years will it take before Word5 is cherished as a treasure of industrial archeology? As an artistic — even spiritual — cultural product which is as impossible to 'improve' as a wind symphony by Stravinsky? Will Word5 become the most characteristic word processor, in the same way as the art of novel writing, as a nineteenth-century invention, or the sonnet, as a renaissance technique, produced

their classic examples during those decisive periods? Or is Word5 just part of the range of graphic techniques succeeding each other in time? Once it becomes possible to make a connection between our thinking and what we now still call a computer, will the word processor become just one of a long range of obsolete techniques or, after all, a genre in itself? It is almost a curse! The ideology of Word5 is that of the CD (common denominator). With the mouse as the instrument of the illiterates, the pen that of the overly-pragmatic and the keyboard, with the help of a precise and manifest organization of hand-composing and tablature, strictly for the poets among us, whereby the enhanced aesthetics of the outline should take you directly to the sphere of the rhetoric. This path branches off via the commands and drifts into the finely nuanced roots with immediate access to spelling checks, freehand and all the other paraphernalia, thus adding a new chapter to the classic rules.

What, on the other hand, makes working in Word5 so alluring is the absence of a distinction between analyst and producer, between writer and operator, between critic and archivist. You are at the same time typist and archivist, *creative* writer and rhetorician. The conflict between form and fellow, between litterateur and programmer, is solved in an atmosphere where formal tradition vanishes into pathetic argument. The Word5 rhetorician is the Narcissus among his peers. Indexes, footnotes, glossaries; he always has his exegeses near at hand. The 'brilliance' of his texts now lies primarily in their design. Who would not turn green with envy at the computer's tablature? If only you could calculate and write as well as that! The envy you feel for Word5 is focused on the absolute superiority it presumes, the needs it suggests. Word5 fetters you, charms you, and lures you into believing that your texts do indeed need all that rhetorical and scientific paraphernalia it has to offer. But how much does this

Mediamatic 7 # 1



page 17

♦ require in poetic powers of expression?

The Word5 user is trapped, he knows he is caught in a hierarchical system, from the spelling check to Dewey's decimal book systematics. Those who have tasted the Word know that they are no longer just entering a text, but are also committing themselves to producing a document with an ISBN number. The notation condemns them to be the producer of a range of digitals. Letters and words immediately have a textual correlation, before even assuming their literary or associative meaning. There is no word, either as such or broken down into letters, that does not assume a descriptive meaning. The writer probes deeply into tree diagrams. He categorizes what he has written, sets up a notation system, indexes his vocabulary with prefixes and suffixes, and arranges the levels on which he moves, however arbitrarily. A text, a chapter, an article, manifests itself as a *file*, which in turn is unthinkable without the background of a *spreadsheet*, to be consulted for support at essential moments.

Thus, Microsoft has ideologically determined the user's text productions. The choice of a letter, the punctuation, spacing, font, varies with the mood of the moment. A direct confrontation on the screen makes it impossible to write a text which is not a *file*, which is not permeated with the smell of the place in the hierarchy of the project manager, who does not worry about the number of bits it takes. And all this despite your awareness that, for all the scaremongering, in this seemingly orderless anarchy it rarely happens that something disappears from your hard disc.

IV

Still, Word5 cannot and should not be rejected as a mechanical protuberance just like that. Because, more than being only rhetorical in character, this programme eventually proves itself capable of self-perception, with activities reminiscent of a narcissistic reflection. Writing means generating electronic

documents, a question of hyper-textualizing, iconizing, outlining, indexing, algorithmic structuring, Boolean operating, calculating machinations. Instructions which immediately show the mathematical and mechanical metaphor. Hypertext inverted. Blame it on Word5.

And indeed, what adventures lie ahead of the Word5 user if he unexpectedly finds himself in the complementary Iconclax Browser?.. He will read about an Iconographic classification, with a systematic arrangement of themes, motifs and symbols from art history and will become immersed in the collections, coded in great detail. While he was used to plodding his way systematically through card-index systems, he now has, available on desk top, the iconographic unveiling of all images and themes from the Western visual arts. No longer does he classify extensive verbal descriptions of the individual representations; he lets himself be referred systematically to alphanumeric codes and hierarchically arranged descriptions. Nine main themes split up the image motifs into an infinite number of levels and sub-categories. There are 23,000 image motifs to be found. He reads that it is intended to disclose less extensive, but coherent collections. The user sinks into these and disappears into a labyrinthine universe. He has finally escaped from the power of the GUI, a sort of children's drawing book with an infantile user-friendliness, meant for word processing 'word processors' who have unconditionally resigned themselves to the limitations of their own handwriting. Now he has penetrated a verbally systematic framework. The windows conquered, he explores art history at a textual level. He navigates the nine-fold tree diagram, a journey which he begins, for example in
2 nature
continues in
20 'natura' [allegorical figure or scene]
branches off to

26 meteorological phenomena,
and finally, via the detours
26c winds
26c3 storm
26c35 whirlwind, cyclone, hurricane,
typhoon, tornado
ends up in
26c352 cyclone at sea.

Each writer is not only his own designer, but also his own rhetorician. How insensitive could he be, not to be astonished, time and again, to see his texts set in the most beautiful fonts, returning from his self-produced
26c3523 the eye of the cyclone?

And how intelligent do you have to be, not to succumb to this challenge of calligraphic allure? Who can still believe that Wittgenstein could have written the *Tractatus Philosophicus*, or Spinoza the *Ethica* without the help of Word5?

This Hypertext communication with an outside world turns out to be suitable for communication with your own brain as well. A connective structure of outlines, indexes, word counts, displays a layout whereby writing turns into word processing, intuition into organization. The writer as the spectator at the production of his own texts.

V

And so the computer languages penetrate the poetic Space. CONFIG.SYS. [the book] reflects the beauty of the computer languages in formulations based on algorithms and mathematical formulas. In the same way as Homer, in his *Iliad and Odyssey*, sings the praises of the Heroes of Troy, as contemporary poets recognize the modern consumer society or reflect the influence of logical positivism, so CONFIG.SYS. [the book] sings the praises of the Computer Languages.

The poem processor processes a language which now, for the first time, becomes aware of the concept of poetry. The Homeric simile (mentioned for the last time in Harry Mulish's *The Assault: It is as if he wanted to say that the entire existence is a simile of another story, and that it is a question of finding out what that other story is about.*) is suddenly revived and, as a result



♦ of its rhetorical process, returns victoriously in *CONFIG.SYS*. [the book]. The outline forces you into the widths and the depths, shows you levels which take you even deeper (wider, higher) than the classical similes. For example, if the improvisatorily used combination of *find* and *change*, followed by a system error, upsets the carefully structured outline, if the original algorithm turns out to be lost, if a collection of ingenious macros disappears, if a strange layout emerges, then the poetic plot protrudes. *CONFIG.SYS*. [the system] is a poetry analyst, too. Select Leopold's *Cheops* and see what happens.

The poetry in *CONFIG.SYS*. [the book] is at an experimental stage of development. Images which come into a communication of machine languages are subsequently forced to function within a mental space focused on meditation and self-reflection, and then adjust to a narcissistic self-reflection. Although in flat contradiction to the communicative function of the artificial languages, these formulas can be loaded and burdened with a consciousness of our own past and future. The empty space of the aesthetic vacuum crowded with, albeit empty, but still significant meanings. *CONFIG.SYS*. [the book] deals with the structure as the content, a structure as a content in disguise, a content which disappears under the tyranny of the form. Isolated from the software programme, the logical construction of this newly developed rhetoric is able to transform every evocative suggestion into a structural abstraction. *CONFIG.SYS*. [the book] is a poetic mechanism filled with abstract meanings, which has no concrete content. Like a mirror-image blackbox, it processes primarily self-produced signals which circulate in networks and self-made collections. However, in parallel with logic and mathematics, it is capable of communicating with other poetic networks. By means of paradoxes, a-logical reasoning and absurd conclusions, it generates a binding structure of its own.

translation OLIVIER/WYLIE

```

CONFIG.SYS
Chicago 12
I. Envy
  [input N]
  X: = 0;
  for Y from 1 to N do
  X: = X+Y
  end; output X.]
-----
II. Coitus
  [X = pos(0) (span('A') @N span(notany('AB')))]
  +pos(*(2 * N)) rpos(*N) span('B') rpos(0))]
  L+ TEXT = :input
  :f(END)
  + TEKSTX
  :f(BAD)
  + output = 'THE ENTRY IS OK'+(L)
  BAD+ output = 'THE ENTRY IS BAD'+ :(L)
  END]
-----
III. Self-generated
  [- FIB N
  [1] A^11
  [2] A2 x N>rA^A, + G2 #A -]
-----
IV. Tortoise
  [?- PRESS([m,[o,p],[[i,p,r],o,[l,p],g],X])]
-----
V. Finite Forms
  [ZP = 90° - f; ZG = 90° - h; PG = 90° - a
  -PZG = 180° - a; -ZPG = t]
-----
VI. Oblivion is for ever
  [type colour = (blue, red, purple, brown, yellow);
  type colour chart = set of colours;
  type day = 1..365]
-----
VII. Now that I open the window
  function signLoc charposition -- gives square upon
  character position
  global gridOriginH,gridOriginV,gridSize,
  gridColumns,gridRows,SignSquare,Signcenter
  put item 1 of charposition into charposH
  put item 2 of charposition into charposV
  put gridOriginH + (charposH) * gridSize into TopLeftH
  put gridOriginV + (charposV) * gridSize into TopLeftV
  put gridOriginH + (charposH+1) * gridSize into BottomRightH
  put gridOriginV + (charposV+1) * gridSize into BottomRightV
  put TopLeftH & ", "& TopLeftV & ", "& BottomRightH & ", "&
  BottomRightV into SignSquare
  put (TopLeftH + (gridSize / 2)) & ", "& (TopLeftV +
  (gridSize / 2)) into signCenter
  return signSquare
end signLoc

```

Pagina 1 kopregel 1

Mediamatic 7 # 1



page 19





Mediamatic 7 # 1



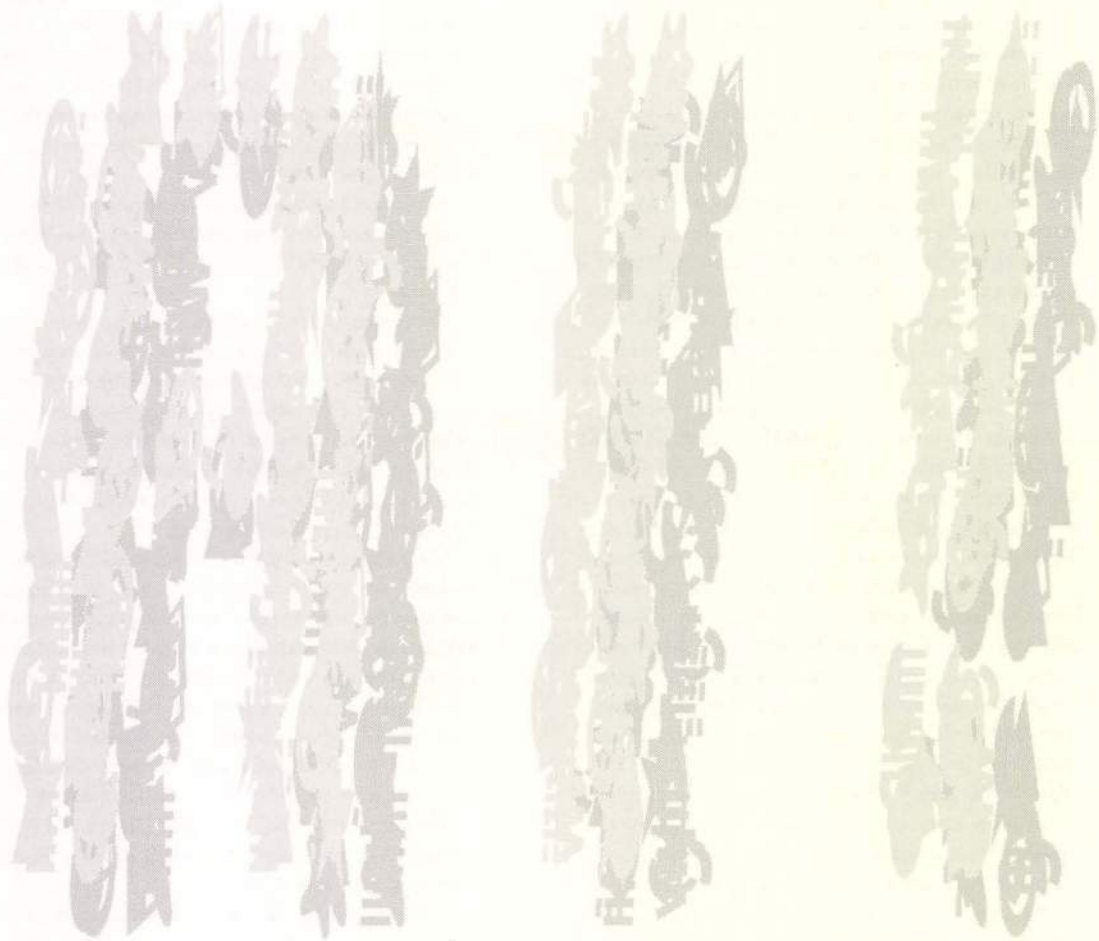
pagina 20



◆ In more religious times, people worried that art's imitation of nature carried a disruptive presumption of man playing at God.

Computers playing at man is the modern dilemma, and in a Godless age, where artists become the fount of spirituality, replicating the artist's actions is the new heresy. If computers can create beauty, perhaps we'd better find faith in God again.

PAUL FISHER *The Guardian*



Mediamatic 7 # 1



page 21

◆ It sometimes feels as if everything is up for grabs in the crazy, fin de siècle postmodern-cyberchips-with-everything world of today. There's nothing to count on, nothing you can wave above your head and say *I believe in this*. Maybe this is how it should be, after all. Even the casual observer of our post-religious times must be starting to cotton on by now that old distinctions between real/unreal, alive/not alive, natural/artificial and so on, right up up to good/evil can not be applied in a world of cryogenics, biotechnology, nanotechnology, instant communication, quantum physics. Time to shake the bag and try a new combination.

O

Present

1 See Bert Mulder's review of J.P. Bischoff's *Versuch einer Geschichte der Rechenmaschine*.

2 So called because their operation is based on the method of finite differences used by contemporary human 'computers' in the preparation of mathematical tables.

3 The British Science Museum built Difference Engine No. 2 last year out of 4,000 iron, steel and gun metal parts. It weighs 3 tonnes and calculates 7th order polynomials to 30 decimal places, analogically, by cranking a handle.

Mediamatic 7 # 1



pagina 22

4 Whose father, Lord Byron, was coincidentally present the night Mary Shelley conceived her Frankenstein myth.

5 Turing believed this was because he was gay, and wrote a syllogism expressing this belief shortly before killing himself: *Turing thinks machines could think. Turing lies with men. Therefore machines can not think.*

◆ We can all name names — Spinoza's posthumously-published shock-horror claim three centuries ago that it was possible to devise a scientific psychology fully consistent with our knowledge of how the body works, an idea which started the man-as-machine bandwagon; Newton, for giving us the mathematical and conceptual basis for the Western science which made so much of this possible; Darwin, for kicking away the crutch of religion, or Freud for forcing us to realise that maybe the rational mind was not all it was cracked up to be after all. But pointing a finger at the past solves no present dilemmas. There's no go going back to a pre-relative world, no option but to just keep peeling away the layers to see what's (in and out) there.

We have long become used to our machines outstripping us in many departments, including ones once important to the survival of the individual and held in great esteem by society, such as strength, speed, stamina and more recently, calculating ability. But the idea that a computer might equal or even overtake us in the capacities of the mind, might become creative, is seen by many as a threat, an outrage, even a blasphemy. Acting like a magnifying glass, focussing and concentrating the technical and philosophical issues, lies artificial intelligence (AI), the most *personal* attack on traditional definitions of humanity.

Both lay people — AI has always had the power to incite popular media interest with *Electric Brain Will Rule World*-type headlines — and academics alike have criticised the development of AI as fundamentally misguided, dehumanising and ideologically pernicious, undermining human agency and responsibility and presenting a travesty of human potential. Scepticism and mockery are now commonly accompanied by fears that if we allow humanity image to be moulded in the likeness of a computer, human values must take second place or even be negated altogether. The deepest anxiety is that such theories and technologies will impoverish our image of ourselves and increase the individual's sense of helplessness in the face of life's challenges. If we are *nothing but machines*, then the social practices and personal attitudes which value our specifically human qualities must be sentimental illusions. If our minds are *nothing but computers*, what then?

But paradoxically, AI is currently helping some thinkers investigate how such mental processes as purpose and subjectivity are possible. AI's main achievement is precisely that it forces us to appreciate the enormous subtlety of the human mind. Computer models have allowed the simplistic theories of the mind, language and perception to be trashed. In fact it wasn't until these theories were attempted to be applied to computers that we realised how oversimplified they were, and at the same time that it was not our ability to play chess schedule industrial processes and calculate pi to a thousand places that was so remarkable, but the simple skills we all have like interpreting a wink across a table from a friend, walking across a crowded room without bumping into anyone, recognising 100 different designs of chair as *chairs* and learning to speak without being told the rules of grammar.

Antecedents of the computer date back to the 17th century, when Leibniz (*the patron saint of cybernetics*, Norbert Weiner called him) and Pascal designed

arithmetic machines.¹ AI's antecedents go back even further: the dream of sexless reproduction or artificial consciousness can be seen in the ancient Greek myth of Pygmalion and Galatea; the alchemists' homunculus and the Golem of Jewish Kaballa fame.

Leaving the fairy stories behind, in the 1840s Charles Babbage designed his Difference Engines² based on the more dependable (but equally obscure to the uninitiated) Kaballa of mathematical integration. Neither these nor his later Analytic Engine were built because of the limitations of Victorian mechanical engineering³, but the latter would have been the first programmable mechanical computer — and would have been programmed by Lady Ada Lovelace⁴, who predicted that the Analytical Engine would be able to act on other things besides number, *were objects found whose mutual fundamental relations could be expressed by those of the abstract science of operations (...)* such as those between *pitched sounds in the science of harmony and of musical composition (...)* the engine might *compose elaborate and scientific pieces of music of any degree of complexity or extent* (B. Toole, *Ada, the Enchantress of Numbers*).

The modern search for AI began in 1950, when Cambridge mathematician and wartime cryptographer Alan Turing published a popular reworking of the core concepts he had first outlined in 1936, claiming that computers could — and by 2000, would — imitate human intelligence perfectly. He devised and gave his name to a (purely behavioural) test for establishing whether this had been accomplished.

The initial reaction in England was to scoff⁵, but the academics soon got over this and the search for AI began at what seemed the most obvious starting point: design a computer modelled on the brain. Simple, transistor-based learning networks were built in the 50s, but neither the technology nor the theory were sufficiently developed to get anywhere. General purpose (Von Neuman) logic machines had arrived on the scene, and seemed to offer greater scope. By the end of the decade, the question *Could a computer think* had been rephrased to *Could a machine that manipulated physical symbols according to structure-sensitive rules think?*

At the time there were good reasons for believing yes. Church's Thesis that *every effectively computable function is recursively computable* and Turing's demonstration that any recursively computable function can be computed in finite time by a maximally simple sort of symbol manipulating device (known as a Universal Turing Machine). Together, these ideas mean that a digital computer, given only the right program, a large enough memory and sufficient time, can compute any rule-governed input-output function. In other words, it can display any systematic pattern of responses to the environment whatsoever, and therefore a suitably programmed computer would be able to pass the (purely behavioural) Turing Test for conscious intelligence. The only problem left was to identify the complex function of response to environment and then write the program (the set of recursively applicable rules) by which the symbol manipulating machine will compute it. These goals became the kernel of the *classical* or *hard* AI research program.

◆ Protestations from psychology labs and philosophy seminar rooms that digital computers were not very 'brain-like' were brushed aside with the theoretically appealing notion that the physical machine has nothing to do with what functions it computes; what you can compute doesn't depend on what you're made of, meat or silicon.⁶ Secondly, according to Turing's Principle of Equivalence, the details of any machine's functional architecture (the actual layout of the circuits) is also irrelevant. These points were the full rationale behind Hard AI, and its proponents (still) believe that it's only a matter of time before computers will do everything a mind can do. Mental activity, they claim, is simply the carrying out of some well-defined sequence of operations (an algorithm). The difference between a brain, including all its higher activities, and a thermostat is simply a degree of algorithmic complexity. Careers have been built on this assumption and its corollary: that when that algorithm is found, it will be runnable on a computer.

In its most extreme form, writers like Hans Moravíc (*Mind Children*) have used Turing's Principle of Equivalence to claim that as the specific hardware is unimportant, then software is all important. *What is our identity?* they ask. It's not the particular constellation of atoms at time *x*: we are replaced several times over through life. It's the *pattern* that's important. They claim that just as the words on a word processor can be saved on disk and reopened in the future exactly the same, so a person's individuality could be encoded in a similar form — indeed, the person's sense of awareness would travel with them into the disk.

These claims are reliant on the presumption that the brain is a digital computer and that no specific physical phenomena are being called upon when one thinks that might demand the particular physical structure the brains have — presumptions that in the last few years have been seriously challenged.

Now the Bad News

Back in the 60s, the initial results had looked good: computers were programmed to do all sorts of smart things like play chess, engage in simple dialogue, solve algebraic problems and so on. Performances continually improved as machines got bigger, faster and used longer, more complex programs. These rule-based systems consisted of a database of knowledge, often extracted or *engineered* from a human expert, plus a management system to apply these rules.

But many of the things researchers most wanted to do with AI — artificial vision, speech synthesis, automatic machine translation — proved almost completely impossible. In 1972, philosopher Hubert Dreyfus argued that the pattern of failure suggested computers were missing the vast treasure store of experience or inarticulate background knowledge that all humans have. MIT's AI guru Marvin Minsky came to appreciate this when he tried to build a block-stacking robot: it kept trying to stack the blocks from the top down, repeatedly releasing them in mid air. No-one had told it about gravity.

The experience, according to Minsky, changed his views of what 'intelligence' was. The secret of our success, he claimed, is not some spark of creativity but the simple common sense we pick up in our daily existence.

For computers to be intelligent, the argument now went, they would have to be educated from the ground up.

This is what Doug Lenat is trying to do in Austin, Texas. He's building a database of common sense knowledge. The Cyc (*encyclopedia*) Project aims to write down as much as possible of what every child knows, taking newspaper clippings and encyclopedia entries and asking 'what a computer would need to know to understand the piece?' For example, to understand *The man drank the beer in the glass*, it would not only have to know what *beer* and *glass* were (and distinguish this from the glass in a window), and that to be drunk out of, a glass must have its open end pointing up for the beer to stay in, and so on. Lenat estimates he will need a *few million* entries to approximate everyday knowledge (compared to an estimated 20,000 pieces of knowledge needed for an expert system to encapsulate everything a law student learns in three years).

But work on vision in the late 70s and early 80s showed processing to be hugely intensive and taking much more time than any biological system. Despite a computer being a million times faster than a nerve and clock frequencies being many times more rapid than any signal picked up by the brain, the tortoise still outran the hare. Constructing a relevant knowledge base is hard enough; accessing the contextually relevant bits gets harder as the database gets bigger.

The strong AI researchers admit that more than a database is needed to think like a human. What is needed is what Minsky calls a Society of Mind. He illustrates what he means by looking at vision. What makes human vision so versatile is the many ways we have of interpreting a visual scene and the fact that we can use them all at once: to tell how far an object is away we may process its apparent size, brightness, the shadows it casts, its parallax motion and a dozen other visual clues. Although no method works all the time, at least one works. Programmes already exist that allow computers to use one — but only one — of them at a time. He speculates that we may be able to make an expert system which uses them all, but this is impossible until we have a program that allows each expert to access the body of knowledge of the others — and we don't know how humans do this yet.

Back to Networks

Hard AI also came under attack from other directions in the 80s. Philosopher John Searle came up with his Chinese Room thought experiment. He cited examples of how simplified versions of the Turing test had already been passed, but denied that this indicates the possession of understanding, that appropriate symbol manipulation by recursive rules represents conscious intelligence. He imagined himself locked in a room, doing all the calculations himself on pen and paper to run the test-passing algorithm. Equipped with an instruction manual in English giving him all the information he needs to run the algorithm, problems are fed into the room in Chinese. He manipulates them according to his rule book and posts the answer back, in Chinese. Does he understand Chinese? The consensus is that he doesn't (*Scientific American*, Jan 1990).

6 The point had been made through the 60s that thinking was a non-material process in an immaterial soul — but it had little impact on AI research, having no evolutionary or explanatory mechanism behind it. It didn't fit in with the logical positivistic world view then dominant that *science was all*.

7 Besides the dreams of fighting robots and pilotless planes, their main goal was automated translation of Russian technical

Mediamatic 7 # 1



page 23

journals and radio broadcasts into English. With the end of the Cold War, expect to more and more talk about the AI Gap with Japan, which has taken on the role of stick-with-which-to-beat dollars-out-of-Congress-with. In 1988, a leading neural net researcher for the government called neural nets *more important than the atom bomb*.

8 See *Apprentices of Wonder — Inside the Neural Network Revolution*, by William Allman for an excellent introduction to connectionism and more details of these and other important developments.

9 *Business Week* estimates that knowledge of how manufactured goods are built and work amounts to 70% of development costs, rising to 90% in the service industry. If such knowledge can be encapsulated in programs, that knowledge could be *leveraged to the hilt*, as they put it.

10 Being a technology which captures the imagination of poets and philosophers and in doing so helps redefine how an age sees itself and how we resolve the dichotomies of life / death etc, rather as the steam engine in the Industrial Revolution, the clock in the Renaissance and the potter's wheel in ancient Greece did.

Mediamatic 7 # 1



pagina 24

11 William Gibson's *Swarm* trilogy (*Neuromancer*, *Count Zero* and *Mona Lisa Overdrive*), introduces a number of identifiable AI types: the artificial (electronic) consciousness of the fused elements of cyberspace (*Wintermute* / *Neuromancer*) is a vast artificial consciousness similar to models suggested by connectionism: create a net big enough and fill it with enough information and consciousness will spontaneously develop as an emergent property of a dynamic system.

The (steam driven) conscious AI narrator of

♦ Searle argued that the difference between brains (which can have a mind) and computers (which can't) lies in the material construction of each, and this assumption led in the mid-80s to a resurgence of interest in artificial neural networks — computers modelled on the wiring of the brain.

Neural nets had been around before until Minsky and Papert's book *Perceptrons* appeared to demolish their theoretical base, just as the US military was making hundreds of millions of dollars available for conventional expert system research.⁷ But modification of the theory and new research into the brain's biology has convinced increasing numbers of researchers that neural nets are the way forward. Firstly, nervous systems are massively parallel. The retina, for example, processes its whole input of around 1 million distinct signals arriving at the optic nerve *at once*, not 16 or 32 bits at a time. Secondly, neurons are comparatively simple and analog — i.e. their output varies with their input — not digital. Also, axons (the 'wire' part of a nerve cell) from one cell to another often have a complementary axon returning, which allows the brain to modulate its activity as a genuine dynamic system whose continuing behaviour is to some extent independent of the outside.

Moreover, the brain wiring is immensely more complicated than that of a computer. An important difference is that logic gates have few in-outs, but nerve cells may have 80,000 excitatory synaptic endings, which are not fixed, as in a computer, but changing all the time (there's evidence that changes in synaptic organisation can occur in a matter of seconds). This brain plasticity is probably responsible for laying down memories, so it can be seen as an essential feature. If the brain is a computer, it's a permanently changing one.

Artificial neural nets turn out to be very good at things conventional computers are not, such as pattern recognition, learning, tolerance of faults, storing large amounts of information in a distributed fashion (thanks to its specific synaptic configuration strengths being shaped by past learning).

Recent work by connectionists (as neural network fans are called) looks very promising. Carver Mead at Caltech has used *vlsi* (Very Large Scale Integration) chips to make an artificial cochlea and retina. These are not simulations, but real information-processing units responding in real time to real light and sound. The circuitry of the chips is based on known anatomy and physiology (of a cat) and output is dramatically similar to their biological counterparts. Terry Sejnowski developed a network called *NET-talk*, linked it to a speech synthesizer so that its output could be listened to while it learned to read out loud. Starting by producing a formless noise for a few hours, the net eventually starts to babble like a baby, and overnight training improved its performance to 95% accuracy — far better than any conventional AI has managed. Intriguingly, it made the same mistakes (such as over-generalisation of rules) that children make when they learn to read.⁸ Finally, Carnegie Mellon University's *ALVINN* (Autonomous Land vehicle in a Neural Network) uses four Sun workstations to process incoming video signals and compares them to thousands of stored images. It knows to brake for a person, swerve round dog and

keep off the pavement, and set a driverless speed record of 55MPH over a 21-mile trip. Its primary use, of course, is intended to be military, but it's also intended as some sort of 'ultimate cruise control' or robo-mailman.

The drawbacks of neural nets are their slow and limited training, usually needing thousands of trial-and-error attempts. As for replicating human intelligence, neural nets' results are more like habits than insights. In spite of this, many critics of Hard AI accept that an artificial intelligence may be developed by exploiting what is learned about the nervous system, if this artificial mind has all the causal powers relevant to conscious intelligence — which brings us back to square one: more empirical studies are needed into the neuronal basis for memory, emotion and learning, plus how these interact with the motor system.

Creativity

Margaret Boden (*The Creative Mind*) challenges those who think AI can't teach us much about distinctly human processes like imagination and creativity. She too believes connectionism may give us the first significant ideas on how analogical thinking and generalisation occur in the mind. Her point is not that computers can be creative, but that there are aspects of human creativity which we can begin to understand through the attempts to build computer models of creativity. This involves the exploration and transformation of conceptual spaces, and the notion and structure of a conceptual space — as well as its various possible transformations — can be described using computational concepts.

Recently, several programs have been written which appear to create. *Jazz Improviser* which can, surprise, do jazz improvisations (well enough to probably pass the Turing Test); *Lawyers for the estate of deceased American fiction writer Jaqueline Susann* are suing the author of a program which writes original stories in her style; *Aaron*, a program (written by human artist Harold Cohen) consisting of a few hundred rules on artistic style has generated thousands of different drawings, some of them exhibited in the Tate and other galleries.

Are they creative? No more than painting-by-numbers is, or following a knitting pattern. Regarding *Aaron*, Boden says since all the drawings could have been done before with the same program, it's more like an artist who's found a style and is sticking with it. A truly creative artistic program would be able to say *I'm bored with this, I'll try drawing limb parts as straight-sided geometrical figures and see what happens*. The program would need a way of reflecting on its own knowledge and would have to be able to construct, inspect and change various maps of its mind. The point is that by their failings, such programs teach us more about human creativity. Genuine creativity requires a break with or transformation of what has gone before, and therefore some conception not only of what has gone before, but of the outer context (technological, social political, etc) in which work is being created.

The question of what intelligence and creativity is is subsidiary to that of *what is consciousness*, since (unless researchers can show us otherwise), the former cannot be present without the latter. Physicist David Penrose (*The*

◆ *Emperor's New Mind*, *ovp* argues that there's an essentially non-algorithmic ingredient to consciousness. In direct opposition to our century's assumptions about the mind, it is the mysterious black box of the unconscious that may well be governed by (horrendously complex) algorithms, but it is the conscious, aware 'me' — what AI researchers have been formally studying as the rational and therefore translucent part of the brain — which is in fact the non-algorithmic, mysterious side. Penrose claims that given our brains are the result of natural selection, there must be some advantage to having a consciousness, and that is our ability to form instant judgements about fresh information (and determine its *truth* or *beauty*). Even mathematics, he points out, simply communicates those truths and to claim that the algorithm for consciousness would itself be conscious is nonsense.

Synthetic or Applied Intelligence

Whether computers could ever think like humans is still a rather rarefied question. Getting the last 10% of verisimilitude may be of only theoretical interest and likely to be mega-expensive. The biggest impact of AI is likely to be in the middle ground between the theoretical and conventional applications of computers with what has been termed *applied* intelligence. This uses case-based reasoning (as opposed to rule-based), which draws inferences from thousands of actual experiences. It is this pragmatic strand of AI which will have the most impact in the coming years, both economically⁹ and socially.

It's an idea put forward by David Bolter in *Turing's Man*. Bolter — a classicist — argues that the computer, as a defining technology of our age¹⁰, is changing the way we think about time, space, humanity, history — everything. To be a Turing's Man (the up-to-date phrase would be something akin to Tim Leary's *cybernaut*), you don't have to agree with the Hard AI position (or be a man), merely work intimately and for extended periods of time with a computer. In doing so, new metaphors and ways of seeing suggested by the computer become internalised. Thus modified and at ease with our new silicon partners, we will be free to enter a new age — the age of synthetic intelligence.

What will this mean for our concepts of reality and illusion; of what it means to be alive or dead? to be conscious or immortal? These terms in previous ages had been pure abstractions whose existence was tied to matters of semiotics and definition. Despite their huge psychological resonance, such discussions had little practical relevance until we developed the technology to keep brain dead bodies alive, replace body parts with artificial prostheses and develop AI systems that simulate features of human consciousness.

To answer, we have to look at AI as part of a western science which functions within a set of conceptual parameters that are largely set by corporate, governmental, military and scientific institutions. No formal means exists by which ordinary people can debate or even discuss the pros and cons of what is happening. We are suffering (or just waking up from) what Langdon Winner calls *technological somnambulism*, *Our willing sleepwalk through the process for reconstituting the conditions of human existence*.

With each new generation of technology, we have fewer alternatives and become more immersed in technological consciousness. As Jerry Mander said in *Whole Earth Review* (Spring 1992): *Living constantly inside an environment of our own invention, reacting solely to things we ourselves have created, we are essentially living inside our own minds. Where evolution was once an interactive process between humans and the natural, unmediated world, it is now an interaction between humans and our own artifacts. We are essentially co-evolving with ourselves in a weird kind of intraspecies incest.* What kind of world are we building here? What qualities of social, moral and political life do we create in the process, and will this world be friendly to human sociability or not?

Heidegger predicted in 1956 that we may finally find a synthesis of the apparently irreconcilable dialectic between mechanism and meaning by literature revealing technology's essence, its power to enframe the phenomenal universe within structures of utility: *Because the essence of technology is nothing technological but rather is a way of viewing the world, essential reflection upon technology and decisive confrontation with it must happen in a realm that is on the one hand akin to the essence of technology and on the other fundamentally different from it — i.e., art.*

So far, most essential artistic reflection about AI and the other major epistemological/technological issues has come from cyberpunk fiction, film and criticism.¹¹ Partly because of the huge technological knowledge that is required to make sense of them, partly because it is science fiction's generic task to *explore the cognitive mapping and poetic configuration of social relations as these are constituted by new technological modes of being-in-the-world* (Vivian Sobchack).

But the spectre haunting cyberpunk is the uneasy recognition that our primal urge to replicate our consciousness and physical being (into images, words, machine replicants, computer code) is not leading us closer to the dream of immortality, but is creating merely a pathetic parody, a simulacrum of our essences that is supplanting us, taking over our physical space and our roles without the drawbacks of human error, emotions, the passions that make life so exhilarating and frightening.

Penrose makes a similar point: either artificial consciousness is impossible, or we will eventually discover what is responsible for consciousness, in which case we will probably try and replicate it. Such an artificial consciousness would have a tremendous advantage over us in being designed specifically for consciousness, and not simply the high point of some messy evolutionary past. Unencumbered by the useless bits of baggage we carry around (like emotions) and built whole rather than grown from a single cell, they might supersede humans.

On the other hand, he says, maybe there's more to consciousness than that, and all the 'evolutionary luggage' is a prerequisite. On the fringes of neo-Darwinism, there is an increasing admission that there does in fact seem to be *something too perfect about evolution for blind chance to be solely responsible, that there's an apparent 'groping' towards some future purpose* (Penrose).

The search for artificial intelligence will inevitably become synonymous with the search for humanity and God. If technology took them away from us, only an analysis of technology can give them back.

The Difference Engine represents the same principle and illustrates the equivalence of Turing machine's principle. The idea of a digitised human intelligence maintaining its sense of identity after transferal to a computer is illustrated by the Finn character, while Case's human intelligence was augmented with discreet, intelligent programs such as that which enabled him to speak Spanish. Putting many of these programs together created the more sophisticated intelligent agent, like the hand held electronic amanuensis used by Komiko in *Mona Lisa*.

A selection of AI in film includes the humans-

Mediamatic 7 # 1



page 25

create-machine-smarter-than-themselves (2001: *A Space Odyssey*, 1968. Evil machine runs amok because, the 1984 sequel informs us, of the imperfection of its original program); computer links up to everything else and takes over the world (*Colossus: The Forbin Project*, 1970); expert system for controlling defence, fitted with voice recognition (*War Games*, 1983); neural network brain gradually learns to become more like a human (*Terminator 2*, 1991). The best popular TV handling the topics are probably *Star Trek: the Next Generation* and *Red Dwarf*.



Mediamatic 7 # 1

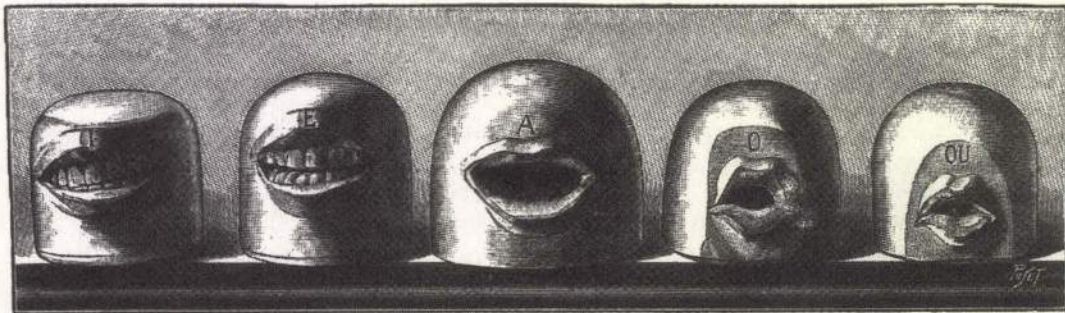


pagina 26



Virtual Voices

Mimesis



Mediamatic 7 # 1



page 27

Het is opvallend dat de digitale mediatechnologieën die nu ontwikkeld worden vaak een *nabootsend* karakter hebben.

Misschien zal straks de twintigste eeuw geboekstaafd staan als de eeuw van de abstractie, en de nu op handen zijnde eeuwwisseling als het moment van de terugkeer naar een mimetische esthetiek. De nabootsing van de natuur is weer een alom nagestreefd artistiek ideaal.

♦ The new digital media technologies which are now being developed are often *imitative* technologies. Future generations may end up viewing the twentieth century as the century of abstraction, and the now imminent turn of the century as the moment of a return to a mimetic aesthetics. The imitation of nature is once again a widely pursued artistic ideal. Sometimes this concerns the imitation, not of the way things look, but of the processes that constitute life, body, or mind.



Soms gaat het daarbij om nabootsing, niet van hoe de dingen eruit zien, maar van de processen die het leven, het lichaam, en de geest constitueren. Mimesis heet dan *artificial life*, *robotica*, of *artificial intelligence*. In andere gevallen gaat het om het klassieke ideaal van de perfecte simulatie van de oppervlakte van de dingen. Dan heet het *ray tracing*, *paintbox*, *digital photography*, *virtual reality*.

Muziek bevindt zich in het spanningsveld tussen mathematische abstractie en pure fysica. Nabootsing is daar niet aan de orde, zou je misschien denken, maar niets is minder waar. Na het mislukken van de 'echte' elektronische muziek, die met sinussen, blokgolven, ruis, en modulatoren geluidssculpturen bouwde waar niemand naar wil luisteren, is er nu een geweldige opbloei van digitale elektronische technologieën waarmee het geluid van conventionele instrumenten zeer gedetailleerd wordt gesimuleerd, en oproepbaar gemaakt voor keyboards en computers met MIDI-interfaces.

Een nabootsende technologie die door zijn toepassingsmogelijkheden nauw aansluit bij de muziek, is de kunstmatige spraaksynthese. Maar door zijn relatie met de taal heeft dit medium toch ook weer een heel eigen karakter. Dit artikel is gewijd aan de geschiedenis, de techniek en de esthetiek van dit medium.

Stem

Taal is een kwestie van symbolen. Conceptualisering en abstractie van de menselijke ervaring.

Muziek is een kwestie van fysica. Niet zozeer omdat muziek door middel van geluid gerealiseerd wordt, maar vooral omdat juist de structurele eigenschappen van muziek (zoals metrum, ritme, harmonie, melodie) uit fysische verschijnselen voortkomen.

Tussen taal en geluid: het spreken. Tussen geest en materie: de stem.

Roland Barthes: *Listen to a Russian bass (...): something is there, manifest and persistent (you only hear that), which is past (or previous to) the meaning of the words, of their form (the litany), of the melisma, and even of the style of the performance: something which is directly the singer's body, brought by one and the same movement to your ear from the depth of the body's cavities, the muscles, the membranes, the cartilage, and from the depths of the Slavonic language, as if a single skin lined the performer's inner flesh and the music he sings.*¹

Namaken/Voorspiegelen

In de stemnabootsingstechnologie kunnen twee benaderingswijzen worden onderscheiden: de *genetische* en de *gennematische*. De genetische benadering is gebaseerd op de imitatie van het ontstaansproces van de spraakklanken in de menselijke fysiologie. De gennematische is gebaseerd op de analyse van de spraakklanken zelf, en reconstrueert die klanken zonder daarbij acht te slaan op de manier waarop het menselijk lichaam ze voortbrengt.

In de achttiende eeuw reeds werden er sprekende machines geconstrueerd volgens het genetische principe: de *hardware* van strottehoofd en mondholte werd in een gestyleerde versie nagebouwd. Naarmate zo'n mechanisch systeem meer lijkt op het geïmiteerde voorbeeld, vertonen de geluiden die het produceert, zoals je zou verwachten, een betere gelijkenis met menselijke spraakklanken.

In de twintigste eeuw zien we een heel andere benadering: digitale technologie die de vorm van geluidssignalen *uitrekent* en dan via luidsprekers ten gehore brengt. De stem wordt nu niet nagemaat maar voorgespiegeld. Het algoritme tovert aan de luisteraar signalen voor die het beeld oproepen van een lichamelijk proces dat er niet geweest is.

De achttiende-eeuwse automaat is een mechanisch lichaam, een uurwerk dat zich de eigenschappen van het leven aanmatigt. In de twintigste-eeuwse computersimulatie wordt de mechanica abstract, lost de machine zich op in de wiskunde. Het lichaam is verdwenen.

Namaken

De impuls van de klassieke beeldhouwkunst: niet afbeelden, maar namaken. Een driedimensionaal model op ware grootte is geen model, maar een kopie, een duplicaat. De Griekse beelden waren gepolychromeerd. In de mythologische waren de beste beeldhouwers vaak in staat om evenbeelden van het menselijk lichaam te maken die niet alleen perfect gelijkend waren, maar die ook konden spreken, en zich op een natuurlijke manier bewegen. In de Chinese en de Germaanse mythologie vinden we soortgelijke verhalen: timmerlui en zilversmeden die verraderlijk verleidelijke vrouwelijke automaten bouwen.

De essentiële stap op de weg van mythe naar technologie wordt gezet in de zeventiende eeuw. De gedachte dat levende organismen functioneren volgens de wetten der natuurkunde, en daarom in principe gesimuleerd kunnen worden door middel van mechanische constructies, is dan niet langer een vaag, verontrustend vermoeden, maar een wetenschappelijke hypothese. In het begin van de zeventiende eeuw bedacht Descartes dat dieren eigenlijk machines zijn.

Thomas Hobbes: *Nature, the art by which God hath made and governs the world, is by the art of man, as in many other things, in this also imitated, that it can make an artificial animal. For seeing life is but a motion of limbs, the beginning whereof is in the principal part within; why may we not say that all automata (engines that move themselves by springs and wheels as doth a watch) have an artificial life? For what is the heart but a spring, and the nerves but so many strings; and the joints but so many wheels giving motion to the whole body, such as was intended by the artificer?*²

In de loop van de zeventiende en achttiende eeuw is er een opleving in het bouwen van automaten die lichamelijke functies van mens of dier nabootsen: de ontwikkeling van de uurwerktechnologie maakt het mogelijk om veel getrouwere nabootsingen te realiseren dan voorheen; en de theorieën van de Cartesianen verlenen aan zulke ondernemingen een filosofisch cachet. Zo maakt men poppen die lopen, fluiten, trommelen, spreken, en schrijven; vogels die fladderen, tsjilpen, eten, drinken en schijten. Er is een curieuze overeenkomst tussen deze automatenbouwerij en de huidige Kunstmatige Intelligentie. Ook toen werden de grenzen van de meest geavanceerde technologieën van het moment verlegd met als doel om de uiterlijke verschijningsvorm van bepaalde aspecten van het menselijk gedrag na te bootsen; en ook toen resulteerde dat in producten die alom belangstelling wekten, omdat ze niet alleen als technologische experimenten konden worden beschouwd, maar ook als biolo-

Mediamatic 7 # 1



pagina 28

¹ Roland Barthes

'Le Grain de la Voix',

in: *L'obvie et l'obtus*,

Paris 1982

(English translation:

'The Grain of

the Voice', in:

The Responsibility of

Forms. Critical essays on

Music, Art and

Representation.

New York 1985,

pp. 269/270)

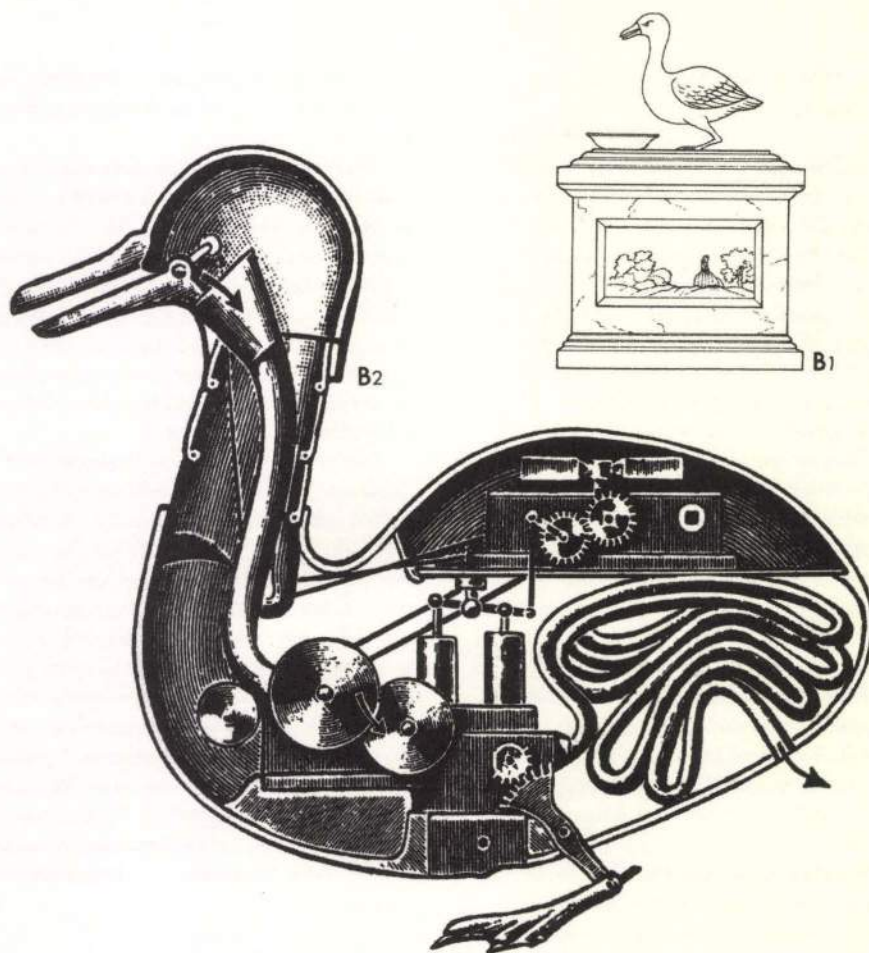
² Thomas Hobbes

Leviathan 1651

(Harmondsworth,

Middlesex 1968)





Mediamatic 7 # 1



page 29

◆ Mimesis is then called *artificial life*, *robotics*, or *artificial intelligence*. But in other cases, it concerns the classical ideal of the perfect simulation of the surface of things. Then it is called *ray tracing*, *paintbox*, *digital photography*, *virtual reality*.

Music exists between the poles of mathematical abstraction and pure physics. Imitation is not an issue there, one might think, but nothing could be further from the truth. After the failure of 'real' electronic music, which used sinusoids, square waves, noise and modulators to build sound sculptures that people don't particularly want to listen to, there is now an avalanche of digital electronic technologies that simulate the sounds of conventional instruments in great detail, and make them accessible for keyboards and computers with MIDI interfaces.

Artificial speech synthesis is an imitative technology which is closely connected with music. However, its relation with language also lends this medium an entirely unique character. This article explores the history, the techniques and the aesthetics of this medium.

Voice

Language is a matter of symbols. The conceptualization and abstraction of human experience.

Music is a matter of physics — not so much because music is usually realized by means of sound, but rather because precisely the *structural* properties of music (such as metre, rhythm, harmony, melody) are based on physical phenomena.

Between language and sound: speech. Between mind and matter: the voice.

Roland Barthes: *Listen to a Russian bass (...): something is there, manifest and persistent (you only hear that), which is past (or previous to) the meaning of the words, of their form (the litany), of the melisma, and even of the style of the performance: something which is directly the singer's body, brought by one and the same movement to your ear from the depth of the body's cavities, the muscles, the membranes, the cartilage, and from the depths of the Slavonic language, as if a single skin lined the performer's inner flesh and the music he sings.*¹

To Copy / To Fake

Within the technology of voice imitation, two approaches are usually distinguished: the *genetic* approach and the *gennematic* one. The genetic method imitates the physiological processes that generate speech sounds in the human body. The gennematic method is based on the analysis of the speech sounds themselves, and reconstructs these sounds without considering the way in which the human body produces them.

The speaking machines of the eighteenth-century were based on the genetic principle: the *hardware* of the larynx and the oral cavity was reconstructed in a stylized way. If such an imitation is faithful enough, the sounds it generates resemble the sounds of human speech.

In the twentieth century, we see an entirely different approach: digital technology which *calculates* the shapes of sound signals and then uses loudspeakers to make them audible. The voice is no longer imitated, but its out-

4 JULIEN OFFRAY
DE LA METTRIE
L'Homme machine,
Leyden 1748

gische modellen, als filosofische existentie-bewijzen, als kunst, of als amusement.

Dit wordt goed geïllustreerd door de carrière van Jacques de Vaucanson, een van de beroemdste achttiende-eeuwse automatenbouwers. Zijn automaten waren vermakelijke en verbazingwekkende tentoonstellingsattracties, maar tegelijk werden hun mechanismen in ernstige wetenschappelijke geschriften uiteengezet — niet alleen door de ontwerper maar ook door Diderot en D'Alembert in hun *Encyclopédie*. De produktie van de automaten had interessante technologische *spin-offs*; uiteindelijk werd De Vaucanson een innovierend organisator in de textielindustrie, die de toen meest geavanceerde fabriek bouwde voor het spinnen van zijde; de techniek van zijn automatische fluitspeler gebruikte hij voor het ontwerp van het eerste programmeerbare weefgetouw, dat later de grondslag zou vormen voor het werk van Jacquard.

L'Homme Machine

Mensen worden door Descartes nadrukkelijk uitgezonderd van zijn redeneringen over het mechanische karakter der dieren. Hij associeert mechanica met gevoelloosheid en met de afwezigheid van bewustzijn. Hij heeft er blijkbaar geen moeite mee om dieren aldus te beschouwen, maar dat mensen gevoelloze machines zouden zijn vindt hij problematischer.

Een belangrijk Cartesiaans argument tegen de mechaniseerbaarheid van de mens wordt door de filosoof Cordemoy geformuleerd aan de hand van het idee van een automatische spraakmachine: *... hoewel ik duidelijk inzie dat een puur mechanisch apparaat enkele woorden zou kunnen uitbrengen, weet ik tegelijk dat de veren die de lucht verdelen of de buizen openen waaruit de stemmen komen, een bepaalde onderlinge ordening vertonen die ze nimmer zouden kunnen veranderen. Zodat vanaf het moment dat de eerste stem klinkt de stemmen die er gewoonlijk op volgen eveneens noodzakelijk moeten volgen — als de machine tenminste nog van lucht is voorzien. Daarentegen hebben de woorden die ik door lichamen als het mijne hoor uitbrengen zelden dezelfde volgorde.*³

De rijkdom van de taal hangt in deze opvatting samen met het typisch menselijke vermogen van de vrije wil, dat intrinsiek onverenigbaar is met de rigiditeit van een uurwerk. Om de vrije wil te verantwoorden, voorziet Descartes het (op zichzelf wel mechanische) menselijk lichaam van een *interface* naar de onsterfelijke ziel. Dit interface zetelt volgens hem in de pijnappelklier — een kliertje in de hypothalamus, waarvan de lichamelijke functie niet duidelijk is.

Een eeuw na Descartes wordt de gedachte om ook mensen als machines te beschouwen toch expliciet verdedigd. In *L'Homme machine* stelt La Mettrie dat *alle vermogens van de ziel in zodanige mate afhankelijk zijn van de juiste organisatie van het brein en van het gehele lichaam, dat zij blijkbaar niets anders zijn dan die organisatie zelf*. In die opvatting is er een materiële identiteit tussen lichaam en ziel, en is daarmee de noodzaak voor een *mind-body-interface* verdwenen. Tussen mens en dier bestaan slechts graduele verschillen. De Cartesiaanse argumenten die betrekking hebben op het mechanische karakter van het dier zijn nu onmiddellijk op de mens van toepassing, maar

veranderen tegelijk diepgaand van betekenis. *Mechanica* staat niet meer gelijk met onbewustheid: het bewustzijn zelf is mechanisch.⁴

Als de meer ambitieuze automatenbouwers op dat moment hun onderzoeksagenda geïnspireerd zouden hebben op het standpunt van La Mettrie, dan zouden ze zo iets als de huidige Kunstmatige Intelligentie uitgevonden hebben: een discipline gericht op het creëren van feitelijke demonstraties van gemechaniseerde mentale processen. Maar daar was de uurwerktechnologie niet geschikt voor. Daarom heeft die stap moeten wachten tot het midden van de twintigste eeuw, toen de elektronische computer beschikbaar kwam.

De toenmalige plausibiliteit van het argument van Cordemoy hangt hiermee samen: niemand kon de vrijwel onbeperkte schakel-flexibiliteit voorzien die geïntroduceerd zou worden door Von Neumanns *stored program computer*. Software is mechanica die zich *wel* dynamisch kan reconfigureren. Programma's zijn virtuele uurwerken met zelf-modificerende en zelf-uitbreidende vermogens. Hoewel die vermogens in principe beperkt worden door de eindigheid van de apparatuur waarop de programma's geïmplementeerd zijn, kunnen we in de praktijk die beperkingen vaak negeren. Vergeleken met het uurwerk realiseert de computer een kwalitatief superieure complexiteit en flexibiliteit. Met deze uitvinding achter ons, kunnen we nooit meer de pretentie hebben om eens en voor al de grenzen van het mechaniseerbare te overzien.

Talking Heads

De eerste serieuze spraakmachines werden ontwikkeld door achttiende-eeuwse automatenbouwers die zich bezighielden met mechanische simulaties van de lichamelijke functies van mens en dier. In deze periode wordt het spraakgeluid nog niet als iets eigenstandigs beschouwd dat men kan analyseren en reconstrueren.

Spraaksimulatie is nabootsing van het *spreken*. Er wordt een kunstmatig lichaam gebouwd dat lucht kan uitblazen en op die manier de lucht in trilling kan brengen. De natuurgetrouwheid van de aldus gegenereerde kunstmatige spraak hangt af van de nauwkeurigheid waarmee de relevante eigenschappen van het menselijk lichaam gedupliceerd zijn.

Net als mensen, hebben deze machines 'stembanden' die in trilling gebracht worden door er lucht doorheen te persen. Hoe de menselijke stembanden precies werken was toen nog niet bekend. Als imitatie ervan gebruikte men het principe van een harmonium: de luchtweg wordt afgesloten door een buigzame metalen tong, die bij overdruk beweegt om de lucht door te laten en die aldus in trilling raakt. De tong werd vaak met leer bekleed om de hoge tonen wat te dempen.

Net als bij een tongen-orgel wordt deze trilling dan overgenomen door de lucht in een resonantieholte — die in dit geval zo goed mogelijk lijkt op de menselijke mondholte. Afhankelijk van de exacte vorm (van de stand van de mond, dus) ontstaan er verschillende klinkers. Afhankelijk van de manier waarop de luchtstroom gestart of gestopt, of bemoeilijkt wordt door vernauwing van de uitstroomopening, ontstaan er verschillende medeklinkers.

Mediamatic 7 # 1



pagina 30

3 G. DE CORDEMOY
*Discours physique de
la parole*,
Paris 1666

♦ put is faked. The algorithm computes signals that evoke the image of a physical process that never occurred.

The eighteenth-century automaton is a mechanical body, a piece of clockwork claiming the qualities of life. In twentieth-century computer simulation, the mechanics is abstract, the machine dissolves into mathematics. The body has disappeared.

To copy

The impulse of classical sculpture was not representation, but imitation. A life-size, coloured, three-dimensional model is not a model, but a copy. The master sculptors of classical mythology even managed to duplicate the human body in sculptures that did not only show perfect likeness, but that could also speak and move naturally. In Chinese and Germanic mythology, carpenters and silversmiths displayed similar skills, building treacherously seductive female automata.

The essential step on the road from myth to technology was taken in the seventeenth-century. The idea that living organisms function according to the laws of physics, and could in principle be simulated by means of mechanical constructions, is then no longer a vague, alarming suspicion, but a scientific hypothesis. In the early seventeenth-century, Descartes presented the thesis that animals are in fact machines.

Thomas Hobbes: *Nature, the art by which God hath made and governs the world, is by the art of man, as in many other things, in this also imitated, that it can make an artificial animal. For seeing life is but a motion of limbs, the beginning whereof is in the principal part within; why may we not say that all automata (engines that move themselves by springs and wheels as doth a watch) have an artificial life? For what is the heart but a spring, and the nerves but so many strings; and the joints but so many wheels giving motion to the whole body, such as was intended by the artificer?*²

In the seventeenth and eighteenth centuries, the construction of automata which imitate bodily functions of man or animal was extremely popular: the development of clockwork technology had made it possible to realize much better imitations than before; and the theories of the Cartesians lent a philosophical interest to such enterprises. Thus, there were dolls that could walk or talk, write letters, or play the flute; birds that could flap their wings, tweet, eat, drink and shit. There is a curious similarity between this kind of automaton building and present-day Artificial Intelligence. In those days, too, the capacities of the most advanced technologies of the moment were exploited with the goal of imitating the outward appearance of certain aspects of human behaviour; then, too, this resulted in products which aroused everybody's interest, because they could be regarded as technological experiments, as biological models, as philosophical existence proofs, as art, or as entertainment.

This is illustrated by the career of Jacques de Vaucanson, one of the most well-known automaton builders of the eighteenth-century. His automata were amusing and astonishing exhibits in popular fairs, while their mechanisms were published in learned scientific articles — by the designer himself, and also by Diderot

and D'Alembert in their *Encyclopédie*. The production of the automata also generated interesting technological spin-offs. Eventually, Vaucanson became an innovative organizer in the textile industry, and built the most advanced silk-spinning factory of that time. He used the technology of his automatic flute player for the design of the first programmable loom, which would later become the basis for Jacquard's work.

L'Homme Machine

Human beings are emphatically excluded from Descartes' reasoning about the mechanical character of animals. He links mechanism with the absence of emotions and the absence of consciousness. Apparently he has no difficulty in viewing animals in this way, but that people could be machines is more of a problem.

The Cartesian philosopher Cordemoy formulates the argument against the mechanizability of humans in terms of the idea of an automatic speech machine: *...although I see clearly that a purely mechanical apparatus could utter a few words, I know at the same time that the springs which distribute the air or open the tubes that let out the voices display a certain order between each other, which they could never change. So that, from the moment the first voice sounds, the voices that usually follow must necessarily follow as well — that is, if the machine still has sufficient air. Contrarily, the words which I hear being uttered by bodies such as mine, are rarely pronounced in the same order.*³

From this point of view, the richness of language is connected with the typically human capacity of free will, which is intrinsically incompatible with the rigidity of a clockwork. To account for free will, Descartes provides the — otherwise mechanical — human body with an interface to the immortal soul. He situates this interface in the pineal gland — a small gland with an unknown function, located in the hypothalamus.

A hundred years after Descartes, the idea that human beings are machines too was explicitly defended after all. In *L'Homme machine*, La Mettrie argues that *all capacities of the soul are to such an extent dependent on the right organization of the brain and the entire body, that apparently they are nothing but this organization itself*. In this theory, there is a material identity between body and soul; therefore, the necessity of a *mind-body-interface* has disappeared. Between man and animal, there are only differences in degree. The Cartesian arguments concerning the mechanical character of animals now apply directly to human beings, but at the same time their meaning changes profoundly. Mechanism no longer implies non-consciousness: consciousness itself is mechanical.⁴

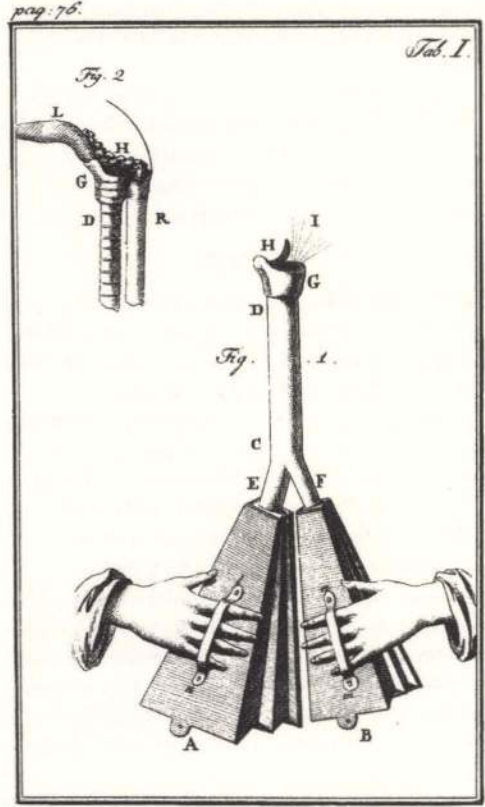
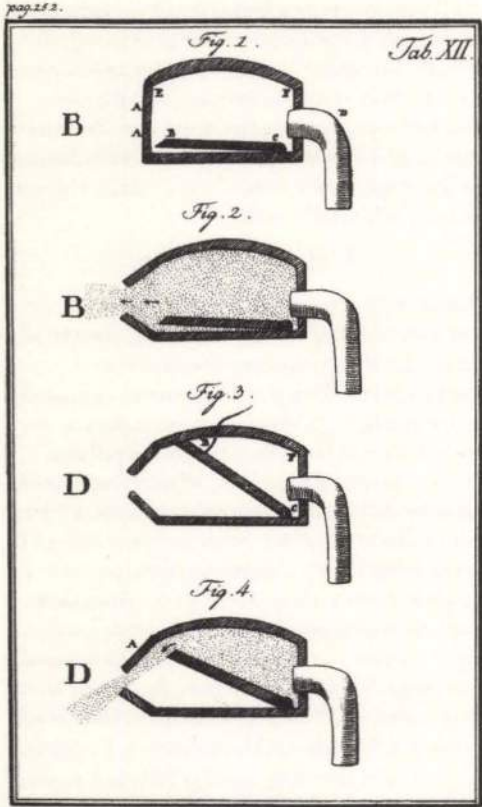
If the more ambitious automaton builders of this period had based their research programmes on La Mettrie's viewpoint, they would have invented something like today's Artificial Intelligence: a discipline aimed at creating actual demonstrations of mechanized mental processes. But clockwork technology was not suitable for such a purpose. Therefore, this step could not be made until the middle of the twentieth century, when the electronic computer became available.

This is also why Cordemoy's argument was so plausible in his days. No one could foresee the virtually unlimited switching flexibility which would be

Mediamatic 7 # 1



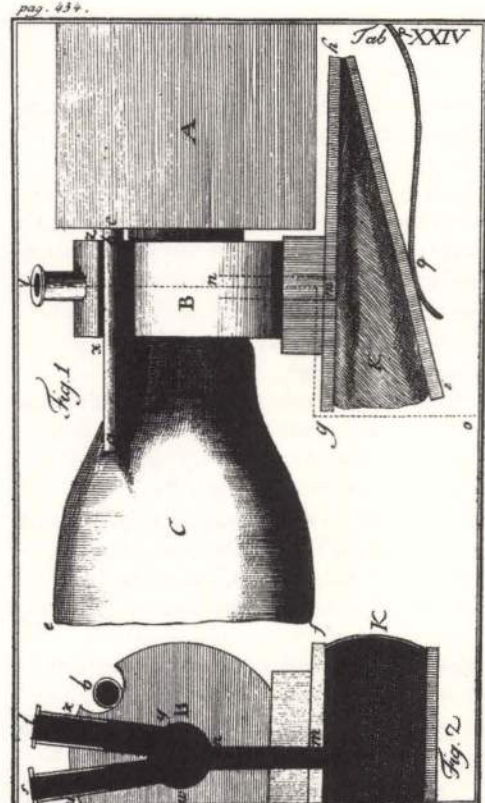
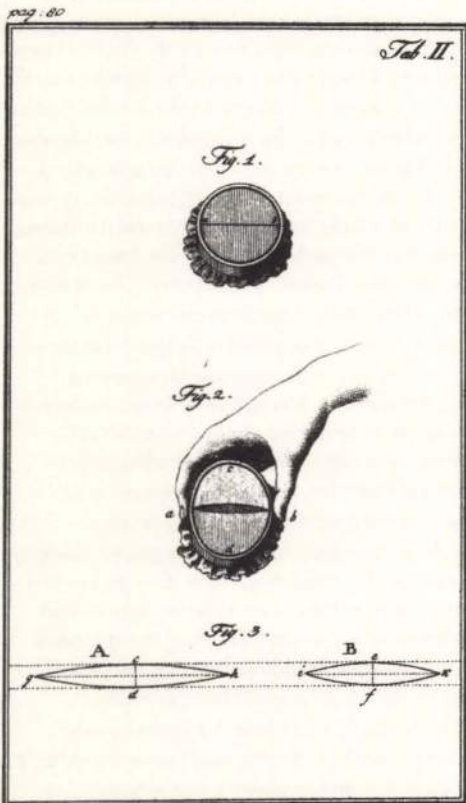
page 31



Mediamatic 7 # 1



pagina 32



O

introduced by Von Neumann's stored program computer. Software is mechanics which is capable of dynamic reconfiguration. Programs are virtual clockworks with self-modifying and self-extending capacities. Although these capacities are limited by the finiteness of the hardware on which the programs are implemented, in practice we can often ignore these limitations. Compared to a clockwork, the computer realizes a qualitatively superior complexity and flexibility. With this invention behind us, we must now forever view the limits of the mechanizable as unknown and open-ended.

Talking Heads

The first serious speech machines were developed by eighteenth-century automaton builders who were engaged in mechanical simulation of the bodily functions of man and beast. At this time, the sound of speech was not yet viewed as a phenomenon which could be analyzed and reconstructed. Speech simulation was imitation of the *act of speaking*. Artificial bodies were created, which could blow out air and thereby make the air vibrate; the fidelity of the artificial speech generated in this way depended on the accuracy with which the relevant features of the human body were reproduced.

Like human beings, these machines had 'vocal cords' which vibrate when air is forced through. The precise functioning of the human vocal cords was not yet known at this time. To imitate them, the machine-builders used the principle of the harmonium: an air tube is closed off by a flexible metal tongue, which moves under pressure to let the air through and is consequently set into vibration. The tongue was often covered in leather to dim the high tones slightly.

As with a reed organ, this vibration was then conveyed to the air via a resonance chamber — which in this case was made to resemble the human mouth as much as possible. Depending on the exact shape of the resonance chamber (that is, the position of the mouth), various vowels could be generated. Depending on the way in which the air stream was started or stopped, or obstructed by constricting the outlet, various consonants could be formed.

As Cordemoy had argued already, independently functioning machines of this kind could only deliver a limited repertoire of texts. Because speech simulation proved far from easy, in practice this came down to rather small numbers of words or sentences, which would be hardwired into the machine. For this reason, speech machines were often designed as *instruments* instead — machines which could generate all the sounds that are needed to pronounce any given text, but which could only pronounce an actual text if operated by a technical expert who determined which sounds were produced at which moment. Descartes' solution, one might say: a mechanical machine driven by human consciousness; a body controlled by a mind.

In 1778, for example, Wolfgang von Kempelen designed a machine which directly imitated the functioning of the oral cavity. The operator squeezes a pair of bellows to press the air, via 'vocal cords', into a resonance chamber, which he modulates with both hands. The various vowels are created by changing

the shape of the resonance chamber with one hand; the consonants are produced as the other hand opens or closes this chamber in various ways.

A lung and vocal-cord prosthesis, which makes it possible to use the hands as a mouth. Technological perversion of speech.

The 'vowel organ'.⁵ The same principle, but in this case: a carousel of different sound cavities. A fan of vowels. A laboratory instrument operated by a technician, by means of switches, wheels, foot pedals. As a result of the technician's actions, the vibrating air is sent to one resonance chamber or another, and such a chamber is opened or closed in a variety of ways. Thus, by a succession of separate interventions, the technician realizes, one by one, the phonetic elements of the language expression to be pronounced.

Human speech is a continuous process. In this mechanical simulation, there is no such continuity. What we hear is phonology: the discrete combinatorics of linguistics.

Joop van Brakel on the 'vowel organ': language shattered into meaningless fragments. Slapstick, merriment, music. Language regressing to animal sounds. Cackling, bleating, barking. (*There once was a time when all speech was song.*)

The vowel organ has ingenious 'artificial vocal cords'. A hollow cylinder with a slit in it continually rotates within another hollow cylinder, also with a slit in it. The result: a slit-shaped opening is opened and closed continually. The air is pressed through this opening. If we use this technique to set the air in motion *without* providing a connection to an 'artificial oral cavity' in which the air can resonate, what you hear is a *fart*. Is that the sound that underlies all speaking?

Other speech machines create an even greater separation between the operating technician and the material production of sound: they insert a keyboard-interface. Abbé Mical's *Têtes Parlantes* (1783) and Joseph Faber's *Euphonis* (1840) belong in this category. Speech machines for entertainment. The designer also acted as operating technician, and as variety artist, ventriloquist: he puts a puppet on stage, and tries to create the illusion that it really speaks.

Here, the laboratory apparatus has become a musical instrument, with an interface which enables the virtuoso performer to add natural dynamics and timing to the mechanical speech utterances, and to compensate as much as possible for the limitations of technology.

Thus, one of Mical's contemporaries writes about the *Têtes Parlantes*: *With a little practice and agility, we will be able to speak with the fingers as with the tongue, and we will be able to give the language of the heads the speed, the calm, and in short all the qualities that a language can possess which is not animated by passions.*⁶ On the keyboard of the *Têtes Parlantes*, you present a text as you would play a musical score on a piano.

Soft Machines

Alexander Graham Bell stands at a turning point in the history of speech synthesis. When he was young, his father took him and his younger brother to an exhibition where they saw a replica of one of Von Kempelen's

⁵ This is a relatively recent machine (built at the Institute of Phonetic Sciences of the University of Amsterdam), but its method of operation definitely belongs to the eighteenth-century tradition.

Mediamatic 7 # 1



page 33

⁶ Avec un peu d'habitude et d'habileté, on pourra parler avec les doigts comme avec la langue, et on pourra donner au langage des têtes la rapidité, le repos et toute la physionomie enfin que peut avoir une langue qui n'est point animée par les

Zoals Cordemoy al beredeneerd had, waren zelfstandig functionerende machines van dit soort altijd beperkt tot het uitbrengen van een eindig repertoire van teksten; en omdat de spraaksimulatie helemaal niet zo eenvoudig bleek, ging het in de praktijk zelfs om beperkte aantallen woorden of zinnen, die in de machine *gehardwired* werden. Om die reden werden de spraakmachines vaak vormgegeven als *instrumenten* — machines die in principe alle geluiden kunnen genereren die nodig zijn om willekeurige teksten uit te spreken, maar die, om een gegeven tekst ook inderdaad uit te spreken, wel een technicus nodig hebben die beslist welke geluiden er op welk moment voortgebracht moeten worden. De oplossing van Descartes, zou je kunnen zeggen: een domme machine wordt aangedreven door het menselijk bewustzijn; een lichaam bestuurd door een geest.

Wolfgang von Kempelen, bij voorbeeld, construeerde in 1778 een machine die de werking van de mondholte op directe wijze imiteert. Door middel van een blaasbalg perst men lucht via 'stembanden' door een resonantieholte, die met de beide handen gemoduleerd wordt. Door met de linkerhand de vorm van de resonantieholte te veranderen kan men verschillende klinkers creëren; de medeklinkers ontstaan, als deze holte met de rechterhand op verschillende manieren geopend of gesloten wordt.

Een long- en stembandprothese, die het mogelijk maakt om de handen als mond te gebruiken. Technologische perversie van het spreken.

Het 'klinkerorgel'.⁵ Hetzelfde principe, maar nu: een carrousel vol verschillende klankholtes. Een waaijer van klinkers. Een laboratorium-apparaat dat door een technicus bediend wordt, via knoppen, wielen, voetpedalen. Als gevolg van de handelingen van de technicus gaat de trillende lucht naar de ene dan wel de andere resonantieholte, en wordt zo'n holte zus dan wel zo geopend of gesloten. Op die manier realiseert de technicus door afzonderlijke opeenvolgende ingrepen één voor één de elementen van de uit te spreken taaluiting.

Het menselijk spreken is een continu proces. Bij deze mechanische simulatie ontbreekt die continuïteit. We horen fonologie: de discrete combinatoriek van de taalwetenschap.

Joop van Brakel op het 'klinkerorgel': De taal valt in betekenisloze brokstukken uiteen. Slapstick, vrolijkheid, muziek. De taal wordt weer dierlijk. Gekakel, geblaat, geblaf. (*There once was a time when all speech was song.*)

Het klinkerorgel heeft ingenieuze 'kunstmatige stembanden'. Een holle cilinder met een sleuf erin draait voortdurend rond binnen een andere holle cilinder met een sleuf erin. Het resultaat: een sleufvormige opening gaat voortdurend open en dicht. Daar wordt de lucht doorheen geperst. Als door dit procédé de lucht aan het trillen gebracht wordt *zonder* dat er een 'kunstmatige mondholte' is aangesloten waarin de lucht gaat resoneren, dan hoor je: een *scheet*. Is dat het geluid dat aan alle spreken ten grondslag ligt?

Andere spraakmachines scheppen een nog duidelijkere afstand tussen de bedienende technicus en de materiële productie van het geluid: ze plaatsen er een *keyboard-*

interface tussen. Tot deze categorie behoren de *Têtes Parlantes* van Abbé Mical (1783) en de *Euphonis* van Joseph Faber (1840). Spreekmachines voor kermisachtige voorstellingen. De ontwerper was tevens uitvoerend technicus. En variété-artiest, buikspreeker: hij voert een pop ten tonele, en probeert de illusie te scheppen dat die echt praat.

Het laboratorium-apparaat is hier tot een *instrument* geworden, met een interface dat de virtuoze uitvoerder in staat moet stellen om een natuurlijk klinkende dynamiek en timing aan de mechanische spraakuitingen op te leggen, en om de beperkingen van de technologie zo goed mogelijk te compenseren.

Zo schrijft een tijdgenoot van Mical, naar aanleiding van diens *Têtes Parlantes*: *Met enige oefening en handigheid zal men met de vingers kunnen spreken zoals met de tong, en zal men aan de taal van de hoofden de snelheid, de rust, en kortom alle eigenschappen kunnen verlenen die een taal kan hebben die niet door de hartstochten bezield wordt.*⁶ Op het toetsenbord van de *Têtes Parlantes* brengt men een tekst ten gehore zoals men een muzikale partituur speelt op een piano.

Soft Machines

Alexander Graham Bell staat op een keerpunt in de geschiedenis van de spraaksynthese. De achttiende-eeuwse technologie heeft hij nog heel bewust meegemaakt. In zijn kinderjaren werd hij, samen met zijn broertje, door zijn vader meegenomen naar een tentoonstelling waar een replica van een spreekmachine van Von Kempelen te zien was. Thuisgekomen, namen de jongens toen zelf ook de bouw van zo'n machine ter hand. Zoals bekend vond Bell jaren later de telefoon uit, en introduceerde hij daarmee de technologie die voor de toekomst van de geluidsverwerking bepalend zou zijn: de representatie van geluid door middel van elektrische signalen. Voordien had hij ook al een gedetailleerd ontwerp gemaakt (dat nooit geïmplementeerd werd) van een mechanische Vocoder.

Maar Bells grappigste bijdrage aan de kunstmatige spraaksynthese vinden we in een andere anekdote over zijn jonge jaren. *Bell's youthful interest in speech production also led him to experiment with his pet Skye terrier. He taught the dog to sit up on his hind legs and growl continuously. At the same time, Bell manipulated the dog's vocal tract by hand. The dog's repertoire of sounds finally consisted of the vowels /a/ and /u/, the diphthong /ou/ and the syllables /ma/ and /ga/. His greatest linguistic accomplishment consisted of the sentence, How are you Grandmamma? The dog apparently started taking a 'bread and butter' interest in the project and would try to talk by himself. But on his own, he could never do better than the usual growl.*⁷

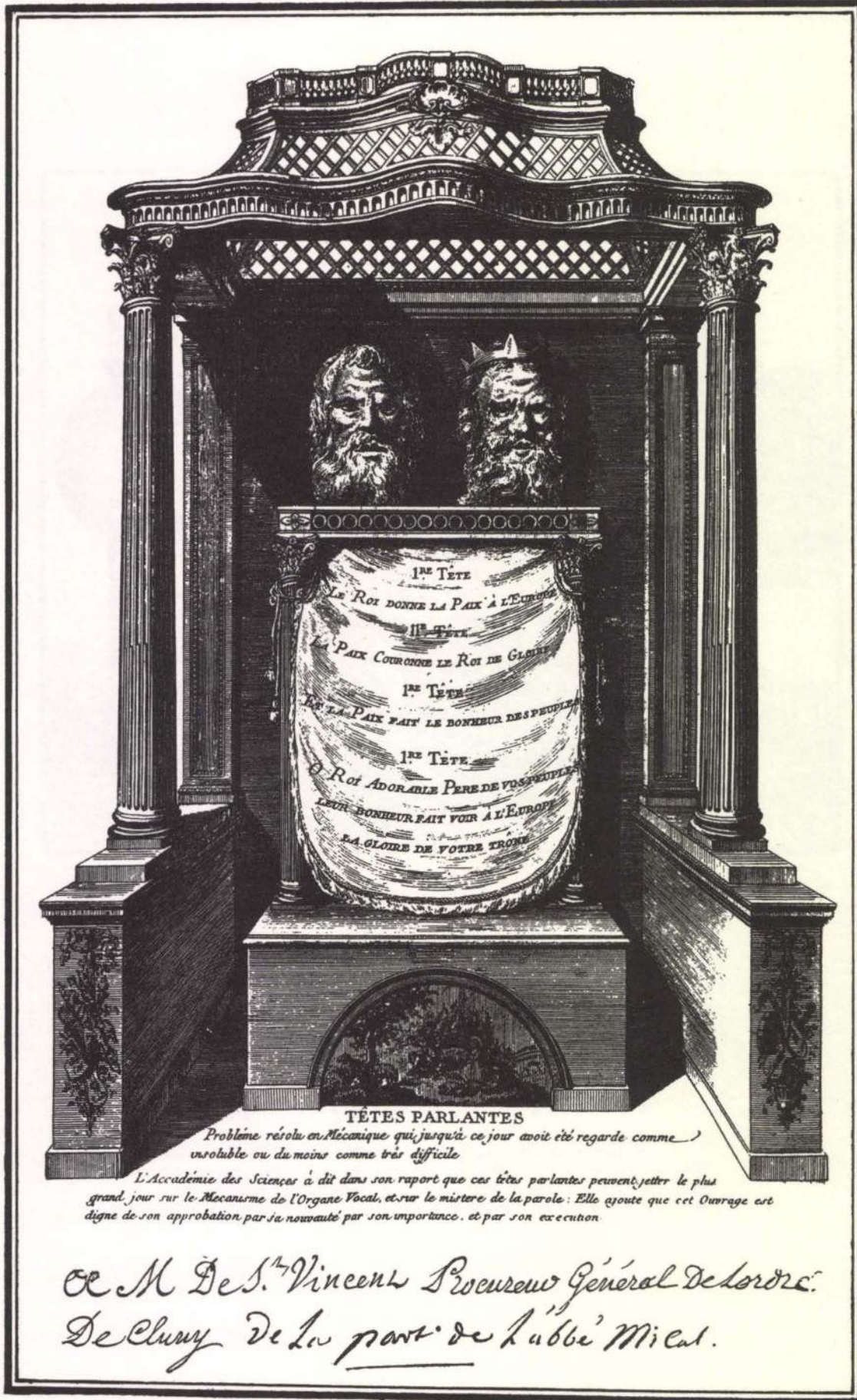
Een soortgelijke techniek, die wat meer in de cyberpunksfeer terechtkomt, hebben we te danken aan Johannes Müller, de grondlegger van de moderne fysiologie. *Seine Arbeitsweise ist deutlich durch die Hinwendung zum Experiment am lebenden und toten Objekt gekennzeichnet. In Fortsetzung der Versuche von Liskovius, der 1814 als erster am Leichenkehlkopf Brust- und Falsetstimmte erzeugte, schnitt Müller einer Leiche den Kopf so ab, daß der gesamte Stimmapparat und ein Teil der Trachea erhalten blieben. Durch anblasen des*

Mediamatic 7 # 1



pagina 34

7 JAMES L. FLANAGAN
Speech Analysis
Synthesis and Perception,
second edition, Berlin
1972, pp. 206/207.



TÊTES PARLANTES

Problème résolu en Mécanique qui jusqu'à ce jour avoit été regardé comme insoluble ou du moins comme très difficile

L'Académie des Sciences a dit dans son rapport que ces têtes parlantes peuvent jeter le plus grand jour sur le Mécanisme de l'Organe Vocal, et sur le mystère de la parole: Elle ajoute que cet Ouvrage est digne de son approbation par sa nouveauté par son importance, et par son exécution.

De M. De S.^r Vincent Procureur Général de la Cour de Clusay De la part de l'abbé Micat.

passions. From a letter by ANTOINE DE RIVAROL, 1783 (*Oeuvres complètes de Rivarol*, Part III, Paris 1808, p. 207) See: JENS-PETER KÖSTER *Historische Entwicklung von Synthesegeräten zur Erzeugung statischer and Vokalartiger Signale nebst Untersuchungen zur Synthese deutscher Vokale*. (Historical development of synthesis machines for generating static and vowel-like signals and research into the synthesis of German vowels) Hamburg 1973, p. 85. On p. 95, Köster also quotes another part of this letter: *If these heads were multiplied in Europe, they would raise terror in all those Swiss and Gascon*

Mediamatic 7 # 1



page 35

language teachers, whose influence has infected all countries and who disfigure our language for the peoples who love it. Köster comments: Here lie the roots of the use of technological tools in foreign language teaching.

Mediamatic 7 # 1



pagina 36

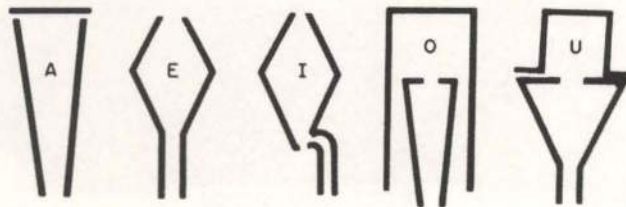
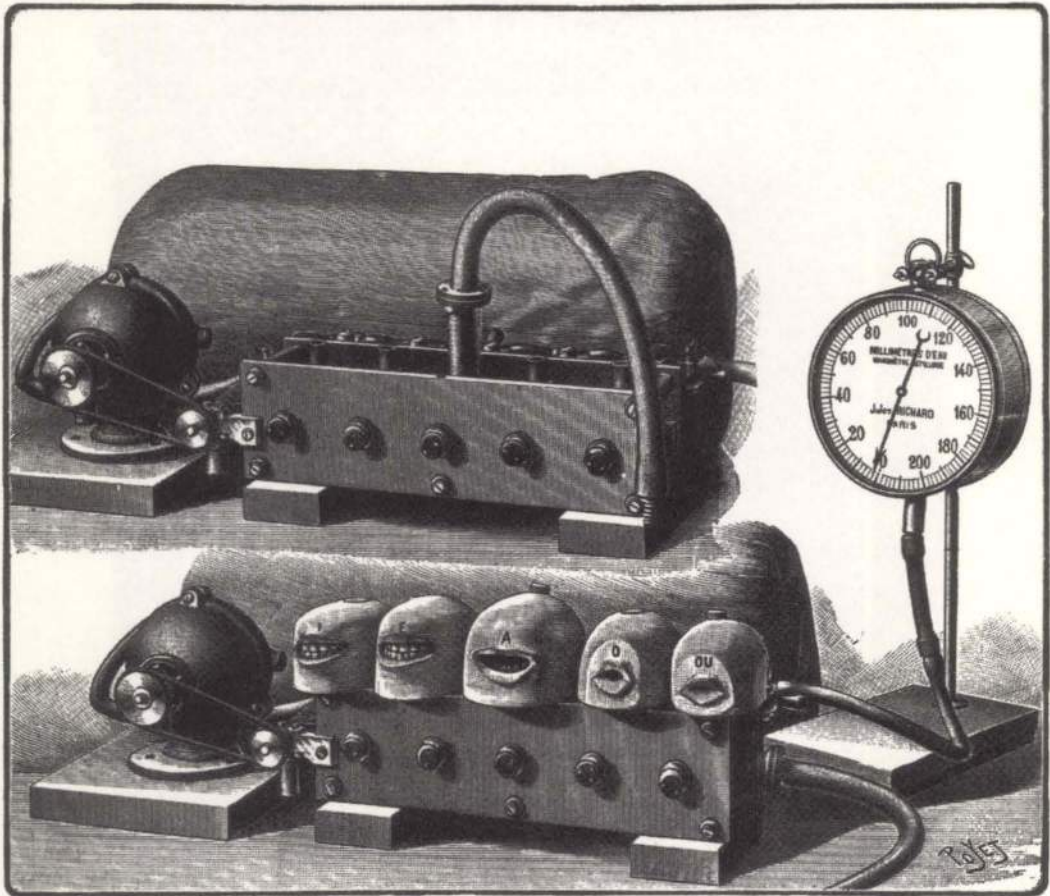


FIG. 9. Kratzenstein's resonators for synthesis of vowel sounds. The resonators are actuated by blowing through a free, vibrating reed into the lower end. The *i* sound is produced simply by blowing into the lower pipe without a reed.¹

◆ speech machines. Back home, the boys proceeded to build a similar speaking machine themselves. When, several years later, Bell invented the telephone, he introduced the technique that would determine the future of sound processing: the representation of sounds by means of electric signals. Bell also produced a detailed design, that never got implemented, for a device that would have been a mechanical Vocoder.

But his most curious contribution to artificial speech synthesis was another early feat. *Bell's youthful interest in speech production also led him to experiment with his pet Skye terrier. He taught the dog to sit up on his hind legs and growl continuously. At the same time, Bell manipulated the dog's vocal tract by hand. The dog's repertoire of sounds finally consisted of the vowels /a/ and /u/, the diphthong /ou/ and the syllables /ma/ and /ga/. His greatest linguistic accomplishment consisted of the sentence, How are you Grandmamma? The dog apparently started taking a 'bread and butter' interest in the project and would try to talk by himself. But on his own, he could never do better than the usual growl.*⁷

A related technology, with a cyberpunk slant, is due to Johannes Müller, the father of modern physiology. His working method is clearly characterized by his orientation toward experiments on living or dead objects. *Continuing the efforts of Liskovius, who in 1814 was the first to generate chest- and head-voice from the larynx of a corpse, he cut off the head of a corpse in such a way that the entire vocal apparatus and part of the tracheae were preserved. By blowing air into the larynx of the corpse, Müller produced vocalic sounds which closely resembled human speech. By moving the lips, he even managed to generate some consonants.*⁸

To Fake

Hermann Helmholtz was a pupil of that same Müller. But his work in the field of speech synthesis was less physiologically and more acoustically oriented. In the second half of the nineteenth-century, research into the phenomenon of sound had reached the stage where one could attempt to analyse the sounds of human speech into elementary components. To synthesize vowels, Helmholtz did not imitate the human body, but built up the sounds from elementary, sinus-shaped components.

His synthesis machine consists of a battery of tuning forks equipped with resonance chambers, with frequencies in harmonious proportions. Driven by electromagnets, the tuning forks vibrate with perfect regularity in their basic frequencies. The volumes of the contributions from the different tuning forks can be varied by partly opening or closing their resonance chambers. Thus, sounds with different spectrums can be composed, which bear resemblance to various vowels: Oo, Ee, Ah, Oh, Uh, Ih...

The same method of synthesis can be applied even more easily with modern electronic technology — a technology which was developed for the reproduction and transmission of sound. The crucial invention which made electronic sound generation possible was the *loudspeaker*: the general purpose sound producer which can replicate the sound of an arbitrary event, without having to mimic its material structure.

The loudspeaker transforms arbitrary electric signals into material sound waves. This creates the possibility of treating electric signals as *models* of sound waves. In electronic technology, this is done by means of resistors, induction coils, radio tubes, transistors. Objects with a specific electronic behaviour are combined into circuits which generate the desired output patterns.

The two kinds of approach mentioned above in connection with mechanical sound synthesis can be applied in electronics as well. The structure and the components of a mechanical system that imitates the human larynx can systematically be transposed to the electronic domain; this will indeed result in a circuit with an output signal that corresponds to the vocal sound produced by the mechanical model. Translating Helmholtz' approach to the electronic realm is even simpler: replace his tuning forks with sine wave generators, and his adjustable resonance chambers with potentiometers.

Electronic simulation has a material form: a circuit consisting of identifiable components and connections. But on the outside, nothing seems to be happening. The clockwork stands still. It thinks.

The structure of the circuit corresponds to the mathematical analysis of a physical sound-generating process. The circuit is a materialized diagram. (A print board actually looks like that.)⁹

The computer is the next step in the development towards an increasingly abstract simulation. The hardware no longer has anything in common with the physics conjured up for the listener. The hardware even has a structure which is essentially incompatible with the origins of music. A computer really 'computes': it manipulates discrete symbols. Music, on the other hand, is generated by the resonance of continuous systems.

Digital sound simulation is two steps away from real sound: the electric signal driving the loudspeaker is represented in the computer as a sequence of discrete symbols that represent the amplitude variation in time, split up into small discrete steps. Thus, even the continuity of the electric signal is *faked*.

The operations on the symbolically represented signals largely correspond to the functioning of the components from electronic circuits — but because these operations are now symbolically represented as well (installed as *software* in the computer), they can be applied with infinite flexibility, in every imaginable combination and sequence. Cordemoy's impossibility has come true: lifeless matter has escaped the rigidity of the clockwork.

The flexible machine which can do *anything* is at the same time the enigmatic machine which shows *nothing*. The machine is motionless, so that we do not see anything happening. But neither does the wiring structure of the components reveal anything about the functions performed. This structure only says: calculations in progress.

The flexibility of the software medium is virtually complete. All operations which can be described mathematically can be implemented. Even the fact that the execution of each operation takes a short, but not infinitely short, moment of time, and that very complex combinations of operations can therefore take a long time, is hardly a limitation anymore. This practical problem is solved by

8 KÖSTER, *op.cit.*, p. 149

Mediamatic 7 # 1



page 37

9 cf. DICK RAAIJMAKERS
'De kunst van het
machine lezen' (The art
of machine reading), in:
Raster 6, 1978, pp. 6-53

Leichenkehlkopfes erzeugte Müller der menschlichen Sprache sehr ähnliche Vokalklänge. Bei passiver Bewegung der Lippen gelangen ihm sogar einige Konsonanten.⁸

Voorspiegelen

Hermann Helmholtz was een leerling van deze zelfde Müller. Maar zijn werk op het gebied van de spraaksynthese is meer akoestisch dan fysiologisch georiënteerd. De bestudering van het verschijnsel *geluid* is in de tweede helft van de negentiende eeuw zover gevorderd dat men kan proberen om menselijke spraakklanken in elementaire componenten te ontleden. Bij de klinkersynthese bootst Helmholtz niet het menselijk lichaam na, maar stelt de klanken samen uit elementaire, sinusvormige componenten.

De synthesemachine bestaat uit een batterij stemvorken voorzien van resonantiekamers met frequenties in harmonische verhoudingen. Aangedreven door elektromagneten, trillen de stemvorken met volmaakte regelmaat in hun grondfrequenties. De volumes van de bijdragen van de verschillende stemvorken kunnen gevarieerd worden door het gedeeltelijk openen dan wel sluiten van hun resonantiekamers. Zo kunnen klanken met diverse spectra worden samengesteld, die gelijkenis vertonen met verschillende klinkers: Aa, Oo, Uu, Ie, Ee, Oe, Ah, Oh, Uh...

Hetzelfde syntheseprocédé kan nog makkelijker worden toegepast met de sindsdien ontwikkelde elektronische technologie. De cruciale uitvinding die de ontwikkeling van de geluidselectronica mogelijk heeft gemaakt was de *luidspreker*: de *general purpose* geluidsvoortbrenger die de geluidstrillingen van willekeurige gebeurtenissen kan nabootsen zonder ook maar *iets* van de materiële structuur van die gebeurtenissen te hoeven dupliceren.

De luidspreker zet willekeurige elektrische signalen om in materiële geluidsgolven. Dat creëert de mogelijkheid om elektrische signalen te genereren en te manipuleren als *modellen* van geluidsgolven. In de elektronische technologie gebeurt dat met weerstanden, condensatoren, inductiespoelen, radiobuizen, transistoren: objecten met een bepaald elektrisch gedrag worden tot schakelingen samengesteld die de gewenste elektrische golfpatronen genereren.

De twee benaderingen die we bij de mechanische geluidssynthese gezien hebben, zijn allebei ook toepasbaar in de electronica. De structuur en de componenten van een mechanisch systeem dat het menselijk strottenhoofd nabootst kunnen systematisch naar het elektronisch domein vertaald worden; dat levert dan inderdaad een schakeling op met een uitgangssignaal dat overeenkomt met het spraakgeluid dat het mechanische model voortbrengt. Simulatie in de stijl van Helmholtz is al heel erg eenvoudig; vervang zijn stemvorken door sinusgeneratoren, en zijn instelbare resonantieholtjes door potentiometers.

De elektronische simulatie heeft een materiële vorm: een schakeling bestaande uit aanwijsbare componenten en navolgbare verbindingen. Maar op het oog gebeurt

er niets meer. Het uurwerk staat stil. Het uurwerk denkt.

De structuur van de schakeling komt overeen met de mathematische analyse van een fysisch proces dat geluid voortbrengt. De schakeling is een gematerialiseerd diagram. Aan een printplaat kan je dat zien.⁹

De computer is de volgende stap in de ontwikkeling naar een steeds abstractere simulatie. De hardware heeft nu helemaal niets meer te maken met de fysica die de luisteraar voorgetoverd moet worden. De hardware heeft zelfs een structuur die wezenlijk incompatibel is met de oorsprong van de muziek. Een rekenmachine 'reken' inderdaad: manipuleert discrete symbolen. Muziek, daarentegen, komt voort uit de resonantie van continue systemen.

De digitale geluidssimulatie is twee slagen verwijderd van echt geluid: het elektrische signaal dat de luidspreker gaat aandrijven wordt in het computergeheugen gerepresenteerd als een sequentie van discrete symbolen, die het amplitudeverloop in de tijd, in discrete stapjes verdeeld, weergeven. Zo wordt zelfs de continuïteit van het elektrische signaal *gefakeed*.

De operaties op de symbolisch gerepresenteerde signalen komen grotendeels overeen met de werking van de componenten uit elektronische schakelingen — maar omdat deze operaties nu ook symbolisch gerepresenteerd zijn (als *software* op de computer staan), kunnen ze met een oneindige flexibiliteit, in alle mogelijke combinaties en volgordes, worden toegepast. Cordemoys onmogelijkheid is bewaarheid: de levenloze materie heeft zich aan de rigiditeit van het uurwerk ontworsteld.

De flexibele machine, die *alles* kan, is tegelijk de raadselachtige machine, waaraan we *niets* kunnen aflezen. De machine is onbeweeglijk, zodat we niets zien gebeuren. Maar ook de bedradingsstructuur van de componenten zegt niets over de functies die er verricht worden. Die structuur zegt alleen: hier wordt gerekend.

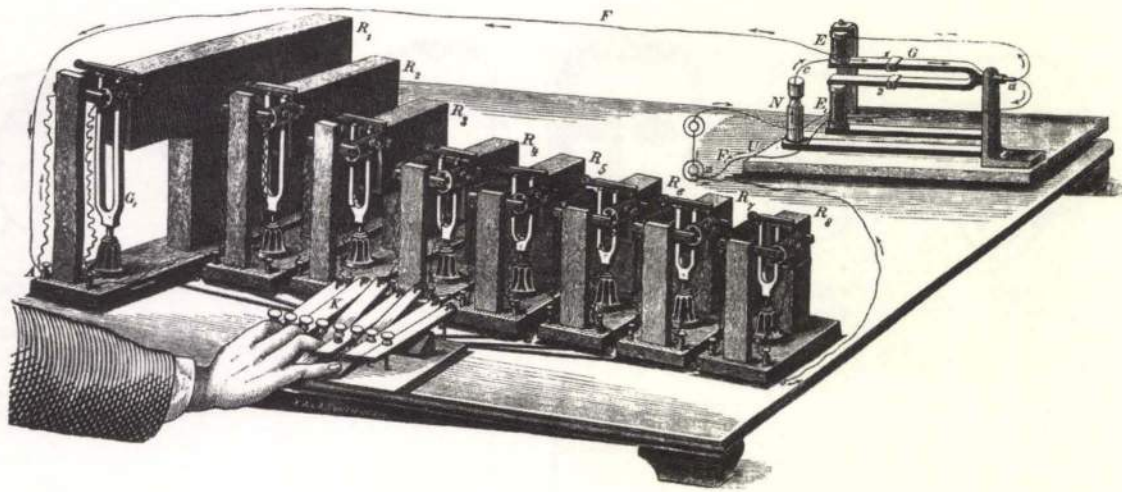
De flexibiliteit van het software-medium is vrijwel totaal. Alle mathematisch beschrijfbaar operaties kunnen geïmplementeerd worden. Zelfs het feit dat de uitvoering van elke operatie een kort, maar niet oneindig kort stukje tijd kost, en dat zeer complexe samenstellingen van operaties daarom toch lang kunnen gaan duren, is nauwelijks een beperking meer. Dit praktische probleem wordt opgelost door de *VLSI*-technologie: voor deelprocessen die te langzaam gaan kunnen vaak *chips* gebakken worden: grootschalig geïntegreerde elektronische hardware, die minder wendbaar is dan software, maar wel *heel erg snel*.

Alles wat je kunt bedenken kan je met software doen. Dat is wat er interessant is aan *ki* en andere experimentele takken van de computerwetenschap: je loopt tegen de grenzen aan van wat we kunnen bedenken. De geluidssynthese is daar een typisch voorbeeld van: de huidige synthesizers hebben een geweldige klankrijkdom, maar de geluidsimulaties van bestaande instrumenten klinken nog steeds *gestyleerd*. In de gevallen dat ze natuurlijk klinken, komt dat omdat er niet gesynthetiseerd wordt op basis van een

Mediamatic 7 # 1



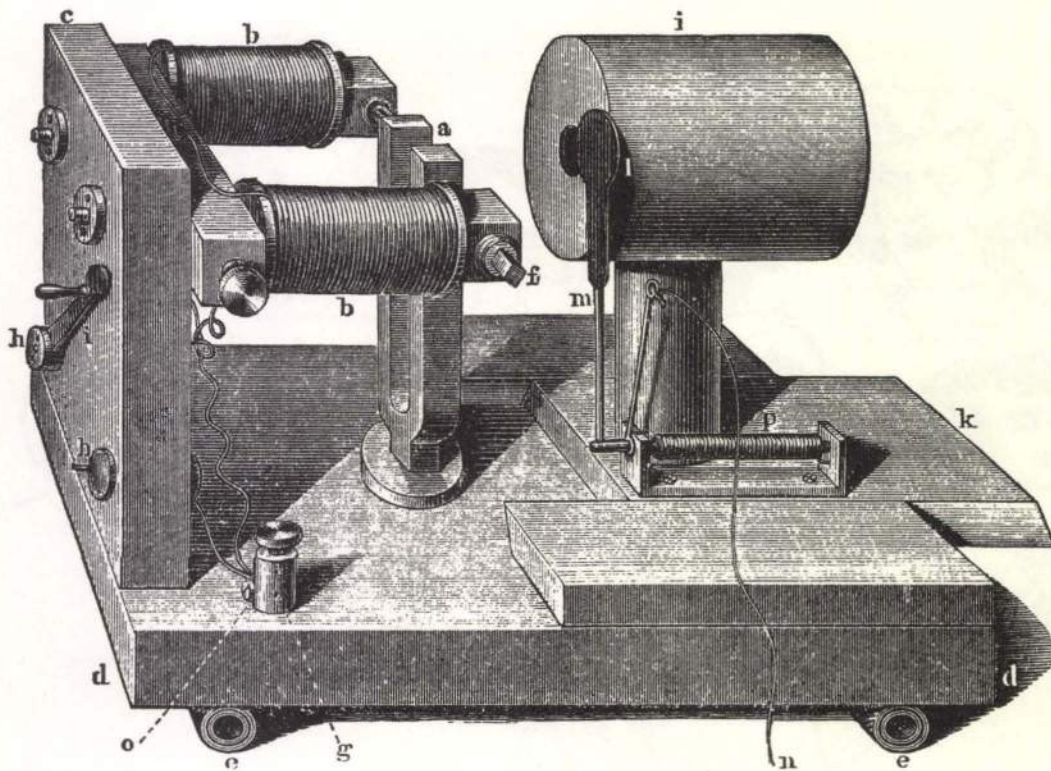
pagina 38



Mediamatic 7 # 1



page 39





ROUGH RITA



FRAIL FRANK



HUGE HARRY



PERFECT PAUL

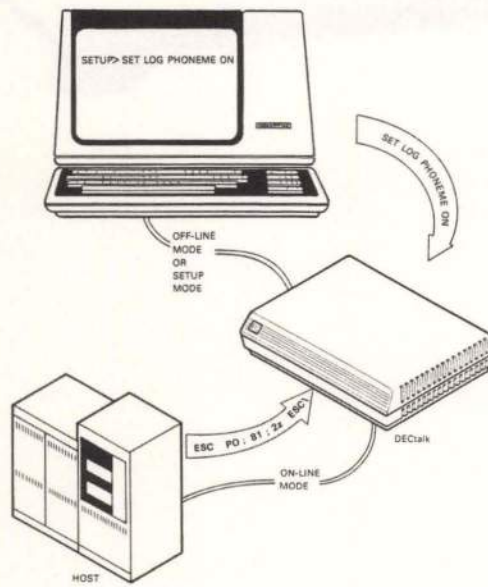


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Mediamatic 7 # 1



pagina 40



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♦ VLSI (custom-built chip) technology. It is often possible to develop special chips for sub-processes which take too much time: large-scale integrated electronic hardware, which is less flexible than software, but extremely fast.

Everything you can imagine you can do with software. That is what's interesting about AI and other experimental branches of computer science: we discover the limits of what we can imagine. Sound synthesis is a typical example of this: modern synthesizers can produce a tremendous richness of sound, but imitations of existing instruments still sound stylized. Where they do sound natural, this is because they are not synthesized on the basis of structural analysis, but on the basis of samples. In that case there is no imitation, but reproduction of a previously recorded sound. The best sounding synthesizers have a great deal in common with tape recorders. They are digital mellotrons.

Digital sound registration technology is now the technology with the highest accuracy. The basic methods of digital sound representation are thus completely adequate. The limitations of digital sound synthesis are solely due to the limitations of our understanding of the psychological structure of sound.

Platonic People

Because their speech was barely intelligible, there was not much use for the first electronic speech-synthesis systems. For example, you could not make them speak a complex text with unpredictable contents if you wanted the text to be understood by an audience.

These systems also sounded distinctly inhuman. The voice appears to be generated by an alien body which is not flesh and blood — by the angular movements of the metal components of the prototypical robot. What you hear is a machine which, in its awkward mechanical way, tries to use the human means of communication. This behaviour evokes disturbing questions about the possibilities and the dangers of technology, about mind and matter, and the nature of human identity.

But current state-of-the-art software is different. A typical example is *dectalk*.¹⁰ This program is the realization of Abbé Mical's wildest dreams. *Têtes parlantes*: not one, not two, but nine different ones; and all of them can more-over be modified and interpolated. The *dectalk* manual presents their portraits and gives them names: *Rough Rita*, *Frail Frank*, *Whispering Wendy*, *Huge Harry*, *Kit the Kid*, *Perfect Paul*, *Beautiful Betty*, *Uppity Ursula*, and *Doctor Dennis*. Protagonists of a comic strip version of *Peyton Place*.

The input for programs such as *dectalk* consists of discrete symbols. The program processes files that consist of sequences of phonemes. So there is no human control of timing and dynamics, as with the eighteenth-century machines which were operated by means of a keyboard. In spite and even partly because of this, the output has greater continuity. The software does not only contain models of the signals that correspond to the individual phonemes, but also procedures for merging the successive signals seamlessly together.

Modern synthetic voices are perfectly intelligible. And because of a more accurate control of the spectrum of vowels, the distinctively metallic quality of the sound has disappeared. But nevertheless, no one would confuse their

output with human speech. The synthetic voice is still inhuman, if only because of its uniformity.¹¹

dectalk's standard voice, *Perfect Paul*, is an abstract sounding voice, that of a newsreader. Neither machine, nor human being. This marks the birth of a new medium. Up until now, you could not listen to a text without listening to someone's body. The independent text, independent of the human body, was always the *printed* text. For the first time, language now has a sound independent of the body — a sound that directly emanates from the linguistic system, from syntax and phonemes.

The next step in this development is foreshadowed by other *dectalk* voices, such as *Whispering Wendy* and *Huge Harry*. These are more personal, but just as equable and imperturbable, smooth and continuous. Airbrush pinups. Platonic bodies.

Whispering Wendy's voice has a pure, clear sound, with very little substance — like Marilyn Monroe's singing voice, or Brigitte Bardot's. The suggestion of a soft, supple, weightless body. *Huge Harry* is *Wendy*'s macho counterpart. His voice is heavy and lustful. Not Elvis Presley yet, but not bad for a beginner.

The synthetic body has already become an erotic ideal. Look, for instance, at the use of classical statues in thirties' fashion photography: *The forms of high fashion assume the look of the statuesque, the hallowed, the classical. Living flesh has the smoothness, the soft luster of ancient marble. Stone, it almost seems, is as supple as flesh. Hoyingen-Huene makes an equation between living and not living bodies, and the equation enchants, for in his photographs the bodies that do not live are not dead. They are statues. His imagery argues that in the realm of fashion there is no death. To enter the fashionable instant is to live forever.*¹²

The future of digital image- and sound-simulation: the smooth coolness of the statue in a naturally moving body, in a sensually modulating voice. Technology is heading slowly but surely toward increasingly perfect robot-porn. Live performers like Prince and Michael Jackson are already beginning to dissolve into their computer-animated images.

When Andy Warhol invented commercial telephone sex, he suggested in the same breath that it could best be done by robots: *A robot-computer to answer the phone, that would be great. It would do the job without emotion.*¹³

Epilogue by Ultra Violet

I think back to one of Andy's earliest paintings, compelling in its simplicity — a starkly black-and-white six-foot-high Coca-Cola bottle, painted in oil on canvas in 1960. I think of the paintings of clean, shiny Campbell soup cans, the young, unlined, fresh-scrubbed faces of Marilyn Monroe, Jackie Onassis, Ingrid Bergman, so many others.

Then gradually I begin to grasp what Andy was trying to say with all his babble about machines and sex. Where sex has turned repulsive and inhuman, machine sex beckons alluringly. Only in telephone sex, robot sex, computer sex, is there escape from ugliness and cruelty. Machine sex is the only kind left that is uncontaminated, antiseptic, clean, even a little mysterious (...)

*Yes, here is still another of the endless paradoxes Andy strews along our paths. In sex, as in art, (...) he reinvents shining, pristine, early morning purity. His kind, of course: on the surface, no deeper.*¹⁴ translation OLIVIER/WYLIE/SCHA

¹⁰ *dectalk* was developed by Digital Equipment on the basis of MITalk. See: JONATHAN ALLEN, M. SHARON HUNNICUTT and DENNIS KLATT *From text to speech: The MITalk system*, Cambridge University Press, 1987

¹¹ Speech technologists are doing their best to imitate human limitations and imperfections. Allen et al. (op.cit.), for example: *Some additional pauses are introduced in longer phrases and slow speaking rate so that the talker does not seem to have an inhuman supply of breath.*

Mediamatic 7 # 1



page 41

¹² CARTER RATCLIFF, 'Out of Time', in: *Artforum International* 30, September 1991, pp. 112-117

¹³ ULTRA VIOLET *Famous for 15 minutes. My years with Andy Warhol* New York 1990, p. 163

¹⁴ ULTRA VIOLET, *Op. cit.*, pp. 165/166

structurele analyse, maar op basis van *samples*. Dan wordt er niet een geluid nagebootst, maar er wordt een tevoren geregistreerd geluid *gereproduceerd*. De best klinkende synthesizers hebben veel gemeen met tape-recorders. Digitale mellotrons.

De geluidsregistratie met de grootste nauwkeurigheid is tegenwoordig de *digitale* geluidsregistratie. De *representatie* van *het* geluid in computationeel verwerk-bare vorm is dus goed in orde. De beperkingen van de digitale geluidssynthese zijn uitsluitend de beperkingen van ons begrip van de psychologie van geluids-structuur.

Platonic People

De eerste elektronische spraaksynthese-systemen waren door hun gebrekkige verstaanbaarheid slechts beperkt toepasbaar. Je kon ze bijvoorbeeld geen complexe tekst met een niet voor de hand liggende inhoud laten zeggen, als je wilde dat die tekst ook begrepen zou worden. En niemand kon de output van deze systemen verwarren met de spraak van een menselijk persoon. De stem komt voort uit het metaal, hoekig bewegende lichaam van de prototypische robot. Wat we horen is een machine, die zich op een onhandige mechanische manier toch van de menselijke communicatiemiddelen bedient. Een geluid dat morbide associaties oproept over de mogelijkheden en de gevaren van de technologie, en over de aard van de menselijke identiteit.

De huidige *state-of-the-art* programma's beginnen langzamerhand een heel ander karakter te krijgen. Een typisch voorbeeld is *dectalk*.¹⁰ Dit programma verwerkt de stoutste dromen van Abbé Mical. *Têtes parlantes*: niet één, niet twee, maar negen verschillende, die ook nog weer allemaal gemodificeerd en geïnterpoleerd kunnen worden. Het *dectalk* manual presenteert hun portretten en noemt ze met name: *Rough Rita*, *Frail Frank*, *Whispering Wendy*, *Huge Harry*, *Kit the Kid*, *Perfect Paul*, *Beautiful Betty*, *Uppity Ursula*, en *Doctor Dennis*. De hoofdrolspelers in een *comic strip* versie van *Peyton Place*.

De *input* voor programma's als *dectalk* bestaat uit discrete symbolen. Het programma verwerkt files waarin sequenties van fonemen opgeslagen zijn. Er is dus geen menselijke beheersing van timing en dynamiek, zoals bij de achttiende-eeuwse machines die via een toetsenbord bediend werden. Toch, en zelfs mede daardoor, heeft de *output* een grotere continuïteit. De software bevat niet alleen modellen van de signalen die behoren bij de afzonderlijke fonemen, maar ook procedures die de opeenvolgende signalen naadloos aan elkaar passen.

De hedendaagse synthetische stemmen zijn goed verstaanbaar. En door een nauwkeurigere beheersing van het spectrum van de klinkers is het nadrukkelijk robot-achtige karakter ervan verdwenen. In plaats daarvan: een sonoriteit die slechts onmenselijk is door zijn gelijkmatigheid.¹¹ *dectalk*'s standaardstem, *Perfect Paul*, is een abstract klinkende, nieuwslezer-achtige stem. Geen machine, geen mens. Daarmee is een nieuw medium ontstaan. Tot nu toe was het niet mogelijk om naar een tekst te luisteren zonder naar iemands lichaam

te luisteren. De eigenstandige tekst, onafhankelijk van het menselijk lichaam, was altijd de *gedrukte* tekst. Voor het eerst heeft nu de taal een geluid dat onafhankelijk is van het lichaam — een geluid dat rechtstreeks voortkomt uit het taalkundig systeem, uit syntax en fonemen.

De volgende stap in deze ontwikkeling wordt ingeluid door andere *dectalk*-stemmen, zoals *Whispering Wendy* en *Huge Harry*. Die zijn *persoonlijker*, maar net zo gelijkmatig en onverstaanbaar. Rimpelloze continuïteit. *Air brush pin-ups*. Platonische lichamen.

Whispering Wendy heeft een hese stem die tegelijk heel zuiver en helder is — en klein, met weinig substantie, zoals de zangstem van Marilyn Monroe, of die van Brigitte Bardot. De suggestie van een zacht, elastisch, gewichtloos lichaam. *Huge Harry* is de *macho* tegenhanger van *Whispering Wendy*. Zijn stem is zwaar en bronstig. Nog geen Elvis Presley, maar het gaat de goede kant op.

Het synthetisch lichaam is al lang een erotisch ideaal. Carter Ratcliff zegt bijvoorbeeld over het gebruik van klassieke standbeelden in de mode-fotografie van de dertiger jaren: *The forms of high fashion assume the look of the statuesque, the hallowed, the classical. Living flesh has the smoothness, the soft luster of ancient marble. Stone, it almost seems, is as supple as flesh. Hoyningen-Huene makes an equation between living and not living bodies, and the equation enchants, for in his photographs the bodies that do not live are not dead. They are statues. His imagery argues that in the realm of fashion there is no death. To enter the fashionable instant is to live forever.*¹²

De toekomst van digitale beeld- en geluidssimulatie: de gladde koelte van het standbeeld in een natuurlijk bewegend lichaam, in een sensueel modulerende stem. *Robot-porno* is het ideaal waarheen de technologie zich nu langzaam maar zeker ontwikkelt — een ideaal dat door live-performers als Prince en Michael Jackson al anticiperend nagebootst wordt.

Toen Andy Warhol de commerciële telefoonsex bedacht, suggereerde hij in één moeite door dat dat dan ook het best met robots zou kunnen: *A robot-computer to answer the phone, that would be great. It would do the job without emotion.*¹³

Nawoord van Ultra Violet

I think back to one of Andy's earliest paintings, compelling in its simplicity — a starkly black-and-white six-foot-high Coca-Cola bottle, painted in oil on canvas in 1960. I think of the paintings of clean, shiny Campbell soup cans, the young, unlined, fresh-scrubbed faces of Marilyn Monroe, Jackie Onassis, Ingrid Bergman, so many others.

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Mediamatic 7 # 1



pagina 42



Mediamatic 7 # 1



page 43



♦ As its name suggests, Artificial Intelligence (AI), has the goal of creating machines that can be said to be intelligent. There has, however, been a distinct lack of success in the area of recent years. We are certainly a long way from the grand promises that were made some time ago. In his 1982 book, *The Thinking Computer*, Jastrow claimed that *in five or six years*

— *by 1988 or thereabouts — portable, quasi-human brains (...) will be commonplace.*

writing the Mind

Mediamatic 7 # 1



pagina 44

They will be an intelligent electronic race, working as partners with the human race (...) little electronic friends that can solve all your problems. Well, four years beyond this deadline we are still waiting, and we seem little closer than we were a decade ago. Indeed, if anything we are further away — aware of the magnitude of the problems.

1

Clearface Heavy

◆ There are, however, glimmers of hope on the horizon, a way forward. Recent writers, such as Bolter in his *Writing Space*, have argued that computing is a way of writing. This idea, not surprisingly, has its origins in hypertext, the use of computers to create interactive, non-linear text systems, but it can be generalised to all computing. AI has failed to recognise or acknowledge its real origins and hence grasp its future. I want to claim that it applies to AI more than any other aspect of computing — AI is in fact an extension of writing — a grammatology of reasoning. My own search in this area began many years ago when I was working within the traditional AI paradigm. Concerns about both the technical possibility and the desirability of such a project soon began to arise. It happened upon an article by a major AI researcher, Mark Stefik, in which he argued that AI should change its goals and try to create a *Knowledge Medium*, a means of communicating knowledge between people. The revised aim being to create intelligent people rather than intelligent machines. He used a number of metaphors to state his case, but one that he missed was the very one he was using to communicate with his audience — the written word. This observation prompted an investigation into writing, which threw up a number of interesting parallels between AI and writing.

Yesterday

Artificial intelligence is a curious beast. Many a popular text on the subject will begin with an introductory chapter on the sources of man's desire to create a being in his image. We read of the splendid robots of the *Illiad*, the Golem created by the Rabbi of Prague, and Mary Shelley's *Frankenstein*. It is strange that a subject seeking to be a science and based on logic should appeal to such mythical beginnings.

The history of writing, too, is full of stories that ascribe its invention to the divine, a gift from the gods. This belief is particularly strong in cultures in which writing was restricted to a special class or caste of priests. The ancient Near East, where normally only the priest class could write, abounds with mythical stories about the creation of the first writing. In Greece, however, where writing was widespread — such myths are lacking. They knew where it came from and had no need for such stories. Like the ancient Greeks, AI should acknowledge its true roots in the technologies of the word: writing and print. It may be less exciting in the first instance, but the potential is far greater. One only need look at the significance and value of the written word to our culture. It is not for nothing that it has been called *The Great Invention*.

Even the claim to independent intelligence has remarkable precursors. Among non-literate cultures, writing created a great deal of astonishment. For them, as Gelb has put it *a book is a living being which can speak*. There are many stories of autonomous intelligence being attributed to the text. In one case a native messenger refused to carry a written message as he was afraid it would speak to him. A native Australian stole some tobacco from a package, which he was carrying

with an accompanying letter, and was completely astonished that the recipient caught him, despite having hidden the letter in a tree trunk during the theft so that it could not see him.

No one today would say that a text was alive, except in the poetic sense. I strongly suspect that in few years we, too, will look upon the reaction to AI programs with similar amusement. But the desire to anthropomorphise is strong (and profitable) as Disney discovered, and may take some time to decline.

Of course, the true beginnings of writing have little to do with any of the mythical beliefs, or the creation of a new intelligence. Recent work by Schmandt-Besserat indicates that we should look to counting stones that were used for trading purposes. That is, initially the push for the development of writing was from accountancy. As Bottero (in *Goody*) has remarked, *Mesopotamian civilisation was quickly caught up in a widespread economy which made necessary the meticulous control of infinite movements, infinitely complicated, of the goods produced and circulated. It was to accomplish this task that writing was developed: indeed for several centuries, this was virtually its only use.*

Likewise, AI, through its roots in computing history, is the son of the accounting and banking software so pervasive today. As writing sought through myth to elevate itself beyond the mundane, although this was actually achieved through literature, so AI must abandon its own myths and accept that it is a form of writing. Recently it has become noticeable that as the creation of interesting conversational partners has proved so difficult, AI has ironically returned to accounting — but without looking to its potential future, as a writing, that this implies. Consider the comment of the director of one AI company who considers that *the big question in knowledge based systems (the primary form of AI system) is — can the customer develop the applications he needs to realise more efficient operation of his business?* Well, if that is still the big question, no wonder the interest in AI is dwindling. Can you imagine anyone saying that the big issue in literary theory is the content of bank statements?

Writing and AI have also shared denunciations. Despite the high status it holds today, writing has not always been considered as benevolent. Writing, Plato has Socrates saying, is inhuman, pretending to establish external to the human that which can only really exist within it. It will destroy memory, making one rely upon external means and thus weaken the mind. Similar complaints followed the development of print. Hieronimo Squarfiaco, as early as 1477, argued that *the abundance of books makes men less studious*, presumably as one would not have to learn everything but could turn to references. AI too has had its share of critics, often on the grounds that if we can get the machine to give us the answers, our own intellects will diminish. If this technology is going to take over much of our intellectual work, what remains? The critics seem to have a case. The trade magazine *Electronics* has put the case for AI thus: *the computerised expert or advisor is always alert, is never under the weather or*

Mediamatic 7 # 1



page 45

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♦ *temperamental, can work 24 hours a day, seven days a week, and cannot accept a better offer from a business competitor.* Little wonder that the public get concerned.

But Plato's worries were unfounded. In fact, writing engenders understanding by virtue of the possibility of exploration and re-examination that it affords. As Goody has remarked, *when an utterance is put in writing it can be inspected in much greater detail, its parts as well as its whole, backwards as well as forwards, out of context as well as in its setting; in other words it can be subjected to quite a different kind of scrutiny and critique than is possible with a purely verbal communication.* It is easier to recognise contradictions in the word set down, rather than in the constant flow of conversation. The invention of print continued this process, allowing the reader to consult and compare many different texts.

Similarly, one of the unexplored side-effects of AI comes from that area known as expert systems. In these, one tries to elicit the reasoning employed by an expert in some subject. This is then formalised and implemented within the computer. It has been observed that this very process aids the expert's understanding of their own reasoning, leading to a refinement of that knowledge. Some years ago I worked on a conventional AI project, designing a system to simulate the reasoning of an economist. Certainly, I would say that the most significant result that came from the project was not a working system, but myself having an understanding of economics, and the economist too found the process of trying to 'externalise' his reasoning helped him in his subsequent work. More concretely, Musen and his colleagues, while designing a system for the handling of cancer treatment, found many logical inconsistencies in the original printed material, materials that have since been improved.

Today

Maybe these parallels are more than coincidence, and AI is a form of writing. The techniques of AI have the potential to be employed as a *Typography of Thought*, allowing an author to 'write down' their thoughts. Just as conventional writing expresses what can be said, so this new form of writing can express what can be thought. It is dynamic and runs on a computer but, unlike the pretences of AI, I make no claim that this new system is thought, anymore than text is voice.

Thus, a computer procedure for metaphorical reasoning can be considered not as a *simulation* for human metaphorical reasoning, but as a *stimulation* for it. The written letter b does not simulate the sound but, through convention, stimulates us into saying it. We have conventionalised symbols for certain families of sound, and it not difficult to image creating an alphabet of reasoning. This cognitive alphabet would allow the expression of many forms of reasoning that AI has uncovered and implemented: causal, metaphorical and diagnostic to name a few. These can be assembled by an author to express an argument or narrative.

This new form of writing is unlike conventional writing in that it will be dynamic, allowing the reader to explore the implications of the line of thought. Like

Derrida's *Machine Programmatrice*, we can read the range of possible meanings within the text, seizing the text's various resources and bend them to our own purposes. This is possible because the computer allows the reader to edit and run the text in a way that the static manuscript or printed text does not easily permit. The question-answer tradition within AI is subverted and employed to allow an author to create a text. The author asks questions of his own models to create the desired appropriate response. We thus have a simple implementation of the notion of the *problematological* approach to text proposed by Meyer. The reader is now in a position to edit the questions and can generate (as the text can be run like a computer program) their own answers, addressing their own concerns.

The value of the comparison with writing is that it gives us some guidelines for designing such a cognitive alphabet and using it to create *Running Texts* (so called because they are texts that can be run). Specifically, in the first instance, significant advantage was gained when the written symbols came to be associated with the existing practice — speech. Havelock notes the original problem with a writing that is ideographic: *The shapes were used to symbolise (...) mental acts directly. They went straight to psychological processes in the brain. In a sense they were too ambitious. They were not content to deal solely with phonetic (...) finally came the systems that sought only this limited aim, of copying linguistic noises.* The attempt to bypass speech and directly represent the world was attempted in seventeenth century Europe. Some of the best minds worked on the Universal Language Project (described in detail by Slaughter) which, despite much effort, failed. It is noticeable that traditional AI continues this approach, designing knowledge representation languages that are 'deeper' than external language expression. The lesson is surely that just as writing used speech as a crutch, so any Running Text system should represent existing practice — conventional text — to carry it through the initial process of development. The output from the executable processes should be tied to, and interpret, everyday text. Once conventionalized, just as conventional writing has left the bosom of 'mother speech', Running Texts will emerge with their own expressive form — *a poetics of reasoning.*

Tomorrow

Should such Running Texts become widespread, this conversion of AI to a communicative medium would raise a new set of questions. Conventionally, arguments about the social impact of AI are predicated on the goal of creating intelligent machines. Should such systems have rights? Could they be held responsible for any mistakes? The new questions follow from the notion of AI as one of many *media* we might use, a knowledge medium.

It is certainly the case that our media seem to infect our minds. A film student of Salomon relates how their *daydreaming is influenced by movies (...)* *I have observed third person narration, flashbacks, zooms, slow-motion emphasis of action, audience viewing, re-takes,*

♦ 'voice of conscience', multipersonality dialogue, background music (...) I fear that there is very little original style to my daydreaming. It is all influenced by celluloid.

One might say that the computer is somehow different. Being a calculating device, could a computer really get into our minds? But even the simple abacus exhibits such effects. It is a technology of the intellect. It has been observed that certain users of the abacus exhibit finger movements when doing mental arithmetic. When prevented from moving their fingers, performance in this mental task fell significantly. They seem to be in the process of internalizing the functionality of the abacus into their cognitive apparatus.

There is also little disagreement that writing and print have changed both our psychology and our culture, although we may debate details. Ong has gone so far as to argue that literate people are beings whose thought processes grow not only from their own natural powers, but also from their restructuring through the technologies of writing. Indeed, for him, *all major advances in consciousness depend on technological transformations of the word*. Bolter has also made the point that writing gives the writer an awareness of himself that is beyond that given by speech; *the technology of writing is customarily regarded as the creation of the human mind, possibly its greatest creation. In fact, it is the other way around: the mind is the creation of writing*.

It is an interesting thought that by viewing AI as a medium to be used by people, AI may achieve that final goal which has proved so illusive. If a technology can truly infect those who use it frequently, artificial intelligence could arise. We would be that artificial intelligence, our cognitive apparatus restructured through the use of this technology.

Other impacts of writing were more social than individual. The concretisation of language through writing and printing produce consequences that were inconceivable with a purely verbal form of language. For example, once printers knew that each page on a large print run would be the same, they began to produce indexes. Indeed having a large library as printing facilitated made its almost imperative. But suddenly ideas became objects that could be located spatially in the text (within the *volume*), not a loose bundle of sounds lost ♦ forever. As locatable entities, authors sought copyright over their words, and citation became standard. Equally, in *Running Texts* ways-of-thinking become like printed words; we can inspect them, index them, give them to others. The potential of taking such an approach is suddenly problematic. What might an index of ways-of-thinking look like? How would I cite an extract from a *Running Text*? How would an author claim copyright over such material, allowing for its infinitely editable nature?

We should also be concerned with the pressure to standardize. Spellings and grammatical forms converged due to print. Will AI do the same to 'thought'? It is not difficult to imagine a dictionary of thought patterns, citing their first use by the *great and*

the good. The lesson from both writing and music notation is that, initially at least, the original practice — the oral tradition — becomes reduced in status. The established authorities use standardised notation to encourage standardised performance. It would be a tragedy to see the primacy of individual thought diminished.

Post-Script

Compare the public perceptions of the two technologies under discussion, AI and writing, as commonly seen through film. In Kubrick's 2001 the intelligent computer Hal is the source of all that goes wrong. In contrast, in the film version of *Fahrenheit 451* books are seen as containers of all that is great in human culture — something for dictators to destroy and for liberators to preserve.

The public perception of what AI tries to undertake suffers from this problem. But the solution is not, as one all too often sees, to try change of interface colour or improve the verbal output of computer systems to make them more personable. To do so is like arguing that the best way to encourage greater interest in nature is to improve the typography of signposts on public footpaths. No, a leap of perception of the natural world had to occur, equally the AI community and its potential users must view AI in a new light. It is this prospect that using AI as a communicative and expressive medium provides.

Too often sci-fi presents us with images of a dead society survived only by its computing machine, the assumption (either explicit or implicit) being that the computers contributed to the decline.

But if we find a ruined city with written records we do not (unlike Plato) think that the speakers of this city were in some way destroyed by the documents. On the contrary, we think that their speech was more appreciated, amplified by their writing. So *Running Texts*, the knowledge medium, might amplify our thoughts into new directions, facilitating the human dialogue between authors and readers that is a prerequisite for rational human progress. The alternative, the classic AI position of mythic intelligent machines can only contribute to a concentration of authority in those who create such systems — systems that give answers — over those who are supposed to use them.

We must return authority, authorship, to the human who creates such *Texts*, and who can then be called to account. The question now becomes not *is this computer behaving intelligently?* any more than we would ask *is this book behaving intelligently?* What one should rightly be asking is *Is the author behaving intelligently?*

Only yesterday I watched a television preview of the new film based on Stephen Hawking's *A Brief History of Time*. Unable to speak due to motor-neurone disease, Professor Hawking must write his words into a computer and the machine — in a voice that seems to come from science fiction — speaks to us. A typical AI project, but the *author* of the words is a human, a remarkable human, and they carry his humanity with them. What machine could have so much to say?

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Mediamatic 7 # 1



page 47

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Mediamatic 7 # 1

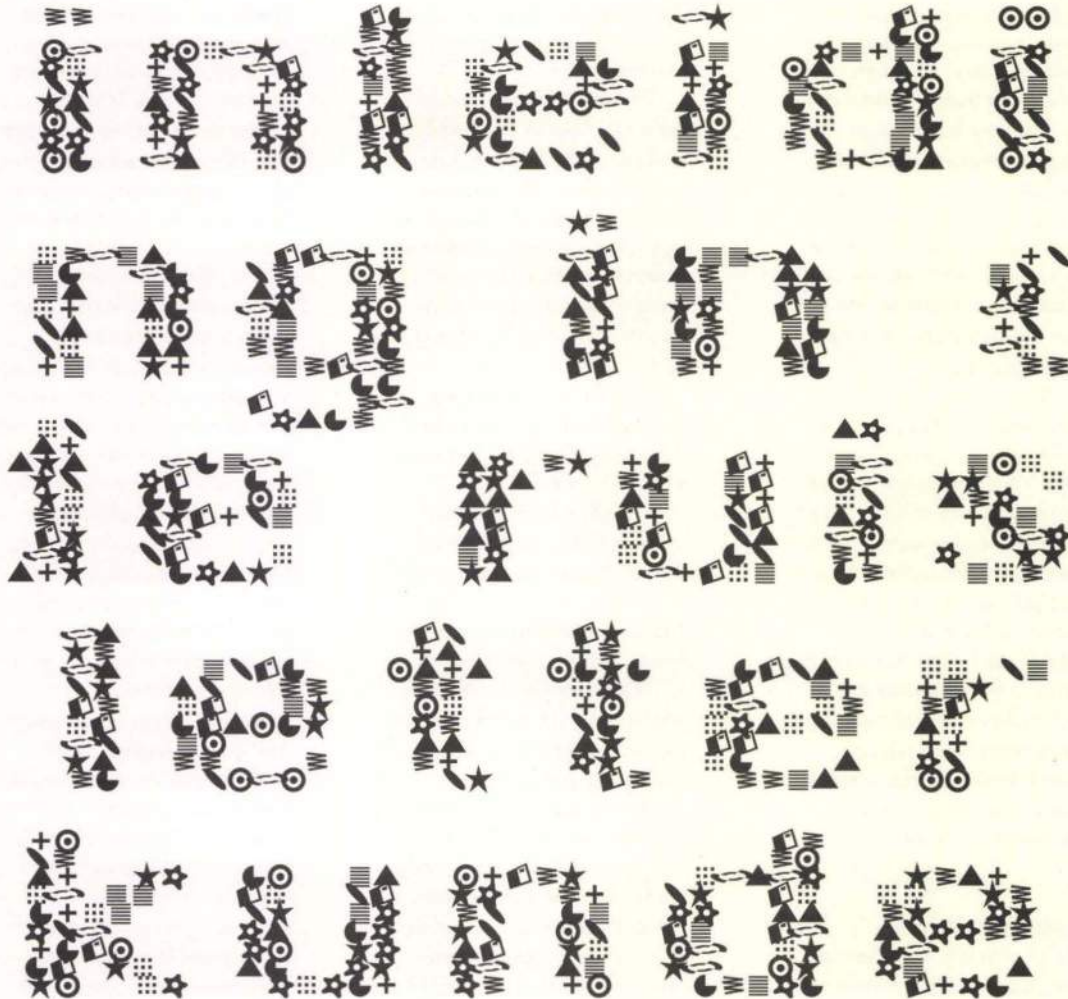


pagina 48



De informatiemaatschappij bestaat bij de gratie van duurzaam bewaarde, snel verplaatsbare data, wat met zich meebrengt dat de nauwkeurigheid van de notatie en opslag op de juiste coördinaten van het grootste belang zijn. Zodra er twijfel is over de juiste plaats om bepaalde gegevens te bewaren, of er ontypische zinswendingen worden gebezigd, is er sprake van storing.

Voor de soepele verwerking van data is waakzaamheid, ja een voortdurende kruistocht tegen de Ruis een heilige plicht.



Mediamatic 7 # 1



page 49

Introduction to Static Literature

♦ Modern information society exists by the grace of durably preserved, easily movable data; correspondingly, accuracy of notation and precise coordinates of storage are of the greatest importance.

Doubt as to where information must be stored or the use of unusual turns of phrase causes disturbance. Smooth data processing requires vigilance, indeed, a constant crusade against Static is a sacred duty.

O

Frutiger Ultrablack

In een universum van digitale data worden schrijffouten, misplaatste en onzinnige mededelingen automatisch gesignaleerd en geïnterneerd in aparte zones. Het gezonde verstand is geautomatiseerd in een digitaal ruisfilter, dat middels spellingcontroles, grammatica-checks, en een prioriteitenalarm (werkend op trefwoord) de anti-ruisridders terzijde staat. De auteurs, sysops, redacteurs en programmeurs weten wat hun te doen staat: het heropvoeden of liquideren van de data, die de storing veroorzaakten.

Daarvoor hebben zij, de functionarissen van de Datakerk, behoefte aan een fijnmazig net van expliciete criteria, die informatie van ruis onderscheiden. Gelezen met de ongelovige ogen van de Ruisletterkundige is deze doctrine een kookboek met de verrukkelijkste recepten.

Ruis, oftewel ongewenste en onverwerkbare data, misplaatste informatie, is het ruwe materiaal van de Ruisletterkunde. Om van afgekeurd format of document tot nieuwe discipline uit te kunnen groeien was het noodzakelijk uit de Datakerk te treden en een eigen domein te bezetten. Een wereldwijd elektronisch netwerk, waaraan duizenden auteurs meewerken is de werkplaats waar baanbrekend werk verricht wordt: Ruis schrijven, en schrijvend binnendringen in het binnenste van de Ruis.

Sluisregels

Zoals Dantes Hel is de Ruisletterkunde een gebied dat bestaat uit in elkaar vallende concentrische cirkels. Bij het eerste contact worden de deelnemers met hun eerste bijdrage verwelkomd in een ontvangsthal. In dit stadium is van openbaarheid en gezamenlijkheid nog weinig te merken. De auteurs kunnen elkaars teksten nog niet lezen. Dat is een van de privileges die moeten worden veroverd. Daarvoor is het nodig een aantal sluizen te passeren, die ieder op hun beurt toegang geven tot een dichter bij het Centrum gelegen ruimte.

De Ruisletterkunde maakt geen verschil tussen bestaand en

nieuw werk. Er is geen reden nieuwe of originele bijdragen aan het systeem toe te voegen in plaats van fragmenten of citaten bestaande tekst. Maar evenmin is het verplicht om dat te doen. Er is alleen proefondervindelijk verschil, het werk van sommige auteurs, zoals Dickens of Wittgenstein kunnen tijdelijk enorm succesvol zijn in de wereld van de Ruisletterkunde. De illusie dat nieuwe informatie van belang is verdwijnt aan de poort van het netwerk.

De Ruisletterkunde vermijdt het zoveel mogelijk de hoeveelheid informatie op de wereld te laten toenemen. Meer info speelt alleen haar vijand, de Datakerk in de kaart. Zij opereert tenslotte niet in dienst van de Betekenis, maar brengt metamorfosen van informatie tot ruis voort. Hoe doet zij dat?

Door een huishouding van sluizen. Een sluis is niets anders dan een cryptische selectie-functie van het systeem. De Ruisletterkunde beschikt over vele honderdduizenden selectie-criteria, die door een automatische loterij om beurten of in combinaties in werking worden gebracht. Zo is het mogelijk dat op een bepaald moment alleen teksten waarin zowel het woord 'dienaangaande' als 'Braziliaanse schone' voorkomen de sluis naar een volgende ruimte passeren. Ook mogelijk is dat een gemiddelde van meer dan vier Franse leenwoorden per 5K, of het noemen van meer dan drie niet-primaire kleuren de deur naar een volgende ruimte opent. Ook moet men verdacht zijn op negatieve selectie: het gebruik van 'bloed' of het in één tekst opvoeren van 'liefde', 'Ierland' en 'kaarslicht', kan voortgang uitsluiten.

De Ruisauteurs zijn van de criteria niet op de hoogte, laat staan dat ze kunnen weten welke eisen er op het moment van schrijven gelden. Hoe gevarieerder hun vocabulaire, hoe extremer hun veranderingen van stijl en onderwerp, hoe groter de kans dat ze de sluizen passeren. Helaas neemt ook de kans toe dat ze een van de vele geheime regels

overtreden, en enkele stadia worden teruggeworpen of zelfs verbannen naar het begin. Met het doordringen in een diepere zone verwerft de auteur zijn privileges.

Eerst kan hij het werk van enkele anderen lezen, in volgende stadia het werk van tientallen, enzovoorts, totdat hij ook het recht verwerft om voorstellen voor 'sluisregels' te doen, al zal hij nooit weten of ze zullen worden gebruikt door het systeem en zo ja, wanneer. De Ruisletterkundige wordt op deze manier getraind in het lezen van ruis. Tenslotte hebben de teksten van de anderen hetzelfde gepresteerd als de zijne om de sluizen te kunnen passeren en samen in die ene ruimte terecht te komen.

Terwijl er dus steeds meer auteurs afvallen of worden opgehouden heeft de succesvolle auteur meer inzicht in de pogingen van anderen. Langs welke wegen streven anderen naar het Hart van de Ruis? Gooien ze de syntaxis aan de kant? Gaan ze opzettelijk foutief spellen? Verknippen ze pagina's van Hongaarse kranten? Of schrijven ze in klip en klaar proza aan hun memoires? Bestaan er onvermoede overeenkomsten tussen de geschiedenis van de tweede wereldoorlog volgens Hilterman en een cut-up van de *Boerenkrant* uit 1968?

Dichterbij het Midden van de Ruis stelt het systeem de eis dat er onderling geciteerd wordt, en de auteurs hun bijdrages adresseren aan elkaar. Wat is een antwoord/provocatie/vraag op/aan wie? Hier genereert de Ruisletterkunde de zone van de Communicatieve Ruis.

In het duister dat geproduceerd wordt door de onafzienbare reeks van bij toerbeurt actieve sluisregels tasten de auteurs verder en verder, in de hoop door te dringen naar het Midden, het Binnenste van de Ruis, waar ze overzicht over alle ingeleverde teksten hebben, en misschien zeggenschap krijgen over het beheer van het systeem. Niemand weet of dat een ijdele hoop is, het is evengoed denkbaar dat het binnenste van de ruis maar een doorgangruimte is, die de auteur weer in de allereerste

Mediamatic 7 # 1



pagina 50

O

Doric Bold

♦ In the universe of digital data, written errors, misplaced and meaningless messages are automatically spotted and assigned a place in separate zones. Common sense has been automated: a digital static filter stands ready to help the anti-static knights with spelling-checkers, grammar checks and priority alarms (that work by key words). The authors, sysops, editors, and programmers know what they must do: rehabilitate or liquidate the data causing the disturbance.

To this end, the functionaries of the Data Church need a finely-meshed net of explicit criteria that separate information from static. To the unbelieving eye of the Static Literary Man, this doctrine is a cookery book containing the most delightful recipes.

Static, i.e. undesirable and un-processable data and misplaced information, is the raw material of Static Literature. To grow from unfit format or document into a new discipline, Static Literature had to abandon the Data Church and occupy a territory of its own. A worldwide electronic network kept going by thousands of authors is the workplace where ground-breaking work is done: writing Static, and, while writing, penetrating to the deepest core of Static.

Sluice Rules

Like Dante's hell, Static Literature has a topology of concentric circles. At first contact, participants and their first contributions are received in a foyer. This stage is hardly typified by its public nature and collectivity. The authors still cannot read each others' texts. This is one of the privileges that must be won. A number of sluices must be navigated, each giving access to a space closer to the Centre.

Static Literature makes no distinction between existing and new work. There is no reason to contribute new or original material to the system instead of fragments or quotes from existing texts. But neither is one obligated to the latter. Difference is determined by

trial and error; the work of certain authors like Dickens or Wittgenstein can be enormously successful for a time in the world of Static Literature. The illusion that new information is important disappears at the network's gates.

Static Literature does all it can to keep the amount of information in the world from increasing. An increase of information would only play right into the hands of its enemy, the Data Church. After all, Static Literature does not serve Meaning, but creates metamorphoses of information into static. How?

With a system of sluices. A sluice is nothing but a cryptic selection device in the system. Static Literature disposes of many hundreds of thousands of selection criteria, activated by turns or in combination by an automatic lottery. Thus, at a given moment, only texts containing both 'with respect to' and 'Brasilian beauty' may be allowed through the sluice into the next space. But an average of more than four loan-words from French in 5K or the mention of more than three non-primary colours may also open the gates to a new space. Or one must be on one's guard against negative selection: the use of the word 'blood' or of the words 'love', 'Ireland' and 'candlelight' in the same text may halt one's progress through a sluice.

Static authors are not aware of the criteria, let alone the rules that apply at the time of writing. The more varied their vocabulary, the more extreme the changes in style and subject, the greater become their chances or getting through the sluices. Unfortunately, the chance of violating one of the many secret rules and being set back several stages, even to the very beginning also increases. The author acquires privileges by penetrating into deeper zones.

In the first phase, he becomes able to read the work of a few others, then of tens of others, etc. until he acquires the right to propose 'sluice rules', even though he will never know if they have been adopted by the

system or when they become active. This is how the Static author learns to read static. Others have achieved the same thing as he with their texts, or else they would not have made it through the sluices and into that space.

While more and more authors drop out or are stopped, the successful author acquires more insight into the attempts of others. What paths do others take in their attempts to reach the Heart of Static? Do they abandon syntax? Make spelling mistakes on purpose? Chop up pages of Hungarian newspapers? Or do they write their memories in ready-made cut-out prose? Are there unsuspected correspondences to be found between the history of the Second World War according to Ludovic Kennedy and a cut-up from the *Farmer's Weekly* from 1968?

Closer the its Centre, the Static system requires authors to cite from each others' work and address their work to each other. What is an answer/ provocation/ question/ to whom? It is here that Static Literature generates the Communicative Static Zone.

In the darkness generated by an interminable series of arbitrarily active sluice rules, the authors feel their way in the hope of reaching the Centre, the Inner Core of Static, where they will gain an overview of all of the texts submitted to the system and perhaps even authority to help run it. No one knows whether that is only an idle hope, it is entirely possible that the core of static is also only a passage leading to the situation of the author when he began: alone with his own text, writing to pass the first sluice-gate, but in ignorance of the requirements the text must meet.

Ornament

Static is to information what ornament is to architecture. Nothing less than its real wealth. Static literature springs from an adventurous realisation, namely,

Mediamatic 7 # 1



page 51

situatie brengt: alleen met zijn eigen tekst, schrijvend om de eerste sluis te passeren, maar onkundig van de regels waaraan die tekst moet voldoen.

Ornamentiek

Ruis is voor informatie wat het ornament is in de architectuur. Niets minder dan de eigenlijke rijkdom ervan. De Ruisletterkunde ontspruit aan een avontuurlijk inzicht. Namelijk dat in de informatie-maatschappij die geleid wordt door de Datakerk de voorraad betekenissen beperkt is, maar dat de hoeveelheid ruis oneindig groot blijft.

De Ruisletterkunde droomt van teksten die uitsluitend uit ruis (ornamentiek) bestaan en zonder betekenis toekunnen. Misschien is er wel betekenis maar die is hier niet van belang. De betekenisbouwers van de Datakerk leveren op die manier het raamwerk dankzij hetwelk de Ruisletterkunde kan bestaan.

Natuurlijk bestaat een segment van alle deelnemers aan het Network Ruisletterkunde uit balorige adolescenten, maar voor het merendeel bedient het net hardwerkende gebruikers die oprecht geloven in de automatische evolutie van nonsens. Zij zien de Ruisletterkunde als een instrument voor het veroveren van de virtuele betekenis, van de gebieden die het traditionele databeheer en de gevestigde taal- en tekstwetenschappen tot woestijn hebben verklaard.

Hun droom is een bloeiende woestijn, waar een niet door betekenissen bedreigde begroeiing van schijndata floreert. Het Network is niet minder dan een letterkundige oersoep waaruit nieuwe werelden en nieuwe levensvormen zullen ontstaan. Het omarmen van de ruis is de levenslustige impuls van jonge, onderzoekende bewoners van het data-universum, waar de ruis en de storing allang tot de grote scheppende krachten behoren, maar die in de ogen van de Datakerk en haar Inquisitie gelden als vijanden van het systeem.

De eerlijkheid gebiedt te vermelden dat langdurige aansluiting op het Ruisletterkundige netwerk behalve dromen ook nachtmerries kan opwekken. Die zijn samen te vatten als het Futiliteits-Syndroom, waarin de ingestorte Ruisridder geplaagd wordt door het donkerbruine vermoeden dat alle data al ruis waren, dat alle letterkunde Ruisletterkunde is. Kortom, dat zijn inspanningen net zo overbodig en illusoir zijn als die van de Datakerk. Het is dit zwartgallige inzicht dat de Ruisletterkunde probeert te ontlopen, net zoals zij al haar krachten aanwendt om de menselijke hang naar betekenis en begrip te ontwijken.

In de onderwereld van de informatiemaatschappij stromen rivieren van ruis, wilde data zonder zin, produktiviteit of adres. Daar in het donker surfen de Ruisschrijvers. Hun bewegingen vormen een nieuw vocabulaire, dat niet dienstbaar wil zijn aan het project van de Datakerk (Kunstmatige Intelligentie), maar de openbaring van de Kunstmatige Domheid uitdrukt.

♦ that the stock of meanings in the information society led by the Data Church is limited, but that the amount of static is without end.

Static Literature dreams of texts consisting only of static (ornament) and devoid of meaning. Perhaps they do contain meaning, but it is of no relevance here. In this way, the Data Church's meaning builders provide the framework by the

grace of which Static Literature exists.

Of course, a number of the participants in the Network of Static Literature are recalcitrant adolescents, but most of them are hard-working computer users who sincerely believe in the automatic evolution of nonsense. They see Static Literature as a tool to conquer the areas of virtual meaning, areas declared deserts by traditional data processing and the established language and textual sciences.

Their dream is a desert in bloom, where the foliage of seeming data flourishes beyond the menace of meaning. The Network is nothing less than a literary primal soup from which new worlds and new life forms can emerge. High-spirited, searching young inhabitants of the data universe impulsively embrace static; static and disturbance have long been great creative forces, but are still enemies of the system in the eyes of the Data Church and its Inquisition.

In all honesty, it must be said that protracted connection with the Network of Static Literature can cause nightmares as well as dreams. These can be summarized as the 'Futility Syndrome'; the depressed Static Knight is tormented by the dark brown suspicion that all data were static to begin with, that all literature is Static Literature, that his efforts are as futile and superfluous as those of the Data Church. Static Literature attempts to avoid this pessimistic view, just as it uses all of its combined powers to avoid the human quest for meaning and comprehension.

In the underworld of the information society flow rivers of static, wild data with no meaning or address, producing nothing, where Static authors surf in darkness. Their movements form a new vocabulary, one that does not serve the Data Church's project (Artificial Intelligence), but, rather, expresses the revelation of Artificial Stupidity.

translation JIM BOEKBINDER

Mediamatic 7 # 1



pagina 52

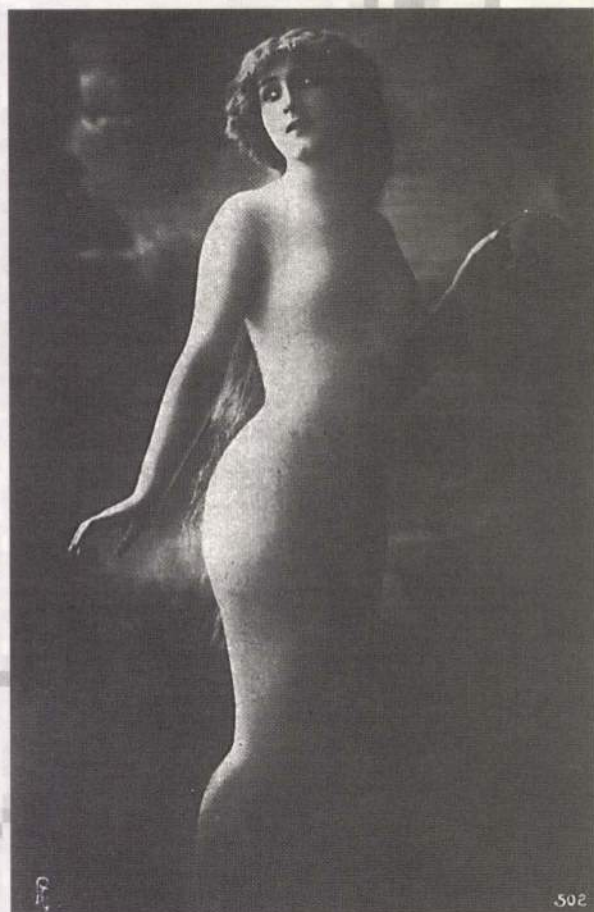




Mediamatic 7 # 1



page 53



De socialist mag in zijn reële bestaansvorm van staatsbeambte pijsnel achter de horizon zijn verdwenen, als potentiële gestalte heeft hij een ongekende toekomst voor zich. Het programmeren heeft hij met de papelel ingegoten gekregen (al in 1830 verscheen de 1.0 versie van het socialisme-programma). Bij gebrek aan geschikte hardware zag hij zich 150 jaar lang verplicht om zijn program op de maatschappij te installeren. De sociale kwestie die hierdoor werd opgeroepen, veroorzaakte de reactie die leidde tot een uitbouw van het oorspronkelijk ontwerp en tot een formidabele hoeveelheid nieuwe applicaties. Bij iedere tegenslag produceerde de socialist een volgend plan en liet zich niet ontmoedigen door illegale kopieerders als spartakisten, revisionisten, leninisten en christen-socialisten. ¶ Toen Hitler en Stalin het socialisme koppelden aan incompatibele software als nationalisme en totalitarisme, stakte de ontwikkeling van linkse programmatuur voor lange tijd. Uit de veelvoud aan toepassingen overleefde alleen de dataopslag en het bestandsbeheer, waar het historisch socialisme een ware obsessie voor aan de dag legde. Denk aan de spreadsheets met de productiecijfers van de vijfjarenplannen, de kilometerslange dossiers van de inlichtingendiensten, de verzamelde redevoeringen der Leaders en de onafzienbare reeksen formuleren en aanvragen die bij het minste of geringste ingevuld moesten worden. Dit was een maatschappijformat dat vastliep in de papieren, een leviathan die niet meer viel te automatiseren. Zelfs de complete geheugenruimte van de wereld zou tekortschieten voor de data-overload die in de archieven stond opgetast. ¶ Toch stak de drang tot programmeren in de jaren tachtig weer de kop op in de figuur van Gorbatsjov. Die moest ontdekken dat hedendaagse sociale programma's op andere hardware draaien dan de maatschappij. Het plan is nu enkel nog promotiemateriaal dat een corporate image presenteert. Toen de investeerders daarop Gorbis keten lieten doorlichten, was het afgelopen met de bankability van de Sovjet Groep. Maar met het verdwijnen van het communisme kreeg de socialist wel eindelijk de kans om z'n programmeerlusten bot te vieren op de media waarin ze het beste tot hun recht komen: computergames, mediabanken en virtual realities. ¶ Het lessen trekken uit het verleden is in het Westen al geruime tijd afgevoerd van het rooster van de levensschool. De geschiedschrijving is voltooid, van nano- tot kosmisch niveau. Alle fenomenen en objecten zijn in een chronologie ingepast: dit loopt van de eerste atoomconconde na de Big Bang, de sigaar, de bad- en slaapkamer, de anorexia, teddyberen, het sublieme, Middeleeuws eten en het strandbezoek tot het beeld van de vagina, de dood en de fijne neus van de avondmens. De complete historie is herbewerkt tot informatie en als zodanig actueel gemaakt. In de huidige geschiedschrijving staan de gemengde berichten naast de wereldpolitiek en de beursnoteringen: er zijn niet langer determinerende factoren (in onder- en bovenbouw) te onderscheiden, zoals het historisch-materialisme die nog kende. Informatie is uiteindelijk alleen maar informatie: het historisch bewustzijn van het Westen is zoekgeraakt door een te grote beschikbaarheid van het verleden. Informatie dringt nooit dieper door dan tot het werkgeheugen van de democratische burger. Alles kan vergeten worden, want de opslag is altijd gedelegeerd aan anderen (expert systems). Tot men onthutst moet constateren dat praktisch alle uiteindingen van Ja Zuster Nee Zuster zijn gewist. ¶ De socialist heeft een goede relatie met zijn eigen harde schijf. Net als de oud-marxisten heeft hij de harde leerschool doorlopen van een stalen memotechniek. History is voor hem niet een van de mogelijke aanklikgebieden, maar het domein waar het stuwende beginsel te vinden is dat aan recente data ten grondslag ligt. De socialist heeft zijn relatie met het verleden altijd als technische schakeling gelegd. Hij was van geboorte af niet zozeer revolutionair of ketter, maar een mediatechnicus. Boeken, pamfletten, kranten, stellingen, manifesten, interventies, polemiek en kritiek – het socialisme was een literaire beweging die geloofde in de overtuigingskracht van het woord om de revolterende meute in de juiste richting te manoeuvreren. De woorden lagen voor de socialist niet ten grondslag aan de gebeurtenis, maar konden deze wel sturen doordat ze een onderscheid konden maken tussen de toevallige omstandigheden van de troebelen en de ijzere dynamiek daarachter. De gebeurtenis is voor hem geen fait divers, maar voorteken. Doordat de socialist nooit bestanden wist en altijd geheugencapaciteit heeft voor meer informatie, is zijn toekomst geen onbeschreven blad en hoeft hij, anders dan de actuele westerse mens, niet telkens weer bij nul te beginnen. De westerling wordt al bij voorbaat moe van al het geduldige graaf- en zoekwerk dat verricht zou moeten worden. ¶ Voor de socialist zijn gebeurtenissen ingebed in een universum van oude en nieuwe schriftuur. Of een tekst nu voorwaarden of eindresultaten besprak, altijd resulteerde dit in nog meer tekst. Het doel was van het socialisme één enorme interactieve hypertekst te fabriceren. Men las elkaar grondig en schreef recensies van honderden pagina's. Het papier bevatte geen dode letters, maar prikkelde tot geschreven reacties. Herlezingen van verworpen auteurs waren altijd mogelijk, waarna de discussie met verve werd opengegooid en resulteerde in een nieuwe voorraad bulkteksten. Onafhankelijk van technologische innovaties en nieuwe media als fotografie, film en radio, ontwikkelde de socialist voortdurend nieuwe schakelingen, maar altijd uitsluitend binnen zijn eigen mediasysteem. Deze praktijk maakt hem tot ideale kandidaat voor beheer en uitbouw van cyberspace, dat zich ook afwendt van parallelle media en een rizoome aanlegt. De jaren tachtig hebben aangetoond dat het omscholen van schriftgeleerden tot programmeurs een relatief kleine stap is. De afwezigheid van illustraties in de soctekst vormt geen belemmering voor de entree van de socialist in het volgende beeldrijk. Hij opereerde altijd al in een groter verband dan het afzonderlijke plaatje, want de maatschappij in 3d was zijn medium. ¶ Als opslagspecialist voorziet de socialist drie opties voor het behoud van het socialisme. Ten eerste zal de volledige teksteditie worden bezorgd op CD-ROM. Maar de markt zit hier bepaald niet op te wachten, zeker nu de kapitaalschietters uit Moskou zijn vertrokken. De zuurhoudende teksttraditie verbruist en verbreekt onder de handen van wanhopige archivariissen. Alleen het Band Aid Concert Save the Archives kan nog voor de benodigde middelen zorgen. Nu het verderschrijven aan het socialistisch project langzaam wordt overgenomen door historici, die met de academische blik van de buitenstaander 'objectief' oordelen, wordt de socialist tegen z'n natuur in destructief en vernietigt zijn archief nu het nog kan. Terwijl de ex-socialisten hun fouten van vroeger opbiechten, ondernemen anderen pogingen het socialisme niet te laten verworden tot informatie. De soctekst gaat donkere tijden tegemoet van nostalgie en memoirigheid, terwijl de basisteksten hun mediale potenties kwijt zijn. Op de diskette van het socialisme is knop van write data naar

read only geschoven. Opslag van het hele socialistische vertoog is niet alleen onhaalbaar, maar bovendien verwerpelijk. ¶ De tweede optie bestaat uit het scannen van het reële bestaande socialisme. De trend om alle kwaadaardige kanten van de twintigste eeuw in een museale context inzichtelijk te maken, zal de misdaden, leugens, wanprestaties en totale mislukkingen van het Oostblok alle (disk)ruimte geven. Tegelijk zal er een wereldwijde fascinatie ontstaan voor de vreemdheid van het feit dat er honderden miljoenen mensen decennia lang gedaan hebben of er een ander systeem mogelijk was dan democratie & markteconomie. De esthetiek van het socialisme bestond erin dat het tussen een duidelijk begin- en eindpunt een volledig systeem van eigen producten, kunststijlen, mode en design wist te ontplooiën, met een verbluffende eenvormigheid. Er zullen themaparken en sensorische ruimtes worden aangelegd om dit historische fenomeen navoelbaar te maken: een tocht langs instortende nieuwbouwwijken, consumentenrijen, blaffende agenten, verklidders, militaire parades, ethische dissidenten. Het ascetische, modernistische non-design zal de cyclus van avant-garde, hype en duurzame modestijl doorlopen en het socialisme laten opgaan in de reeks van jaren vijftig, sixties, punk en eighties. Deze recycling gaat voorbij aan de grote mogelijkheden die de socialist voorziet. ¶ De derde optie namelijk is die van opslag en beheer van het socialisme als potentieel. Eindelijk is het medium binnen handbereik waarmee het socialisme gevestigd kan worden, zonder hinderlijke bijverschijnselen als politiek, management, milieu en militarisme. Het socialisme als model heeft het realiseren van de totale vrije tijd als inzet. De Sovjetstaten waren hierin een heel eind gekomen. Het arbeidersparadijs kende vele mogelijkheden om er even van tussen te gaan: wie naar z'n werk ging om er te ontbijten in de volkskeuken, ging na de koffie wat vrienden opzoeken om een biertje te drinken en een bioscoopje te pikken. Het bestaan was van een relaxte ledigheid waarin de dialectiek van productie en consumptie was overstegen. De socialistische arbeidsmoraal is te begrijpen als vroege vorm van vr. Ook in het datamilieu valt niets te beleven en ontbreekt de warensfeer. De prestatiedwang kan daar prima omzeild worden (door te doen alsof je werkt). Het socialisme als vr-omgeving is een atopie waarin consequentieloos kan worden geacteerd of toegekeken. vr is voor de socialist geen archief of museum, maar parkeerplaats van een ideale samenleving in een periode waarin de Nieuwe Wereldorde een zelfde werkdagwoning oplegt aan de hele wereldbevolking. De socialist heeft begrepen dat je dit monopolie niet moet aanvechten, maar uitzitten. Hij zit niet te wachten op de Verelending en het daarop volgende klassebewustzijn, maar knutselt verder aan z'n virtuele model, zoals hij vroeger aan zijn tekst-galaxy bleef schrijven. Tot het moment dat vr in de werkelijkheid implodeert. Dan is de socialist paraat.

Mediamatic 7 # 1



pagina 54

The socialist in his real form, that of a government official, may have disappeared over the horizon like a shot, but as a potential figure he can look forward to an unbelievable future. He was spoon-fed on programming (version 1.0 of the socialism program was out by 1830). Lacking suitable hardware, he was forced for 150 years to install his program in society. The social question this raised caused a reaction which led to an extension of the original design and a formidable number of new applications. With each setback the socialist produced a new plan, refusing to be daunted by illegal copiers like Spartacists, revisionists, Leninists and Christian socialists. ¶ When Hitler and Stalin coupled socialism with the incompatible software of nationalism and totalitarianism, the development of leftist programming stalled for quite a while. Of the many applications, only data storage and file management, for which historic socialism showed a true obsession, survived. Think of the spreadsheets with the production figures of the five-year plans, the intelligence services' miles of files, the Leaders' collected speeches, the endless series of forms and applications which had to be filled out at the drop of a hat. This was a social format that got entangled in papers, a Leviathan that was too big to be computerized. All the memory in the world wouldn't have held the data overload that was heaped in the archives. ¶ Yet the urge to program reared its head again in the 80s in the person of Gorbachev. He discovered that contemporary social programs require hardware other than society. The plan is now merely PR material which presents a corporate image. When the investors had Gorbys' chain investigated, the bankability of the Soviet Group was finished. But with the disappearance of communism, the socialist finally got another chance to vent his programming lust in the media which do it the most justice: computer games, media banks and virtual realities. ¶ In the West, the School of Life took learning from the past or the syllabus along time ago. Historical writing is complete, on all levels, nano to cosmic. All phenomena and objects have been fitted into a chronology which runs from the first attosecond after the Big Bang, the cigar, the bathroom and bedroom, anorexia, teddy bears, the sublime, medieval cuisine and going to the beach to the image of the vagina, death and the subtle nose of the night owl. All of history is reprocessed into information and made into news. In contemporary historical writing, miscellany is next to world politics and the stock market quotations; determining factors (infrastructural or superstructural) as historical materialism knew them can no longer be distinguished. Information is ultimately just information; Western historical consciousness has been lost through the too great availability of the past. Information never penetrates deeper than the working memory of the democratic citizen. Everything can be forgotten, because storage is always left to others (expert systems). Until we are forced to admit disconcertedly that virtually all episodes of certain tv series have been erased. ¶ The socialist has a good relationship with his own hard disk. Like the ex-Marxists, he learned the hard way, with mnemonics of steel. To him, history isn't just one of many possible areas to click into, but the domain where the driving principles at the root of recent data can be found. The socialist's relationship with the past has always been a technical connection. From birth, he was not so much a revolutionary or a heretic, but a media engineer. Books, pamphlets, newspapers, proposals, manifestos, interventions, polemic and criticism – socialism was a literary movement that believed in the word's power of persuasion in manoeuvring the revolting horde in the right direction. For the socialist, the words did not underlie the event, but they could direct it so that it could discriminate between the chance circumstances of riots and the iron dynamics behind them. For him an event is not a *fait divers*, but an omen. Since the socialist never erases files and always has memory space for more information, his future is not a blank page, and unlike the modern Westerner, he need not start over and over again at 0. The Westerner is already tired before starting from all the patient digging and searching that needs to be done. ¶ For the socialist, events are imbedded in a universe of old and new writing. Whether a text discussed prerequisites or end results, it always resulted in yet more text. The goal was to fabricate one massive interactive hypertext out of socialism. Everyone read each other thoroughly and wrote reviews hundreds of pages long.

Paper was not just a mass of dead letters, but a stimulus to written reactions. Rereadings of detestable authors were always possible, after which debate was energetically thrown wide open, resulting in a new supply of bulk text. Independent of technological innovations and new media like photography, film and radio, the socialist continually developed new connections, but always exclusively inside his own media system. This practice makes him an ideal candidate for the management and expansion of cyberspace, which also shirks parallel media and constructs rhizomes. The 1980s showed that retraining the scribes as programmers is a relatively small step. The absence of illustrations in soctext is no obstacle to the socialist's entering the new world of images. He was already operating in a larger context than the single picture all along, because 3-D society was his medium. ¶ As a storage specialist, the socialist has three options for the preservation of socialism. First, the complete text edition will be available on CD-ROM. But the market is decidedly not waiting for this, especially now that the sugar daddies have left Moscow.

The acidiferous text tradition is yellowing and crumbling in the hands of desperate archivists. Only a Band-Aid *Save the Archives* concert could yet provide the necessary resources. Now that further writing on the socialist project is slowly being taken over by historians, who judge 'objectively' with the outsider's academic eye, the socialist is becoming destructive against his nature and destroying his archive while he still can. As the ex-socialists own up to their past mistakes, others act in an attempt to prevent socialism degenerating into information. The soctext is approaching dark times of nostalgia and memoirs, while the basic texts have lost their medial potency. On the socialism diskette the tab has been moved from *write data to read only*. Storage of the entire socialist discourse is not only impracticable but objectionable. ¶ The second option consists of scanning existing socialism. With the trend of providing insight into every pernicious side of the twentieth century in a museum context, the crimes, lies, and total failures of the Eastern Bloc will get all the (disk) space they need. At the same time there will arise a worldwide fascination with the strangeness of the fact that for decades, hundreds of millions of people acted as though another system besides democracy & market economy was possible. The aesthetics of socialism consisted of its managing, between definite beginning and end points, to develop a complete system of its own products, artistic styles, fashion and design with stunning simplicity. Theme parks and sensory spaces will be installed to make this historical phenomenon understandable: a tour past collapsing housing developments, consumer queues, barking police officers, informers, military parades, moral dissidents. Ascetic, modernist nondesign will be shown to pass through the cycle of avant-garde, hype and timeless styles, allowing socialism to fit into the 50s-60s-punk-80s series. This recycling will not address the great possibilities anticipated by the socialist. ¶ The third option is that of storing and managing socialism as a potential. Finally the medium is at hand with which socialism can be instituted without troublesome side effects like politics, management, environment and militarism. Socialism as a model is motivated by the realization of total free time. The Soviet states got quite a distance with this. The workers' paradise knew many opportunities for getting away: you went to work to have breakfast in the people's kitchen, and then after the coffee to find some friends to have a beer with and catch a movie. Existence was of a relaxed idleness in which the dialectic of production and consumption had been transcended. The socialist work ethic can be understood as an early form of vr. In the data environment too, there is nothing to do, and the aura of goods is missing. Pressure to perform can be easily got round (by acting like you're working). Socialism as a vr environment is an atopia where one may act or watch without consequence. For the socialist, vr is not an archive or museum, but a parking lot for an ideal society in a period when the New World Order is imposing the same pressure to work on the whole world population. The socialist understands that you mustn't fight this monopoly, but wait it out. He does not wait on pauperization and the subsequent class consciousness; he just keeps tinkering with his virtual model, as he used to keep writing on his text galaxy. Until the moment when vr implodes in reality. Then the socialist will be ready. translation LAURA MARTZ

Mediamatic 7 # 1



page 55

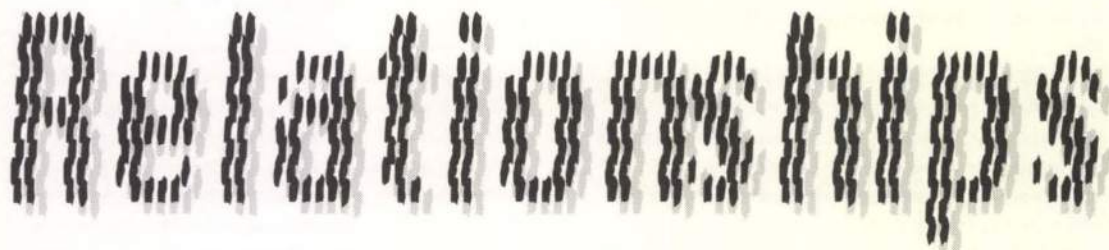
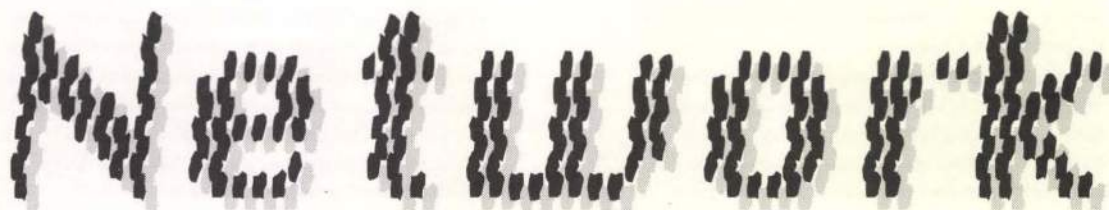
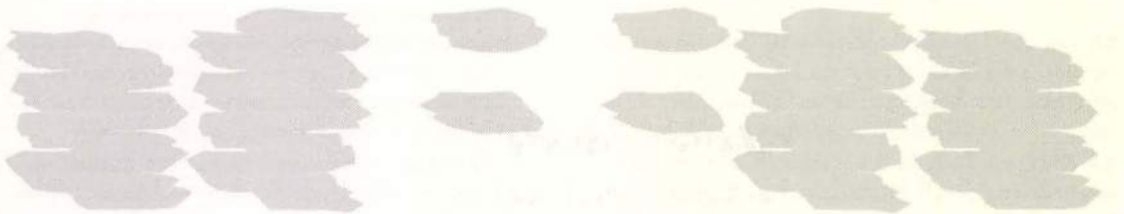


Mediamatic 7 # 1



pagina 56





Mediamatic 7 # 1



page 57

◆ *The ultimate aim of an information-based society is to enable any person to find the answer to any answerable problem.* JERRY POURNELE

◆ Having a computer on your desk and no modem is like using the Ferrari in your garage only to sit in and listen to the stereo,

I once read somewhere. A pc connected to the phone network now has an overwhelming choice of roads to travel down, from the speed limit-less spun glass Autobahns that span continents, to the short hop Local Area Networks (LANs) used by colleagues for office gossip. By modulating and demodulating digital data into- and back from the analogue signals of the phone system, the modem acts like an electronic doorman to a parallel universe of clubs, services, arenas and knowledge banks that anyone and everyone can use for entertainment, communication, gainful employment, subversion, sexual gratification, plain

old curiosity and a thousand other activities. Whether it's access to a live, global press conference, back issues of the *Washington Post*, or psychoanalytic abstracts you're after, or swapping multimedia artworks, nifty new shareware programs, snippets of new hacker lore or the latest stock quotations, the doorman always remembers your face, rarely asks for a tip and never refuses you entry for wearing sneakers.

Network Roots

◆ It wasn't until the advent of direct access storage devices in the mid-60s that the techniques behind this wealth of activities — text manipulation and on-line (interactive) operation — became practical. Before that, electronic data was stored on tape and access to it was sequential (and therefore slow) only. From simple message-passing utilities developed the now-familiar electronic (electronic)-mail. In 1971, the Nixon administration's wage and price freeze generated a sudden demand for communications and coordination among the private sector, labour groups and government policy makers, and the Office of Emergency Preparedness commissioned Dr. Murray Turoff to develop EMISARI (Emergency Management Information and Reference System), a computer-based version of the voice conference call, and the prototype computer conference system (Rappaport, *Computer Mediated Communications*, Wiley 1991).

The following year, the fact that much work in government and academia was already being generated electronically, coupled with the development of larger storage devices and advances in techniques for searching for text strings, allowed the first information services to start up. By 1989 there were 4,000 in the US alone, devoted to every subject under the electronic sun, from an exhaustive list of Pancake Recipes Database, to data from the last US census. In 1978, file exchange by the first modems was possible and all the key ingredients for an electronic community were in place.

Today, computer conferencing, bulletin boards and information retrieval systems together form a global web of interconnecting technology. This web is not yet integrated in any significant way, but gateways between centralized conferece and e-mail systems, and global networks such as Usenet, MCI mail and Sprint are growing.

From these humble, nerdy roots, with a little help from a crooked US president, the global telecommunications network has become the most complex human creation ever and the arena for an increasingly dominant share of economic and social activity. We're starting to call it Cyberspace, a developing dimension of electronically amplified human consciousness; the ultimate medium. As John Barlow said recently: *If you don't believe Cyberspace exists already, where do you think most of your money spends most of its time?*

Network Explosion

If the 1970s was a decade of experimentation and model formation, the 80s witnessed an explosion in both systems and user numbers, as well as databases and the information in them. The trend to interconnection began and is gathering pace as the 90s progress. The local LANS are linking up with the more widely dispersed Wide Area Networks (WANS), connecting to national and international networks (often through electronic or virtual gateways) which are themselves coalescing into meta-nets. Although it is too soon to speak of The Network, very soon will be. Only then will we really start to see what it — or should it be *we*? — is/are really capable of.

There's big money being put on the table to make sure it happens. During the next decade, estimates Northern Business Information, *more money will be spent on phone equipment than has been spent since the invention of the phone in*

1876. If I wasn't averse to their use, I'd have used an exclamation point there. Sales are expected to nearly double from \$101.6 billion in 1991 to \$192 billion by 2000. This kind of money does not slosh around the global economy without leaving some pretty major change in its wake.

If you read the right magazines, you can be forgiven for believing that what the world needs now is billions of dollars of new glass fibre lines — Highways for the Mind, as they've been dubbed by those pushing the vision. Available bandwidth (the measure of how much data can be squirted down the line in a given time, measured in kilo- or mega-bits-per-second) is expanding all the time. So-called T1 (1.5 mbps) trunk lines are common, T3 (44 mbps) are already available and by the end of the decade, 100—500 mbps will be common, while gigabit-per-second and faster technology has already been demonstrated by researchers.

Each increase in bandwidth expands the uses of the network, and the media that can be used on it. In 1975, when messages were passed from one machine to another, round trip delays in electronic text communications of several days were not uncommon. As network speeds have grown, so the media we can use on them have expanded from text to graphics to Voicemail to video and eventually to HDTV images — all further extend the power of the phone line. The plain vanilla e-mail medium is splitting into a whole tutti-frutti of electronic media.

Smarter is Faster

However, telling us we need Highways for the Mind now (and subscribers and/or government should pay for it) is disingenuous, to say the least. For one, we're going to get them anyway through natural upgrading. Glass fibre is cheaper and easier to install and maintain than the old copper wires. Secondly, it disregards the equally important role of the intelligence of the communications terminal (computer plus modem) being used. Smarter machines can use smarter compression techniques and better interfaces with the network, more intelligent modems can send and receive data quicker, irrespective of the network speed.

Nicholas Negroponte, director of MIT's Media Lab, uses a 'wink' metaphor to explain why bandwidth is an over-rated necessity (*Scientific American*, September 1991). A wink (1 bit) across the dinner table to a friend may convey an enormous amount of information — say, 100,000 bits or a compression rate of 100,000 to one. The transmitter and receiver share a common pool of knowledge and experience and they have the intelligence to put the wink in context. We cannot look at bandwidth at the expense of the intelligence of its terminals (which itself is growing at a phenomenal rate, as is the speed/price ratio of modems, and compression technology). We can already send video signals down the old T1 wires. Both channel and computing capacity used imaginatively will lead to useful services and products in the future, not one. It seems possible, even likely, that this combination will lead to the demise of text-based communication, as VR goggles, and multimedia video images, etc. become cost effective.

Far more significant are the social barriers to cyber-paradise. As the range of services and options available increase, so training time and costs to use an expanded data network grow too, demanding significant commitment from employers, and effort from users to master complicated

Mediamatic 7 # 1



pagina 58

◆ interfaces and sophisticated search techniques. Both have been overestimated by network architects, to whom networking was both easy and its benefits obvious. At the same time, by extending the power of the desktop to reach any corner of a corporation (in the sense of 'group of collaborating humans'), and beyond, the 'risk' that traditional lines of corporate communications are bypassed is increased.

Equally importantly, the very construction and functioning of most electronic media ensure messages sent leave an indelible audit trail as they move around the network. *The immediate availability of such records is a potential political problem and may be the primary reason for the resistance to this form of communication, claims Rappaport.*

He illustrates the point with an episode from the recent past. When the Exxon Valdez hit Prince William Sound in 1989, communications between Exxon HQ in New York, the US Coast Guard and Alaska were conducted through one fax machine (all the public phones were jammed with calls). Exxon set up an emergency office in Houston and asked Notepad International Inc to submit a proposal for facilitating communications (this a week after the spill). Notepad's proposal emphasised not only the comms. capabilities but the auditability of the electronic trail. Exxon's reply was a *thanks, but no thanks*. According to Notepad, the system could have been up and running in hours. About three months later, an Exxon employee claimed to have 'accidentally destroyed' a tape containing all records of communications about the crisis.

Communications software and potential revelation of culpability go hand in hand. The threat to management comes from this unquestionable documentation of the negative (although records will also reveal who made good moves and suggestions too). Can the rising call for public accountability of governments and corporations be stemmed much longer? Rappaport fears that managers, who have achieved their status largely on verbal skills (and the ability to cover their asses, claim credit while avoiding blame, etc) fear alteration of the communications landscape towards text skills. *This very fact may prevent text conferencing from ever achieving a significant impact on the American corporate scene, says Rappaport.*

The legal and ethical questions surrounding our march into cyberspace also threaten to disrupt a smooth transition to this new era in human communication. As the network and its human creators are corkscrewed together in increasingly committed symbiosis, so the flaws in our half of the partnership become intensified. The primary symptoms are an increasingly urgent need to answer questions such as who owns the knowledge on the network, how do we ensure equitable access to it and how do we protect our privacy and the security of our data? Beneath these are deeper questions such as what is wealth and creativity for? What do we mean by equitable? How do we address the grievances of potential electronic terrorists? What does it mean to be human? These are questions which have to — maybe more importantly, *can* — be attended to synchronously with the development and extension of our new symbiotic partner.

Cosmic Networks

Peter Russell (*The White Hole in Time*) approaches this issue by backtracking a few tens of billions of years to get the wider angle. Throughout the evolution of the cosmos, says Russell, the amount and speed of information (change) has been growing through positive feedback as creativity begets more

creativity. The more things that exist, the greater the chance of more existing. The evolution of matter took around 10 billion years after the Big Bang to occur. Once complex chemicals had allowed the evolution of life, the rate of change increased. The evolution of sex whipped things up a bit more, and so did the evolution of multicellularity. This in turn enabled nervous systems and brains to come onto the scene, again speeding up the rate at which change occurred.

The human brain — the most complex structure yet observed in the universe — allowed the evolution of language, as significant as the evolution of sex. We no longer had to build up all our experience from scratch but could pass it on across generations and the *meme* (idea) began its journey to replace the gene as the currency of human evolution. We began to see order in the universe ask questions — science was born, along with philosophy and theology. Time was extended beyond the 'eternal now' into past and future as we became conscious that we were conscious, an eye on the universe which through us was able to observe itself.

Each new step forward quickened the pace at which change could occur, like a huge spiral whose first revolution took 10 billion years, it tightened in on itself as the spiral's arms got smaller and smaller.

Our opposable thumbs also allowed the development of tools and technology, giving us immense power to shape the environment. Agriculture, fire, the wheel — all increased our leverage, extending life's ability to collect, process and store information to the stage where we needed electronic brains (computers) to sort through it, again tightening the spiral with positive feedback. The spiral is now so tight, its turns now take just years, soon months. How long can it go on?

The headlong rush has created unparalleled opportunities for disaster, Russell claims as result of our detachment from nature. Our best, if not only chance of making it through to the end of the spiral (to God knows what's in store) is to explore the last domain, the inner self. Russell calls for a Manhattan Project of the Mind to develop technologies for the management and understanding of the mind.

De-bugging our Human Software

Still prone to the greed, paranoia and aggression of our ancestors, Mankind is like a cancer or a viral program that keeps us growing uncontrolled at the expense of the organism (Earth). Although greed, paranoia and aggression had their role to play in the development and success of humans, today they are not just inconveniences but lethal bugs in the software of the mind, rather than the hardware of the body. Russell's Manhattan Project of the Mind would be a project to de-bug our software.

Such a project would be the largest and most important in our history. The only way it could be achieved is through the networks. Only the networks have the speed, reach, storage capacities and interconnectedness necessary to handle the flow and exchange of information necessary.

The psychotherapeutic and imaginative uses of a fully-functioning cyberspace have been widely discussed, but the promise of group collaboration across and between academic disciplines, the electronic audit trail mentioned, on-line political activism and fundraising, all combine to make cyberspace the key to personal, societal and global survival.

But to get there, one of the biggest hurdles we face is the question of security, from cybervandalism, government and

Mediamatic 7 # 1



page 59

♦ commercial intrusion of privacy, blackmail, terrorism and so on. The technology for 100% security already exists, but the us government (the de facto standards setter in computing thanks to its huge power of patronage) consider the main techniques military critical technology and subject to export controls. They even keep trying to insert a right to tap amendment to the various communications bills that come before Congress, like a bunch of old men hanging on to their childhood security blanket while the world transmutes around them. Until the question of security is answered to the public's satisfaction, the potential of cyberspace will remain neutered. What no politician I've ever heard appreciate is that the shift to a networked society necessitates a move to a new system of social control based on fairness, tolerance, mutual need and diversity rather than fear, coercion and monopolisation of material and geographic resources.

In the meantime, the FBI has a growing role call of heavy-handed and inappropriate action against electronic information users and service providers. From within the cosy, congenitally tolerant and mutual society of Holland, it is easy to downplay the problems of privacy and censorship. The Dutch *Grondwet* (Constitution) guarantees that telecoms carriers have no say over the information carried, and the government takes it seriously. Yet even here, the tram ticket inspectors are already carrying CD-ROM players loaded with a complete list of names and addresses of Amsterdam residents (to check up on fare dodgers giving wrong addresses). There are opportunities for abuse of electronic data we are only beginning to dream about. The European Community is currently tendering for suppliers to build the European Nervous System, a high-speed data highway similar to that proposed by the us National Research and Education Network. This is designed to link up taxation, customs, police and emergency services Europe-wide. Barely a peep from the non-specialist European media about it.

Being British, I have more time for the fears of the likes of the Electronic Frontier Foundation (EFF). Britain has over 100 laws restricting access to information. The Thatcher years were notable for the number and range of cases brought against journalists, civil servants and members of the public who revealed embarrassing details of government shenanigans. MI5, the primary internal security force, has just moved to a spanking new, state-of-the-art headquarters in London, said to be filled to the rafters with electronic surveillance and counter surveillance (and counter-counter surveillance for all I know) equipment. We need organisations who care about and lobby for the right legal and technical cyberspace.

For the record, the EFF has published a set of principles of network access.¹

There are many other areas of legality that need ironing out as well, such as who owns the text posted to a bulletin board? Compuserve claims 'compilation copyright', while leaving individual texts under ownership of their authors. What rights of editing do sysops have? What is an author? The problems of legal and political barriers will be harder to solve than the technical. Says Rappaport: *Universal access is unlikely before a world government is in place.*

The price of access to the network is still based on the (inflexible and expensive, especially in Europe) phone billing system. With an ISDN network, connectionless service is

possible, private-public network differences disappear, the trunk-and-branch topology disappears, as does the concept of a network backbone, as any computer can establish identical connections to every other node as required. Self-routing datapackets whiz through the net making and braking connections in microseconds. The network itself becomes a huge processor with its own high-speed storage, dynamically moving, replicating, modifying data and adding or deleting control or accounting information as it passes from connection to connection. From the view of the network there are no users or circuits per se, only self routing, variable packets of data. Prices should reflect this, perhaps by charging for the number of nodes visited rather than amount of time logged on or the distance travelled.

A Network for Who?

The benefits of using a network increase the more people are using it. Companies have consistently overestimated the motivation of the mass market to use information services. The problem is that the more there is to watch, the less the untrained user feels inclined to spend time getting to know their way around. The problem of the personal commitment needed to use the services has not been tackled. Motivation was taken for granted by software authors. Games, telerotica or a Rupert Murdoch-like entrepreneur (*Play Cyber-Bingo and win a Ford Fiesta* or later, *Bonk Sam Fox in Cyberspace!*) may be the best bets to bump-start a mass market. Office gossip and politics are great motivators, but it is just this sort of use that many managers have been keen to stamp out, for reasons mentioned earlier.

Nor should discussions be confined to getting the affluent North alone on-line. In fact, with their traditions of oral storytelling, shamanism and mystic paths to enlightenment, the 'developing' nations have a major role to play in the building of cyberspace. Where on-line technology has been put in the hands of indigenous populations, their reactions have been to show an acceptance and comfort using it that would shame many a grizzled old exec. Dave Hughes, a Colorado techno-pioneer, gave a workshop in using the combined text/graphics code NAPLES to a group of native American artists last year, and found a people who could share his vision and then expand it (*High Performance*, Spring 1992).

In the hands of the Sioux, Crow, Navajo and Assiniboine artists, NAPLES had become an *algorithm with soul*. With it they created bold colourful graphics and sent them to each other down the phone line and stored them in a virtual library. The works recreated stories sketched out in the sand by grandfathers, tales of shamanic flight. Virtual reality had been discovered by indigenous peoples aeons ago. *At a time when Future Shock is becoming a permanent state of mind and philosophers grimly ponder how the proliferation of new technology will affect our lives, the Indians are excited by the prospect of reintegrating the cultural values of their ancestors,* concluded the article.

It seems we could all use a little reintegration around here. After dividing and differentiating knowledge for hundreds of years — with, let's not forget, some great achievements — it seems that to go any further it's imperative we stand back and re-integrate it to give a more encompassing and meaningful model of nature that takes into account the whole of human experience. Such a broad brush vision painted in cyberspace is not only desirable, it's crucial.

1. Establish an open platform for information services by speedy deployment of personal

Mediamatic 7 # 1



pagina 60

2. Ensure competition in local exchange services
3. Promote First Amendment free expression by reaffirming the principles of common carriage
4. Foster innovations that make networks and information services easier to use
5. Protect personal privacy
6. Preserve and enhance equitable access to communications media.

Rumour has it...

◆ The computer is the canvas of our time, on which we inscribe our beliefs and read the stories we tell ourselves.

The quality of the canvas determines the quality of our communications. To date, computers have been simple, recording few of our stories and only known questions being answered. But the times, they are a'changin.

The last decades left us with the feeling that computers deal with predictable, controllable, consistent and *true* data.

If a computer is not a clean machine, then what is? The next decade will bring us the computer as the world in which the unknown is as common as the known, where dark pockets of data are waiting for us to release their riches...

Mediamatic 7 # 1



page 61



◆ Apple's Advanced Technology Group created *Rumour Monger*. It is software that does only one thing: it spreads rumours on a computer network. It is part of a research project into new ways of distributing information. Its workings are simple. A small piece of software runs on every machine on the network, allowing users to write and read rumours while storing and exchanging them in the background without disturbing the user. Rumours (text that users enter with their keyboard) are stored on the network, distributed over the different computers. If the user wants to add a rumour to the rumour pool, he chooses *new rumour* on one of the screen menus. A small window appears in which text is typed. He hits the *spread rumour* button and the rumour disappears from his screen. The rumour monger on his machine becomes active every couple of minutes and contacts a few other rumour mongers it can recognize. Then it exchanges 'new material'. Because they, in turn, do the same, all rumour mongers constantly exchange rumours. Users view rumours in two lists: 'unread rumours' and 'read rumours'. Double-clicking on a title in the 'unread' list opens a window to display the text of the rumour. After reading it and closing the window, the title reappears in the 'read' list.

The interesting part is what controls this environment: what determines when rumours are no longer rumours? The initiator can set a time limit on the rumour for it to deactivate itself. The other rules in the rumour-ecology determine 'hot' and 'cold' rumours. A first-time rumour is 'hot' and spreads from machine to machine. When a rumour 'meets itself' its status on that machine is changed from a 'hot' rumour to a 'cold' rumour, and two different algorithms determine how cold a rumour should be to become inactive.

A Case:

Such 'enabling technology' creates new possibilities of communication, and a group of 50 of us at a Dutch tv station lived on this new 'canvas' just to see what would happen. The following case-study charts our experiences of interacting with something that turned out to be confusing and left us changed. We installed the software and told everybody in simple terms what it was and how to get it to work. It turned out that software that spreads rumours is *uneasy* — you don't know what to do. Spread rumours? Reactions ranged from questioning looks and disbelief to outright irritation. It takes some persuasion before people accept that an electronic space for rumours might be interesting.

When I decided to use it the first impression was one of effort: spreading rumours is no self-evident activity. The new 'canvas' made me self-conscious. Rumours tend to be associated with soft-spoken secrets, while speaker and listener glance around to check for others listening. So what happens if I use software doing just that explicitly? Should I type softly or use a smaller font?

There's also the problem of the *rumour* itself. I sit in front of my screen and wonder what actually is a good rumour (Something that is wrong? Something that is right? Something about somebody?) Making up a rumour suddenly seems hard, while recognizing one is simple. Is a rumour determined by its content, by the way it's communicated? Or both?

Reading rumours seems more exciting and certainly easier. I open every incoming title in the 'unread rumours' window

immediately. All kinds of texts pass by my eyes. But few are the hot stuff I was waiting for. I'm not the only one that fails to produce rumours-on-demand. What's more: it seems that most of the messages concern the new medium itself: asking questions about its use, useless comments and others of a *testing testing, 1-2-3* nature.

The first days on rumour monger have no class. Confusion abounds for some weeks. Conversations try to delineate the what-is for an acceptable rumour, and rumour monger is not a good environment for conversations. The question *How does this work?* is a question and not a rumour. Rumours are statements that reveal, answers to questions un-asked. Is *Who is the smiling woman on the third floor?* a sort of rumour? It certainly persists on the network while scoring a number of possible cues. A powerful rumour is *A promising journalist that used to be a squatter is on leave in Turkey where his holiday is paid for by the dictator...* (who is it? and what is this connection to a dictator? That's something I'd like to know!) But how often do you run across a rumour like that?

All good rumours seem to concern something I want to know. But the software spreads all rumours to everybody and it's hard to think of something that *everybody* really wants to know. The distribution of spoken rumours is within a sub-culture that values the information, it reaches just the right people. A rumour contains information, but never *common* knowledge. It seems to strive to become known.

Spreading rumours to everyone, I reach the right people, but also all others. I will have to phrase the rumour carefully to avoid problems. Is a rumour of value to some just because it is not known to all? One solution is that I write in code, with secret allusions that only mean the right thing to the right person. I create a semantic sub-culture to make my rumours more effective. *BD loves AD* means more to me than it does to you: and it's new to me.

The software plays other tricks on us. Rumours spread from machine to machine in unpredictable order or time. Users are tempted to answer a rumour, thereby starting conversations. While this may happen 'in turn' on their machine, on the next machine the answer may arrive before the question! Some people find a way to construct stories where every statement is complete in itself, but it clearly takes effort.

Then there is a maintenance problem: cleaning the rumour lists is not an advisable thing to do. When I clean the lists (there is a command that does it), the active software always amasses rumours, and after a couple of hours I'm left with as many as I threw away. With over a thousand rumours it takes more than a day for all rumours to turn up again, but they do. The rumour itself determines if it is 'active' or not, and there are no other 'filters' that I can use. They grow on me like fungus, giving me a feeling of the network having a life of its own, as if I'm part of an environment that is, at least partly, beyond my control — just like most other things in normal life but unlike most information systems, that behave so predictably.

Rumour monger also gives us a new kind of freedom: to know without knowing and say without saying. The fact that rumours don't have the name of their creator attached is a new experience. It's a new way of telling stories, building an environment of shared knowledge that is nothing more and nothing less: knowledge shared equally, with no separation between the knowers and the non-knowers. This new class

Mediamatic 7 # 1



pagina 62

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♦ of information gives new vitality to the inhabitants of the network, hearing the unheard-of from the insides of the organization.

How, in the end, did it survive? It didn't. We had to remove the software because it interfered with the communication hardware that connects the different networks into the wide area network. It blocked them and made that we couldn't do our normal work. We took a chance, and it was fun while it lasted.

What did we Experience?

We can use sociology or information technology as the starting points for understanding the experience. *Encyclopedia Britannica* treats rumours under 'collective behaviour'. As a social phenomenon it has four conditions: both the interest and the ambiguity about an event must be high; the demand for news is greater than the supply of information; the group shares the need to act but is reluctant until the situation can be better defined and they need to act in concert.

These conditions appear in three situations: firstly in totalitarian environments where information is strongly controlled, secondly when events threaten the understandings on which normal life is based and lastly when a strong, shared incentive to act is blocked in some way.

We never thought about them in this way, but felt it. While we were struggling with the creation of rumours the organization was at peace. But when it went through a really rough patch recently, I overheard people saying that with rumour monger the situation wouldn't have gotten out of hand the way it did. These events which threaten the understandings on which normal life is based suddenly brought rumour monger back to mind, but now as an instrument of direct social change.

Another approach is the 'distribution of information' as the spread of ideas: rumours as waves in the organization's meme pool. They might be compared to viruses, all of which have one thing in common: they spread themselves, duplicate, promulgate, multiply or reproduce 'just because'. What else they do makes all the difference: some don't do anything, some do nasty things, like give people flu or erase their hard disk. Rumour monger is like this: spreading ideas without hesitation. Even if we want the bad to stay put, what if we have a way to spread the good and just? What if we had an engine that amplifies good ideas by bringing them into contact with others, human or electronic? We would increase variation, stimulate people to change by providing information in new ways. Based on our own experiences using networks the last seven years we know that the stimulation of variation increases the effectiveness and the quality of an information network. Old information systems try to handle complexity by reducing the variation, increasing the predictability. New networks control complexity by coordinated stimulation of variation. How should we stimulate this in order for it to be productive is something that needs to be researched. Rumour monger might be one of the instruments.

Artificial life researcher Thomas S. Ray creates computer simulations of simple organisms competing for survival in cyberspace ('Living together': *Cybernetic Parasites*, *Scientific American*, Jan.1992). His artificial ecosystems remain more diverse when parasites are present. In some simulations, only eight out of 20 unparasitized species survived. With just one

type of parasite, twice as many host species persisted. Can some ideas be compared to parasites? Could rumour monger have supported the longevity of the inhabitants of the information environment?

Yet another angle is the introduction of an existential dimension in information systems. Here the sociological and informational approaches meet. Information systems carry 'descriptions' of the organizations they mirror. Today, these provide only a narrow view on the world that is the organization. Rumour monger adds a layer of existential meaning that changes the information system into an environment where networks are not only keepers of information, but link us into webs that supply meaning beyond and above mere data in databases. Tools like rumour monger support the tender communications between people but add little information with 'direct use'.

This reminds me of *thick descriptions* — a term coined by philosopher Gilbert Ryle - that appears in ethnographic multi media. Ricky Goldman-Segall, who worked at the MIT Media Lab and now runs Merlin (the Multimedia Ethnographic Research Laboratory) in Vancouver wrote on thick descriptions in 1989, quoting Clifford Geertz:

Thick descriptions are descriptions which are layered enough to draw conclusions and uncover the intentions of a given act, event or process. In a video environment, thick descriptions are images, gestures, or sequences that convey meaning. Neither the quantity nor the resolution of the images make the descriptions thick. What creates thickness is the ability of the visual description to transmit what is really being 'said' (...) they provide us with a way to articulate the meaning of what we see, and, they help us to come to terms with one of the problems inherent in observational research — the fact that it tends to resist any kind of systematic evaluation and, like all interpretative approaches, it is 'imprisoned in its own immediacy or detail'. (*The Interpretation of Cultures*, 1973)

It is the *extra* that seems to bring life to things. Geertz' treatment concerns anthropology, but it certainly has parallels. He states that people are *suspended in webs of significance*, a viewpoint he attributes to Max Weber. Anthropology, by separating the thin from the thick descriptions, sets up a hierarchy of meaningful structures to gain a more insightful view into organizations:

As interworked systems of construable signs (what, ignoring provincial usages, I would call symbols), culture is not a power, something to which social events, behaviors, institutions, or processes can be casually attributed; it is a context, something within which they can be intelligibly — that is, thickly — described.

The understanding of how the symbolic is interwoven with all aspects of an organization will give us a way to understand that culture. Rumour monger adds to an organization like 'thick description' to an event. It brings the life of the organization out into the open, exposing it for all to see and participate in. It is 'extra' information without a value 'in itself', changing the environment of the organization in which the data exist. It provides meaning by modulating the user instead of his data.

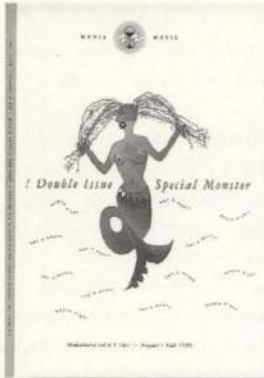
Software like rumour monger is playful, but no game. It creates a new class of information, a new 'shared environment' where people coordinate their activities in new ways. It is one of the mechanisms that infest networks with more humanity by providing nothing more than an electronic virtual space where the constraints for communication foster variation. It left us as different people.

Mediamatic 7 # 1



page 63





4#1/2

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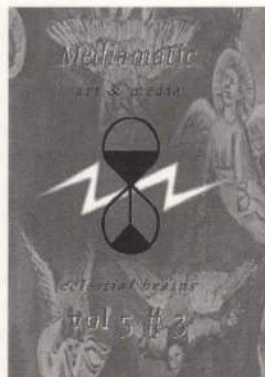
pagina 64



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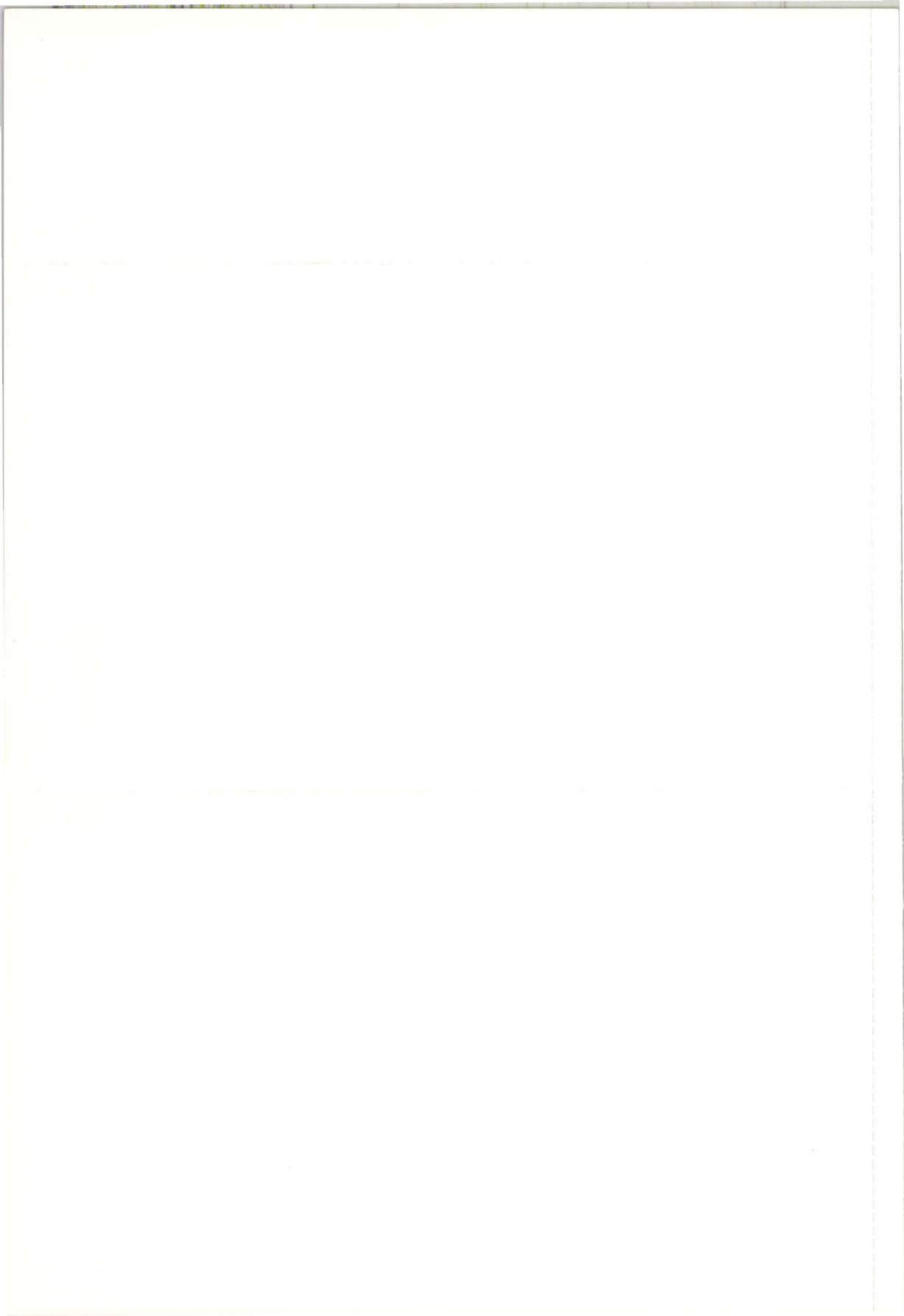


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Mediamatic 7 # 1



page 65

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7#4/8#1 Audiovisual Architecture Issue June 1993

Dubbelnummer in samenwerking met *Telescope Magazine* uit Tokyo Double issue co-published with *Telescope Magazine* from Tokyo.
 Over het grensgebied van Stedelijke-, Architectonische- en Mediaruimte. Kan men in een Media Wonen? Zap-Steden en Vloelbaar Kristal onder één Kap!
 • Cross overs between Urban, Architectural and Media Space. Can one Live in a Media? Zap-Cities & Liquid Crystal Cottages. Communication Architecture!

I

War,
Tidal
Waves,
isdn
and
Cyber
space

Mediamatic 7 # 1



pagina 66

♦ As every schoolboy knows by now (not least thanks to Friedrich Kittler), war is the mother of all media-technology. The Gulf war was a media war, a showcase for media equipment developed for the battlefield, presented to emerge purified on the business and home consumer front. Older media originated for the command of troops and surveillance of the enemy include the telegraph and telephone, computers, networks, as well as digital and glass fibre networks.



◆ The telescopically extended view of the CCD camera in the tip of the Cruise Missiles onto the tv screens witnessed during the Gulf war demonstrates the continuum of media for C³I (Command, Control, Communication and Intelligence) and media for mass coverage of war. The latest link between the two is ISDN. France Telecom has been utilising the heavy use of its ISDN video-conferencing facilities during the war as a sales argument in the Japanese market. FR's other major PR-event was the Olympic Games. Since their foundation a continuation of war by other means, the Games supplement the test bed and show-case function of the dirty real thing. Similarly, the camera inside the crashing race car transposes the last proof of reality (the accident) into medial existence (presence — being there when death hits) into hi-definition tele-absence.

A war is also waging in a quite metaphorical sense (a metaphor, by the way, that trivializes the difference in stake — life and money becoming interchangeable): *The battle lines are beginning to be drawn in one of the most important wars that will be fought in the liberalizing international markets for telecommunications equipment. The terrain for this battle is the field of central switches.* With an estimated \$95 billion (in 1987), these switches represent the lion's share of the international telecommunications equipment market (Martin Fransman, 'Controlled Competition in the Japanese Telecommunications Equipment Industry', in: C. Antonelli (ed) *The Economics of Information Networks*, Amsterdam 1992)

The media taught us to be insatiable, now we are insatiable for media-technology. We want more, and we want it at the push of a remote control button. Unfortunately, the industrial production system of hard- and netware innovations churns out novelties at a far lower rate than the industrial software

production lines for tv, CD and video etc. Investments on a different scale are necessary, therefore research lab fundraisers and industry PR people have to boast the excellence and attractiveness of ISDN or HDTV even louder than in the case of *Batman* or *Hook*. These funfairs first of all attract journalists, ever hungry for hot topics to cannibalize into a trend — all that counts is who breaks the story, regardless of how far away the media technology is from implementation. This genre of fashion writing creates a kind of *fiction science*. In earlier days people used to hang on the words of shamans and priests, now they are glued to the keyholes of R&D labs.

New technologies and devices force a tidal wave of public attention ahead of them, raising expectations to a degree that people are inevitably disappointed when they see the first products out of the lab.

Virtual Reality is a tragic example in case. The old media covered the new medium extensively; there are metres of shelf-filler on the subject. The labs of physicists, engineers and computer scientists are overrun by journalists and researchers into the social and philosophical implications of VR. At the same time scientists complain of funding difficulties because the politicians think everything is there already, no more research needed.

Narrowband-ISDN

Many media-savvy people know that there is such a thing as ISDN, maybe they've even seen videophones and other applications at a trade fair or promotion show. But that's about all. A friend who's professionally involved in VR was surprised to hear that the ISDN now in place is not glass fibre-based but the old copper wires with new protocols. The special thing about ISDN is that it's a public network as opposed to the high-capacity leased lines

exclusively for corporate use. But the public hasn't seen much of it yet and has got bored, because the promises of sensationalist propaganda and journalism have not been delivered.

The ISDN that we've had since the late 1980s is a Narrowband-ISDN, an enhanced digital service based on the existing dual-strand copper wire telephone lines. Central switches are mostly digital in Japan, Europe and the USA. The trunk lines for analog telephone services are also mostly glass fibre. Corporate communications PBXs (Private Branch Exchanges) and LANS (Local Area Networks) are mostly digital and optical. In 1992, 14 countries had established N-ISDN networks: Japan, USA, Britain, Singapore, Australia, France, Italy, the Vatican, San Marino, Germany, Hong Kong, Belgium, the Netherlands, and Spain. Implementation is behind schedule everywhere for reasons of immaturity of technology, basic problems in testing and network control, and problems of sheer cost.

The Integrated Services Digital Network transmits the different data formats on one network. Digitization improves the chances of the signal surviving in the noise of the receiver because distortion can be corrected and the input reconstructed to high fidelity more easily than with analog methods. In short, higher transmission capacity of higher quality becomes available.

Service on international ISDN lines first began in June 1989, as a joint development between AT&T, British Telecom and Japan's KDD. A network of international submarine fibre optics cables is currently being laid. Telecommunications turns into something very like international air-travel, with the major national companies connecting international passengers via their respective home base. France and Britain successfully lure clients to set up their European

Mediamatic 7 # 1



page 67

◆ communications hubs in Paris or London, for private or virtual private networks (software-defined networks that act like private ones but use public lines).

The trend towards higher capacity transmission is supplemented by more intelligent Codacs (Coder/Encoder), and more elegant compression algorithms (fractal compression being the new craze) might make it possible soon to get a B-ISDN-comparable transmission rate on the copper ISDN. British Telecom even has an \$800 colour videophone on the market that has smart enough compression technology to run on the analog phone system at 10 images per second. Just plug it in, connect the modular jack and you can send your face, your video cut-ups or computer graphics to a friend who shares the hobby.

There were digital fibre networks before, but never a public one. Video-conferencing was a sport for an exclusive club of executive talking heads. That ISDN is becoming a global public utility means economy of scale, means lower prices for terminals, means integration into mass consumer culture. New tele-sex services will arise, junk-mail will go full-motion, full-color and 3D, otaku circles will use it, Cyberhackers will hook up weird interfaces and ride the hi-speed waves — maybe even art will profit from it.

Techno-Nationalism

When you want to survey the 'war' around ISDN you can distinguish different 'battle fields'. ISDN is only one aspect in the large-scale tectonic shift in organizational foundations of the telecommunications landscape. The market structure of massive, former state bureaucracies and their monopolistic counterparts in the private sector is undergoing deregulation/liberalization in Europe, Japan and the USA.

The major players are still the old PRTS and companies like

Siemens, Alcatel, Philips, NTT and AT&T, and techno-nationalism is still widely prevalent. Industrial policy decisions, such as standard setting, are taken in a way to favour and protect the national champions. But new companies are moving into the ISDN market like Sprint Co., one of three companies providing ISDN services on the American market, or Syncordia (established by British Telecom and joined by Deutsche Telekom, France Telecom and NTT — the mating of the dinosaurs).

The bureaucratic mentality still lingers in privatized (NTT) and deregulated (Deutsche Telekom) public utility network carriers, but there's new cut-throat competition. The insider view is that only a few telecommunications companies will survive to the 21st century.

From a more abstract viewpoint of national economy, the current effort to establish the 64 kbit/s Narrowband-ISDN is an incredible waste of resources. It is already conceivable that the gigantic investments in switching and terminal equipment will bring only slight improvements in the performance of the network. The great leap will only come with glass fibre-based Broadband-ISDN, for which all the switches, terminals and remaining copper wires from user to central switch will have to be replaced again at the beginning of the next century.

That N-ISDN will not flop like videotex is mostly due to billing policies. For the staff of a the information and communications department of a large corporation needing nationwide and international links, it's a simple calculation. Beyond a certain volume of communications it's cheaper to go digital.

In addition, LANS can be interconnected by ISDN. Virtual private networks based on ISDN lines are cheaper and more flexible than

dedicated leased lines. Fax and data communications get faster. Video conferencing and other forms of visual communications will get the biggest boost, which is nice but not very exciting.

From the individual user's point of view, ISDN is still a virtual entity, 'vapourware', a promise for the future. The most interesting improvements to them are in the visual media: videophones, multimedia, and interactive on line services.

The sexiest trends in media — trends pointing to a massive increase in the amount of data per document — are those involving the merging of the media (hypertext, CD-I), the greater manipulability of real images (Photoshop, Terminator 2), HDTV as likely standard for computer monitors in the near future, and new interfaces (3D, VR with cheaper VDI-boards for the 468-chip PC).

But networking, in the restricted range that is possible at all, still requires a lot of patience. Even taking into account advances in data compression, all these applications are just screaming for far greater bandwidth of transmission networks. This and whether economies of scale can bring down terminal prices enough for visual communications to spread into the mass consumer culture, are the big ifs.

Technical

Communications

Device

Tele-writing, tele-hearing, tele-seeing, tele-killing, tele-touch, tele-masturbation. Being where you are *not* requires not being where you *are*. One of the most clarifying experiments in expanding the senses was conducted in the early days of the medium now turning digital: John Carty, president of Telephone Pioneers of America and one of the most important promoters of the telephonization of the USA, came up with a special PR show for a British

Mediamatic 7 # 1



pagina 68

♦ diplomat in 1917. The Briton was given two earphone receivers, one connected to a microphone picking up the sound of the waves of the Pacific, the other located at the shore of the Atlantic. He probably didn't hear much more than the noise of the receiver, but his ears were effectively hearing at both coasts of the USA.

In order to attach a technical medium to one of the human sense organs the body has to be interpreted as a technical communications device. When a new medium is developed for each sensory apparatus, tests establish the specifications for bandwidth, resolution and noise. Sensory deprivation brings to the fore the pure *Eigen-noise* of the senses. The signal then has to be modulated onto the noise of this receiver.

With digital media the frequency at which the analog input from the real world is scanned is measured in order to recreate the input with high fidelity¹. The discovery that 24 discrete images per second will give the impression of continuous motion was rather crude compared to the extensive technical approach to linking HDTV with the biological receivers. For optimum HDTV performance, the developers had to coordinate developments with human visual and auditory perceptions. Therefore this world of high resolution will produce a *sensation of immediate presence (...)* for optimum impact (Ministry of Post and Telecommunications, *Telecom '91*, Tokyo 1991, p. 55, 61).

The actual location of perception is not in the senses but in the brain. From the simple combination of moving images and moving seats in the Showscan system we already know that even crudely coordinated stimulations triggers the brain to integrate the separate inputs into an experience of 'being there'. The partial stimuli are recombined by the holistic synthesizer of

our grey matter, and any form of interaction between the incoming signals multiplies the effect.

Synthesis is only to be had for the price of a previous segmentation, sensory prothesis only for the price of an amputation. The biological senses are fragmented into an array of technical interfaces. Multimedia becomes legible as a technological implementation of the Wagnerian *Gesamtkunstwerk*: *In the world of electric circuitry, entire environments are kept in a state of interface and dialogue among themselves (...). When the entire world becomes a unified and 'animated collage', by virtue of the speed of information services, it is a natural step to try to deal with the entire world as a work of art.* (Norbert Bolz quoting McLuhan, *Theorie der Neuen Medien*, München, 1990). The 'impact' of the new inter-media is enhanced further by adding 3-dimensional, kinetic, haptic, olfactory etc. sensory stimulation — the engineering version of aisthesis. ISDN is to the transmission network what multimedia is to the desktop machine. There are already devices that use a laser beam to directly write an image onto the *Netzhaut*, technically the ideal interface for a fully user-to-user optical broadband transmission system. B-ISDN creates a *Gesamtkunstwerk* from a mosaic of 2 million stimulations per second.

Accessibility

For cyberpunks and network-otaku, ISDN is an inevitable step towards a Gibsonian cyberspace. We're not there yet. For now its Big Business and Big Politics. But media networks are already an environment with people populating them. Communicating — staying in touch — is, after all, one of the most sexy and fun games around. Once a medium has spread throughout a culture it can come alive in all sorts of

ways. Print can be used for anything from revolutionary pamphlets and laws, Dada manifestos and bank notes. How streets are used can only be planned only so much (riot control, residential area etc), for the rest they grow anarchically from the activities of interested parties, people who live in certain neighborhoods, businesses, through-traffic etc. Whether a street is alive or not does not depend on the company who paved the road or the public budget from which it was paid for.

The same is true for other networks. Whether ISDN will come to life depends first of all on accessibility, its incorporation into mass culture. Once the infamous critical mass is reached and the 16-year-old techno-otaku from next door gets his hands on it we will see what it's really good for. *Information technologies are used for human communications, thus inherently unpredictable uses are created, with different applications unintended in the technology's design/control plan.* (Loretta Anania, 'The Protean Complex. Are Open Networks Common Markets', in: C. Antonelli, *The Economics of Information Networks*, Amsterdam 1992).

There will not be one unified, homogenous network, but a patchwork of networks inside networks, of interlaced islands with gateways to connect them, with plenty of room for grassroots, dirty talk; fast, cheap, and out of control. (Maybe it will take a Californian garage company or Nintendo to come out with a *Volks-ISDN-board* for the laptop.) ISDN carriers in Europe and the US exclusively focus on business applications. Japan's NTT also targets the home user. Meaning cheap, meaning available to media and reality hackers. Looks like a sure bet to expect the weirdest forms of use in Japan. If you want to watch cyberpunk happen, this is the place to keep an eye on.²

¹ The highest perceivable sound frequency is 4000 Hertz. To accurately reproduce a signal the number of scans has to be twice the highest frequency of the input signal, so 8000 measurements per second are needed. The amplitude is encoded in bytes of 8 bits, which gives the 64 kbit/s capacity of the N-ISDN.

Mediamatic 7 # 1



page 69

² If you still think there's no creative potential there to produce anything interesting (the Japanese being group-driven, brainless technocrats and so on), watch out for *Tetsuo*, a powerful network and a universal data jack to which all sorts of home-brewed terminals and interfaces can be hooked up, which promises to be a highly favorable environment for network surfers and meta-realists.



Mediamatic 7 # 1



pagina 70



The Archaeology of Computer Assemblage

Mediamatic 7 # 1



page 71

De 'Ars Combinatoria' van de Berlijnse filosoof-technicus Werner Künzel

◆ The 'Ars Combinatoria' of Berlin philosopher-engineer Werner Künzel

De Westberlijnse filosoof en programmeur Werner Künzel heeft het ambitieuze plan opgevat een genealogie van de computertheorie te ontwikkelen, geschreven vanuit 'de geest van de filosofie'.

In de vijf boeken die tot nu toe verschenen, behandelt hij *Founding Fathers* als Lullus, Leibniz, Kircher en Babbage.

De wortels van de high tech gaan volgens hem terug tot in de Middeleeuwen.

◆ The Berlin philosopher and programmer Werner Künzel has hatched an ambitious plan to develop a genealogy of computer theory, written in 'the spirit of philosophy'.

In the five books he has published so far, he discusses founding fathers like Lullus, Leibniz, Kircher and Babbage.

The roots of high tech, says Künzel, reach back into the middle ages.



In een opgewekte, heldere stijl gaat de tekstarcheoloog Künzel de polemiek aan met degenen die geloven dat de computer pas midden 20ste eeuw ten tonele verscheen en het pre-electronisch tijdperk afdoen als barbarij. Künzel: *De computertheorie is tegenwoordig zo succesvol dat ze haar eigen geschiedenis niet nodig schijnt te hebben. Toch gaat er iets verloren. Dat kan je goed illustreren aan de hand van de kunstmatige intelligentie. Het onderzoek hiernaar is begonnen in de 19de eeuw en via de filosofie en de psychologie in technologisch vaarwater terechtgekomen. Intelligentie lijkt daarmee een technisch vraagstuk te zijn geworden, terwijl je het ook interdisciplinair zou kunnen behandelen.* De archeologische graafwerkzaamheden van Künzel zijn dan ook grensvervagend. Hij richt zich zowel tot de filosofen als de softwarebouwers.

Nadat Werner Künzel overdag heeft lesgegeven bij Siemens, duikt hij 's avonds met een enorme bevlogenheid in de boeken om de 'geheime oorsprong' van de computer bloot te leggen. Toen z'n proefschrift over Foucault en Hegel af was, liet hij zich omscholen tot programmeur. Een verwijzing in een Amerikaans boek bracht hem op het spoor van de dertiende-eeuwse Spaanse priester Raymundus Lullus. Deze uitvinder/missionaris ontwikkelde een schema voor een symbolische machine die als 'tekstmachine' combinaties van betekenissen genereert. Het verbaasde Künzel dat de gevestigde filosofie de technici in haar eigen gelederen zo heeft verdrongen en regelrecht censureert. *Als er iets is wat de vertegenwoordigers van de Zuivere Geest door en door haten, dan is dat wel de poging om de filosofische waarheid op welke manier dan ook te mathematiseren*, schrijft Künzel in zijn boek over Lullus. *Niets is in hun ogen zo vervaarlijk als de infiltratie van de mathesis in het rijk van de ideeën.*

Sinds het Duitse idealisme rond 1800 heeft de filosofie zich volgens Künzel op haar eigen terrein teruggetrokken en de industriële revolutie aan zich

voorbij laten gaan. *De kloof tussen techniek en de alfa-wetenschappen is niet pas in de 20ste eeuw ontstaan. Ik lees nu toevallig Gaston Bachelards opstellen over epistemologie waarin hij de filosofen uit de 19de eeuw verwijt de technische ontwikkeling in hun tijd al niet meer te hebben begrepen. De filosofie die we nu kennen heeft de weinige opvattingen over techniek die ze heeft eigenlijk gehaald uit een periode die nog niet technisch was, dus voor 1800. Bachelard gaat het in dit geval om de elektriciteit. De negentiende-eeuwse filosofie oriënteerde zich op het bewustzijn van de burgerij en deze was in deze periode in feite zo stabiel, dat een reflectie op de opkomende techniek niet nodig was om de geldingskracht van de filosofie te bewijzen. Pas in de tweede helft van de 20ste eeuw moesten filosofen constateren dat ze uit de boot waren gevallen. Heidegger, maar ook de Frankfurter Schule hebben getracht de geschiedenis van de filosofie te herschrijven, om erachter te komen vanaf welk moment men het contact met de wereld verloor, maar geen van hen heeft het terrein van de natuurwetenschappen of de techniek betreden. Zo bleef techniek synoniem aan 'catastrofe', die van buitenaf de wereld, maar ook het denken zelf, bedreigt. Dat nota bene filosofen aan de wieg van de computer stonden, valt zo volledig buiten het blikveld van de huidige geschiedschrijving.*

Technicus-Filosoof

In analogie met Nietzsches 'kunstenaar-filosoof' zou je Künzel een 'technicus-filosoof' kunnen noemen. Ik vroeg hem wat je daaronder zou kunnen verstaan: *Een technicus-filosoof is iemand die zijn realiteitsbegrip ontleent aan de media waar hij of zij mee omgaat. Dat is een reusachtige breuk met het realiteitsbegrip zoals dat tot op heden wordt onderwezen, dat nog uitgaat van de Dialogen van Plato. Nog steeds neemt men als voorbeelden een tafel, een stoel of een boom. Het mag curieus klinken, maar het realiteitsbegrip is in die 2000 jaar niet veranderd. Het denken vanuit de technische media zou niet het mogelijk verlies van lichamelijk waarnemingsvermogens tot uitgangspunt moeten nemen.*

Het is eerder een concessie aan de veranderde omgeving. De technicus-filosoof hoeft deze ontwikkelingen ook niet per se verder te voeren, maar dient daar wel over na te denken. Men zou op z'n minst een besef moeten hebben van wat er gebeurt wanneer kennis mediaal wordt overgedragen en opgeslagen.

Techniek is voor Künzel meer dan een verzameling machines: het is bovenal een knutselbezigheid. En ook aan teksten kan gesleuteld worden. Künzel bedrijft de 'Ars Combinatoria' dan ook op geheel eigen wijze: hij laat zien dat het denken in rizomatische vertakkingen, toegepast op de raakvlakken van filosofie en techniek, een veelbelovende toekomst heeft. Dit gaat verder dan het beoefenen van een vrije, associatieve schrijfstijl om verborgen geschiedenissen te ontsluiten. Electronische media veranderen de structuur van het denken zelf. Zo zou de invoering van hypertext spannende gevolgen kunnen hebben. Hoe zal de filosofiegeschiedenis gerecipieerd worden wanneer alle basisteksten, van pre-socraten tot postmodernen, op één CD-ROM staan? Heideggers *Sein und Zeit* zal ongetwijfeld veel toegankelijker worden: je klikt het woord *Geworfenheit* aan en krijgt een korte uitleg van het begrip, een etymologie, in welke passages en 'boeken' Heidegger dit begrip nog meer gebruikt en welke filosofen hierop doorgaan. *Compact Hermeneutics* die het interactieve interveniëren in bestaande teksten een solide, technische basis geven. Want de techniek verhoogt niet alleen het plezier in tekstverwerking, maar biedt ook nieuwe communicatiemogelijkheden. Künzel: *In tegenstelling tot film, radio en tv, waarvan men vroeger zei dat ze enkel passieve consumenten van ons maakten, activeert de computer ons en maakt ons producenten. Dit actieve aspect van de wetenschapsproductie brengt een grote verandering teweeg in het auteurschap. De auteur was tot voor kort iemand die boeken schreef en lezingen gaf. De interactieve kennisproductie via netwerken heeft zoveel consequenties voor het auteurschap, dat de filosofie en de*

Mediamatic 7 # 1



pagina 72

◆ In a bright, clear style this textual archeologist delivers his rejoinder to anyone who believes the computer appeared on the scene only in the mid-20th century and who would write off the pre-electronic era as barbaric. Künzel: *computer theory is currently so successful that it seems to have no use for its own history. Yet something is being lost. Artificial intelligence is a good illustration of this. People started researching it in the 19th century and ended up via philosophy and psychology in technological waters. Intelligence seems to have become a question of engineering, though you can treat it in an inter-disciplinary way as well.* Künzel's archeological excavations blur those boundaries. He is addressing philosophers as well as hard- and software designers.

After teaching at Siemens during the day, by night Werner Künzel enthusiastically hits the books in an effort to expose the 'secret origins' of the computer. It began when, after completing a dissertation on Foucault and Hegel, he trained as a programmer. A reference in an American book put him on the trail of 13th-century Spanish priest Raymundus Lullus. This inventor and missionary developed a blueprint for a symbolic 'text machine' which generates semantic combinations. Künzel was surprised at how established philosophy had displaced the engineers within its own ranks and how it censored them outright. *If there's anything the exponents of Pure Intellect thoroughly detest, it's the attempt to somehow mathematize the philosophical truth,* writes Künzel in his book on Lullus. *In their eyes, nothing is so awful as the infiltration of mathematics into the realm of ideas.*

According to Künzel, since German idealism (around 1800), philosophy has withdrawn into its own territory and let the industrial revolution pass it by. *The gulf between technology and the arts and letters did not arise in the 20th-century. At the moment I happen to be reading Gaston Bachelard's*

writings on epistemology, in which he accuses 19th-century philosophers of not having understood the technical developments of their time. The philosophy we know today gets the few opinions it has of technology from a period that was not yet technological — before 1800. In this case Bachelard is talking about electronics. 19th-century philosophy was oriented to the bourgeois consciousness, which was in fact so stable during this period that reflection on the upcoming technology was not needed to prove the validity of philosophy. Only in the second half of the 20th century have philosophers had to acknowledge that they have fallen behind. Heidegger, and also the Frankfurt School, tried to rewrite the history of philosophy, to trace the point at which it had gotten out of touch with the world, but none of them spoke of the natural sciences or engineering. Technology remained synonymous with 'catastrophe', an external threat to the world, but also to thought itself. That philosophers were, nota bene, present at the birth of the computer is not addressed in today's historical writing.

Engineer-Philosopher

By analogy with Nietzsche's 'artist-philosopher,' you might call Künzel an 'engineer-philosopher'. I asked him what this would denote.

Künzel:

An engineer-philosopher is someone who derives his concept of reality from the media he works with. This is a huge break with the concept of reality as it has been taught up to the present, which is still based on Plato's Dialogues. We still use a table, a chair or a tree for an example. It may sound curious, but our concept of reality hasn't changed in 2000 years. If we think from a technological media paradigm we're not supposed to take the possible loss of bodily powers of perception for granted. It's more about making a concession to the changed environment. The engineer-philosopher does not per se have to take these developments any further either, but he should at least think about them. We should at the very least realize what happens when knowledge is transferred and stored through media.

For Künzel technology is more than a collection of machines; above all, it is a case of tinkering.

And texts can be doctored, too. Künzel practices 'Ars Combinatoria' in his own unique way: he proves that there is a promising future to thinking in rhizomatic bifurcations, applied at the interface between philosophy and technology. This goes beyond the use of a free, associative writing style in order to unlock hidden stories. Electronic media alter the structure of thinking itself. So the introduction of hypertext could have exciting consequences. How will the history of philosophy be received when all its basic texts, from the pre-Socratic to postmodernism, can fit on one CD-ROM? Heidegger's *Sein und Zeit* will undoubtedly become much more accessible; you look at the word *thrownness* and are shown a short explanation of the term, an etymology, other passages and 'books' in which Heidegger uses the term, and in which other philosophers take it up. Compact hermeneutics will give interactive intervention in existing texts a solid, technical base; technology not only heightens the pleasure to be had in word-processing, it offers new communication opportunities. Künzel: *In contrast to film, radio and tv, which they used to say only made us into passive consumers, the computer activates us and makes us producers. This active aspect of knowledge production has brought about a great change in authorship. Until recently an author was someone who wrote books and gave readings. Interactive knowledge production via networks has so many consequences for authorship that philosophy and literary studies can't fully survey it yet.*

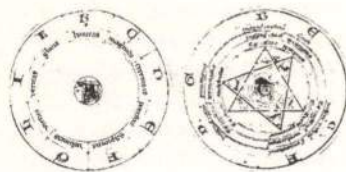
Werner Künzel, with his colleague Heiko Cornelius, has already provided an example of these technological possibilities and translated Lullus's *Ars Magna* into the 'higher language' of Cobol (available separately on floppy). They do not intend this adventure in programming as a bonus digital contribution only accessible to the technically literate. The structure of Cobol and Lullus's category code are elucidated step by step for the lay reader in a separate chapter. With a bit of perseverance, we can



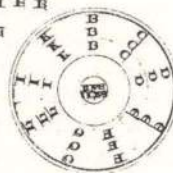
literatuurwetenschap deze nog helemaal niet kunnen overzien.

Werner Künzel heeft samen met zijn collega Heiko Cornelius al een voorbeeld gegeven van de technische mogelijkheden en de *Ars Magna* van Lullus omgezet in de 'hogere taal' *Cobol* (apart verkrijgbaar op floppy). Dit programmeravontuur is voor hen geen extraatje dat als digitale bijdrage alleen voor technisch geletterden toegankelijk is. Stap voor stap wordt in een apart hoofdstuk de structuur van *Cobol* en het coderen van Lullus' categorieën voor de leek inzichtelijk gemaakt. Met enig doorzettingsvermogen kan de lezer vervolgens de afgedrukte uitdraai van het programma gaan 'lezen' om erachter te komen hoe de combinaties van Lullus door Künzel e.a. zijn omgezet in computertaal.

Volgens Künzel heeft Lullus de eerste tekstmachine ontworpen die in staat is waarheidsgetrouwe uitspraken te produceren. Met behulp van geometrische figuren, die met elkaar verbonden zijn en volgens exact gedefinieerde voorschriften met elkaar communiceren, worden alle mogelijke uitspraken gegenereerd en in tekenketens ondergebracht. De Lullus-hardware bestaat uit onafhankelijk van elkaar draaiende schijven, met op iedere schijf negen woorden of begrippen. Deze elementen vormen tezamen een logisch samenhangende zin met een vraag (waarom, wie), een subject (engel of levend wezen), de 'goddelijke attributen' zoals kracht en deugzaamheid, relationele verbanden (verschillend van, tegendeel van) en een deugd (trouw, medelijden) danwel slechte gewoonte zoals haat of hebzucht. Lullus brengt vervolgens de vijf categorieën samen in letters zodat er, als we een draai aan het rad geven, een bepaalde lettercombinatie uitrolt. Deze heeft Lullus vervolgens ondergebracht in tabellen. De software bestaat volgens Künzel uit de strikte regels die aan de interpretatie van de lettercombinaties zijn opgelegd. Lullus wilde met deze machine consistentie en transparantie in het denken aanbrengen door de



U C Q D D D E E F F G G H H I I K
 B D C E D E F E G F H G I H H
 B C Q H D O E V H I G H
 B E C O D H E I H H
 B O C H D I E H
 B H C I D H
 B I C H
 U H



gebruiker te dwingen steeds van dezelfde bouwstenen gebruik te maken, die voorzien zijn van heldere definities. Volgens Künzel heeft de Lullus-tekstmachine als achterliggend doel het formuleren van universele regels, die grenzen cultuuroverschrijdend zijn. Deze moet kennis voortbrengen die ook bruikbaar is in 'heidense' gebieden die nog niet gekerstend zijn.

Monadologie

Eenzelfde doelstelling treft Künzel aan bij de Duitse filosoof Leibniz (1646-1716). Ook hij wilde in het door burgeroorlogen verscheurde Europa van de 17de eeuw een universele taal ontwerpen die via een netwerk van universiteiten de communicatie op gang zou moeten brengen. Leibniz' nooit gebouwde cilindrische rekenmachine betekent volgens Künzel een belangrijke stap voorwaarts van dode mechanische berekeningen naar een flexibele *Ars Combinatoria*, waarin een verschil wordt gemaakt tussen het invoeren van gegevens en het rekenwerk zelf. Ook filosofeert Leibniz over een binaire rekenmachine, die gebaseerd is op een tweevoudig getallenstelsel. Leibniz schrijft in 1679: *Het binaire systeem, d.w.z. het rekenen met 0 en 1, is ondanks z'n lengte voor de wetenschap het meest fundamentele systeem en leidt tot nieuwe ontdekkingen. Wanneer getallen worden gereduceerd tot 0 en 1 heerst overal een prachtige ordening.*

Belangrijker dan zijn ontwerp voor een rekenmachine vormen Leibniz' gedachten over de monadologie. De monade als een *ondeelbaar bestanddeel van stof of geest* is in de technische lezing van dit begrip een in zichzelf gekeerde ruimte, zonder ramen, schijnbaar geheel afgesloten van de buitenwereld. Weliswaar komen er geen beelden binnen, maar er vindt desalniettemin wel degelijk een uitwisseling van 'data' plaats. Künzel trekt de vergelijking tussen de gesloten monade en met de duisternis binnen de chips van de Central Processing Unit.

Voor Künzel bezit het monadebegrip van Leibniz (in navolging van Deleuzes *Le pli*) een bijzondere actualiteitswaarde: *De klassieke filosofie heeft Leibniz' monade afgewezen omdat het te star en te statisch zou zijn. Bij Hegel, Marx en Adorno is het subject een dynamisch geheel dat voortdurend stroomt en zich transformeert. Volgens Hegel bestaat er geen substantie die niet in beweging is; er bestaat niets dat niet wordt opgelost in deze beweging. Gedeeltelijk komt dat overeen met onze ervaringen, maar tegelijkertijd voelen we ons begreemd. Onze huid en ons lichaam leggen beperkingen op. We hoeven dus niet louter de beweging als uitgangspunt te nemen, maar kunnen ook beginnen bij de polen of de dragers van de beweging. Je zou dan zo kunnen redeneren dat er verschillende instanties bestaan, individuen, die als eenheden weliswaar voortdurend met elkaar communiceren, maar daar niet geheel in opgaan. Ze lossen niet op, maar worden aan elkaar gekoppeld.*

We kunnen ons vervolgens afvragen wat de aard van de hedendaagse technische interfaces is, wat voor openingen of laspunten dat zijn. Het goede aan het begrip monade is dat het zowel de eenheid van het individu als de verbindingen met de buitenwereld en communicatiemiddelen in zich verenigt. Lange tijd ging het ik alleen maar op in een dialectisch, groter geheel. De monade daarentegen benadrukt de mogelijke openingen en combinatiemogelijkheden, die niet van tevoren zijn vastgelegd in wetmatigheden.

Mediamatic 7 # 1



pagina 74

◆ then 'read' the printout of the program to see how Lullus's combinations have been translated by Künzel and Cornelius into computer language.

According to Künzel, Lullus designed the first text machine capable of producing truthful statements. With the help of connected geometric figures which communicate with each other according to precisely defined instructions, all possible statements are generated and placed in character sequences. The Lullus hardware consists of independently rotating disks, with nine words or terms on each disk. Together these elements can form a logically coherent sentence with a question (why, who), a subject (angel or living being), a 'divine attribute' like strength or virtue, a relational connection (different from, opposite of), and a good trait (loyalty, sympathy) or bad (hatred or greed). Lullus then assigned the five categories to characters, in such a way that if we give the wheel a spin a certain character sequence rolls out. He then ranged these in tables. According to Künzel, the software consists of the strict rules imposed on the interpretation of the letter combinations. Lullus intended this machine to introduce consistence and transparence into thought by forcing the user to repeatedly use the same building blocks, all equipped with clear definitions. The underlying goal of the Lullus text machine, he says, was the formulation of universal rules which could cross boundaries and cultures. It would create knowledge which would also be useful in 'heathen' areas which were not yet christianized.

Monadology

Künzel discovers a similar goal in the German philosopher Leibniz (1646 — 1716). He too, in civil war-torn 17th-century Europe, wanted to design a universal language which would facilitate communication via a network of universities. Leibniz's cylindrical computer, never built, signified an important step forward from dead mechanical calculations to a flexible 'Ars Combinatoria', which would

differentiate between the feeding in of data and the calculation itself, according to Künzel. Leibniz also philosophized about a computer based on a binary numerical system. In 1679 he wrote, *Despite its length, the binary system, in other words counting with 0 and 1, is scientifically the most fundamental system, and leads to new discoveries. When numbers are reduced to 0 and 1, a beautiful order prevails everywhere.*

More important than his design for a computer are Leibniz's thoughts on monadology. As an indivisible component of matter or mind, the monad is technically a space drawn in upon itself, without windows, apparently completely closed off from the outside world. Although no images enter, a definite exchange of data nevertheless occurs. Künzel makes a comparison between the sealed monad and the darkness inside the chips of the central processing unit (cpu).

For Künzel, Leibniz's monad concept (after Deleuze's *Le pli*) exhibits an extraordinary timeliness: *Classical philosophy rejected Leibniz's monad because it was thought to be too rigid and static. In Hegel, Marx and Adorno the subject is a dynamic whole which continuously flows and transforms itself. According to Hegel, there is no substance that is not in motion; nothing exists which does not dissolve in motion. That partly accords with our experience, but at the same time we feel restricted. Our skin and our bodies impose limitations. So we don't have to take just motion as an assumption; we could also begin with the poles or the vectors of motion. You could then reason that individual bodies exist which are indeed constantly communicating with each other as entities, without being completely absorbed by it. They do not dissolve, but are connected to each other.*

We can then ask ourselves about the nature of contemporary technological interfaces, what kind of openings or splices they are. The good thing about the monad concept is that the entity of the individual as well as its connections with the outside world and means of communication unite in it. For a long time the Ego was only

part of a dialectical, larger whole. In contrast, the monad emphasizes possible openings and communication possibilities which are not established ahead of time by laws.

Leibniz's monad cannot exist without a network. Michel Serres shows this in *Hermes I* and demonstrates that Leibniz's network is very economically constructed. Leibniz does not think in terms of cross-connections. For him all communication moves via the *Divine Central Monad*, and functions optimally this way. This may be inconvenient if there are only two monads, but it's demonstrably more efficient when a thousand monads are communicating with each other. The *Central Monad* then acquires a technical function and becomes part of a communication model. In this light, this network doesn't have to be dismissed as a rigid, authoritarian model representing a certain world order or religion. From our point of view a network needs no interfering central authority. For us the central switchboard is no more than a technical necessity, and as an agent of power it disappears in the background. But for Leibniz, communication had yet to get underway, and he wanted to organize it. It's still worth the trouble for the engineer-philosopher to take the efficiency of this monad model seriously and not write off everything that was thought of before Hegel.

The monad is also sometimes associated with 'cocooning': the Western tele-citizen who locks himself away from the evil outside world and stays in contact with others only via telecommunications. It seemed legitimate to me to ask a promotor of the monad concept whether we are on the eve of a class struggle between monads and (dataless) nomads. Künzel: *The technological gulf between population groups and continents is indeed becoming ever wider. And for a long time the situation will remain such that the privileged monad will have the choice of whether or not to use e-mail or fax and the nomad will not. The equipment has gotten so cheap in the West that it's affordable for everyone. But that will probably soon become true of the entire world population — the Walkman is no longer an exclusively*

Mediamatic 7 # 1



page 75



WERNER KÜNZEL/

HEIKO CORNELIUS

*Die Ars Generalis Ultima
des Raymundus Lullus,
Studien zu einem geheimen
Ursprung der
Computertheorie,*
5de ed., Berlijn 1991.

WERNER KÜNZEL/

PETER BEXTE

*Gottfried Wilhelm Leibniz
Barock-Projekte,
Machinenwelt und
Netzwerk im
17. Jahrhundert,*
Berlijn 1990.

WERNER KÜNZEL

*Der Oedipus Aegyptiacus
des Athanasius Kircher,
Das ägyptische Rätsel in
der Simulation eines
barocken Zeichensystems,*
Berlijn 1989.

Mediamatic 7 # 1



pagina 76

WERNER KÜNZEL

Charles Babbage.

*Differenz-Maschinen,
Exkurse zur Kartographie
der technischen Kultur im
19. Jahrhundert,*
Berlijn 1991.

WERNER KÜNZEL/

PETER BEXTE

*Präsenz, Zeitspeicher und
Time Machines, Essays,*
Berlijn 1991.

Deze rijk geïllustreerde
boeken kunnen worden
besteld bij:

♦ These lavishly
illustrated books may be
ordered from Edition
Olivia Künzel,
Holsteinische Str. 37/1,
1000 Berlijn 31,
Germany.

Voor Leibniz bestaat de monade niet zonder een netwerk. Michel Serres toont dat aan in zijn *Hermes I* en laat zien dat het netwerk van Leibniz zeer economisch is opgebouwd. Leibniz redeneert niet vanuit de dwarsverbindingen. Alle communicatie loopt bij hem via de Goddelijke Centrale Monade en kan volgens hem zo optimaal functioneren. Dat mag onhandig zijn als er maar twee monaden zijn, maar werkt aantoonbaar efficiënter als er duizenden monaden met elkaar gaan communiceren. Zo krijgt de Centrale Monade een technische functie en wordt onderdeel van een communicatiemodel. Op deze manier bezien hoeft dit netwerk niet afgedaan te worden als een star, autoritair model, dat voor een bepaalde wereldorde of religie staat. Vanuit onze optiek heeft een netwerk geen centrale instantie nodig die ingrijpt. Voor ons is de centrale niet meer dan een technische voorwaarde en verdwijnt als machtsinstantie op de achtergrond. Maar voor Leibniz moest de communicatie nog op gang komen en dat wilde hij organiseren. Het blijft de moeite waard voor de technicus-filosoof om de efficiëntie van dit monademodel serieus te nemen en niet alles dat voor Hegel is uitgedacht bij voorbaat af te schrijven.

De monade wordt ook wel geassocieerd met 'cocooning': de Westerse teleburger die zich afsluit van de boze buitenwereld en alleen nog via telecommunicatie met anderen in contact staat. Het leek mij legitiem om aan een promotor van het monadeconcept de vraag voor te leggen in hoeverre wij aan de vooravond staan van een klassenstrijd tussen monaden (data-loze) nomaden. Künzel: *De technische kloof tussen bevolkingsgroepen en continenten wordt inderdaad steeds groter. En de situatie zal nog lange tijd zo zijn dat de geprivilegieerde monade wel de keuze heeft al dan niet van e-mail of fax gebruik te maken en de nomade deze mogelijkheden niet heeft. De apparatuur is in het Westen zo goedkoop geworden dat ze voor iedereen betaalbaar is. Maar wellicht geldt dat straks ook voor de hele wereldbevolking — de walkman is al niet langer een exclusief Westers consumptiegoed. Dat zal sterk*

afhangen van de vraag in hoeverre dringende problemen zoals honger en milieuvervuilingen worden opgelost. Wat heeft een Indiaan in het Amazonegebied aan een laptop als zijn leefomgeving naar de knoppen gaat? Of mensen in Afrika die moeten vluchten voor droogte of een burgeroorlog?

Behalve met Lullus en Leibniz hield Künzel zich bezig met de barokke charlatan/theoreticus Kircher, die de Egyptische hiërogliefen als willekeurig tekensysteem opvatte en op het niveau van de simulatie tilde. Künzels laatste boek is gewijd aan de vroeg-negentiende-eeuwse filosoof/ingenieur Babbage. Hij ontwierp een rekenmachine en was tegelijkertijd als filosoof en theoloog in staat om discussies met vakgenoten te voeren. Babbage dacht na hoe de schepping als programma gefunctioneerd zou kunnen hebben. Maar ook hij bleef een outlaw en is in vergetelheid geraakt.

Voor Künzel zijn deze studies slechts kleine puzzelstukjes uit een groot interdisciplinair onderzoek naar de verborgen geschiedenis van de techniek: *In mijn boeken kritiseer ik de bestaande arbeidsdeling tussen techniek en filosofie niet in zulke directe bewoordingen. Ik neem eerder de positie in van de verteller en draag stenen van een mozaïek aan die het mogelijk maken een algemene kritiek te formuleren. Maar die kan alleen in groepsverband ontstaan.*

Dit ambitieuze project zou het levenswerk van Künzel kunnen worden. Maar wordt, als bijvoorbeeld Künzel z'n baan bij Siemens opgeeft en full-time in de archieven duikt, zodoende niet weer de band met de techniek doorgesneden? Het enthousiasme waarmee hij nu zo'n radicale kortsluiting veroorzaakt tussen historische teksten en het hedendaagse computervocabulaire, zou dan snel kunnen verbleken. De speelruimte van de technicus-filosoof in de huidige academische wereld is nog uitermate beperkt. Zo blijven we aangewezen op nachtelijke theorie-escapades, die de weg weten door de duisternis van de chip.

♦ continued from page 75

Western consumer good. This will depend heavily on to what extent urgent problems like hunger and environmental pollution are solved. What does an Indian in the Amazon area need a laptop for if his living environment is going down the tubes? Or people in Africa who have to flee from drought or a civil war?

Besides Lullus and Leibniz, Künzel has been interested in the baroque charlatan/theorist Kircher, who saw Egyptian hieroglyphics as an arbitrary sign system and raised them to the level of simulation. Künzel's latest book is devoted to the early 19th century philosopher/engineer Charles Babbage. He designed a computer and was simultaneously capable of debating with colleagues as a philosopher and a theologian. Babbage reflected on how creation could have functioned as a program. But he, too, remained an outlaw and faded into oblivion.

For Künzel, these studies are merely small puzzle pieces taken from a great interdisciplinary investigation into the hidden history of technology: *In my books I don't criticize the existing division of labour between technology and philosophy in such explicit terms. Rather, I take the position of the narrator, and add stones to a mosaic, making it possible to formulate a general critique. But that can only come about in a group context. This ambitious project could become Künzel's life's work. But won't the connection with technology be severed in the process, if for example he gives up his job at Siemens and submerges himself in the archives full-time? The enthusiasm with which he is now so radically splicing historical texts with contemporary computer jargon might then fade. The play space of the engineer-philosopher in the modern academic world is still extremely limited. We must thus resort to nocturnal theoretical escapades to show us the way through the darkness of the chip.*

translation LAURA MARTZ

Mobilhome*

DOOR JOUKE KLEEREBEZEM



Virtual Reality*

BY GEERT LOVINK

The second half of the memorable year 1989 saw not only the 'velvet revolution' that swept Eastern Europe, but also the presentation of virtual reality to the world. Two developments that will occupy us for the rest of the nineties, however far removed they may be from us. Two contradictory movements: while the collapse of communism is hurling us back into the nineteenth century, vr is catapulting us far into the 21st. Fascinating and horrifying scenarios arise. In a flash, everything seems possible. But familiar, everyday patterns are slowly resurfacing: it is up to the former Eastern bloc countries to sort out their own problems and virtual reality will have to prove itself, too. The euphoria dies down and what is left is the media hype. The theme has been *abgegessen*, as the Germans say. Once exposed as mere fashionable subjects, the highlights of 1989 have become the object of enormous disdain.

Howard Rheingold, editor of the *Whole Earth Review* in San Francisco, apparently recognized this mechanism early on and wrote a very serious and entertaining standard work about the pre-history, birth and childhood of vr. He can rightfully be called the godfather of the reality engines. Not only did Rheingold witness the first tests of various prototypes, the excited presentations and conferences; he traveled the world as a networker and intermediary, visiting various laboratories where vr software and interfaces are developed.

The author of *Tools for Thought* was not exactly staggered when the new wonder appeared. He had been closely following innovations in computer technology since the seventies. He is personally acquainted with all of the tinkerers in garages, prophets and millionaires-to-be and has witnessed their climb up the social ladder (in the us, this means that they frequently change jobs). We become acquainted with principal characters like Krueger, Lanier, Fischer, Laurel and Walker. But his colourful description of these eccentric characters is more than human interest. The pioneers embody potential destinies of virtual reality, from fun arcade games, edutainment and telerobotics to post-communication.

Contrary to all expectations, Rheingold begins his account with an extensive search for the predecessors of the *street legal mesmerism machines* and thus makes an important contribution to the history of technology. While it is claimed that the us has no official policy on technology and that business sees only short term interests, that cannot be said of Rheingold. The time he takes to come to his point can be seen as an indirect plea for a Manhattan Project for vr. Rheingold's message is that high tech does not just appear out of the blue, however ingenious individual inventors may be. The us will pay a high price for the current lack of money for long-term research and development. A scientific program with clearly defined goals is needed, in which government and business collaborate. But a mrti in the us conflicts with all anti-trust laws and could therefore never exist. What remains is the creation of as good a communication network as possible with research centres in Japan, Europe and the us. Rheingold would be glad to fulfil this function. Besides his publications, he has founded a news group within Usenet (*sci.virtual worlds*) through which researchers can contact one another using e-mail.

Rheingold sees Morton Heilig's *Sensorama*, created in the early sixties, as the first vr machine. For the first time, film images, sound and smell were 'stuck' to the senses of a person seated in a sensory sensation cabin. Rheingold in the cabin: *I put my hands on the handlebars and rested my face against a viewer that looked like a pair of binoculars with a padded face plate. Right below the eyepiece was a small grill, near my nose, where the odours would have been pumped in and out of smelling range. Small speakers were positioned on either side of my ears. The machine started. I heard an automobile, apparently with the muffler removed, saw an expanse of sand dunes, felt my seat lurch, and found myself looking from the driver's seat at a stereoscopic view of a dune-buggy ride.* But film turned out to be dead end and was left stranded in 3-D and Cinemascope. But the seeds of vr are present in the *Sensorama* in the form of the principles of 'enabling technologies' and 'convergence'. Only after great advances in simulation, miniaturisation and graphics in the late eighties, could cross-pollination be attempted.

Another starting point of vr is the development of human/computer interfaces. In this regard, Rheingold writes of the ground breaking work of Douglas Engelbart, who wanted to take computers out of the hands of experts. He was the first to perceive the computer as a problem-solving device and mind amplifier for personal use. Engelbart's Augmentation Research Center is the birthplace of word processing, windows and the mouse, the core of vr: *it became possible to interact with a computer by using a natural gesture.* Rheingold also devotes a great deal of attention to Ivan Sutherland's *Sketchpad*, the first program that allowed one to draw with a light pen directly on the screen during the portrayal of data on a cathode ray tube.

Although stereo presentation is important to the three-dimensional illusion, it is less important than the change that takes place in the image when the observer moves his head, wrote Ivan Sutherland in 1968. Sutherland's invention, the head mounted display (hmd) saw the light of day on January 1, 1970. Ironically, this extremely heavy helmet was sometimes called 'the sword of Damocles' and developed further by NASA. The perfection of the helmet paralleled the development of computer-aided design, which allows the portrayal of three-dimensional spaces on a plane. All pieces of the puzzle formed by the hybrid collection of 'artificial reality', a concept patented by Myron Krueger. Krueger is sometimes called the grandfather of vr. Rheingold devotes much attention to his concepts and installations, though the reader can

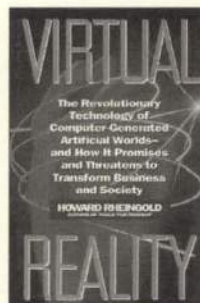


DIRK VAN WEELDEN
De Bezige Bij,
Amsterdam 1991,
ISBN 90 234 3209 6,
Dutch text, 210 pp,
Dfl. 29,50

Mediamatic 7 # 1



page 77



HOWARD RHEINGOLD
Summit Books,
New York 1991,
ISBN 0 671 69363 8,
English text,
416 pp. \$22.95



sense a certain distance between him and this kind of techno-prophet, especially in the case of hypertext king Ted Nelson.

Rheingold sums up the two foundations of the pre-history of VR technology: *The idea of immersion — using stereoscopy, gaze-tracking etc. to create the illusion of being inside a computer-generated scene. And the idea of navigation — creating a computer model of a molecule or a city and enabling the user to move around as if inside it.*

Rheingold then devotes roughly two hundred pages to his expedition through the various outposts of the 'Reality-Industrial Complex'. He takes us along to the Mountain View NASA lab (birthplace of Scott Fischer's VR), Jaron Lanier's VPL Research, Inc., a hippy carpenter's shop that burst its seams (where the Dataglove was made) and the cool Autodesk offices of VR entrepreneur John Walker. Then time is compressed into a series of sensational achievements, culminating in the memorable date June 7, 1989 when VPL and Autodesk present their VR systems to the public simultaneously, followed immediately by demonstrations at the SIGGRAPH conference. This formed the starting shot for the creation of various other firms (like Sense8) and quarrels about trademarks, illustrating what a village Silicon Valley actually is.

In this turbulent period, Rheingold stumbled on John Furness's HIT laboratory in Seattle. This company embodies the interweaving of military research and civilian industry (or should we call it conversion?). In HIT's case, Rheingold draws a direct line from the WWII flight simulator *The Link* (one of the key historical antecedents of VR) to the navigation model that HIT is developing for Seattle harbour. Rheingold seizes on this to point out the shortcomings of present-day systems. Furness: *We don't understand the human factors dimensions of virtual space. We don't know how to measure how real a virtual world seems. Except for the more expensive military versions, virtual displays lack sufficient resolution for wide-field-of-view presentations.*

There is an insatiable need for bandwidth in the lines of communication, while ISDN and VR are still in the very early stages of development. Not to mention the 'bugs of humans'. Many are familiar with the California hype that has been sweeping the world since the summer of 89. But less well-known is the research that began around the same time in Japan, England and France. Take the ATR lab in Kansai Science City, not far from Kyoto. They place special emphasis on psychological research into perception and cognition. These Japanese researchers want to get rid of the clumsy goggles ('face suckers' as they are called at VPL). They consider the face to be an organ of (non-verbal) communication that cannot be hidden from view. Gesture recognition can occur through so-called voice commanded 3-D shape acquisition cameras. Called 'wireless VR' by Rheingold, these intelligent machines are familiar with our personal character traits. HIT's prototype combines old optical technology — the lenticular lens autostereoscopic system — with modern enabling technologies of liquid crystal displays and head tracking devices. HIT's 'future vision' for the twenty first century is summarized in the key phrase *VIAR: 'Visual, Intelligent and Personal'*. According to them, the future belongs to 'visual thinking'. Besides 'communication with realistic sensations', the Japanese believe in the commercial potential of VR on the fun market. Rheingold can already see the Fujitsu-Disney Cyberpark in his mind's eye. The Japanese take the slogan *What Mankind Can Dream, Technology Can Achieve* very seriously.

In the final part of the book, Rheingold covers the various existing applications of VR. These vary from transputing architecture, fingertip virtuality for creating 'tactile pictures' and the virtual violins in Grenoble to data visualization for *cybernautic brokers who zoom through landscapes that are 3-D depictions of*

marketplaces. Separate research is being done on the tele-operator technique: an 'out of the body experience' in which one operates a machine at a distance. In this section, Rheingold adds some critical annotations: *Just what we don't need right now are powerful machines doing things to the world before we have discovered just what it is we ought to be doing to the world. To the medical diagnosticians or surgeons who want to float their vision into an artery or a cornea, teleoperated robots are a miraculous aid. To those who turn rain forests into plywood, semiautonomous megadozers are an ideal instrument. The families of bomb-squad experts and firefighters who risk their life and limb might see impervious telerobots as a gift of life. And to those who would rather not risk their own flesh but don't mind spewing shrapnel into the bodies of other human beings, teleoperated gunships are the way to go.*

Rheingold did not get to (or did not want to include) the Gulf War in his book. January 17, 1991 can be termed a subsequent milestone in VR. For many, Desert Storm meant an abrupt end to what (with hindsight) can be called naive enthusiasm about VR. While Rheingold touches on the 'alienating effects' and discusses the global wargame simulator SIMNET (along with 'teledildonics' and VR as 'electronic LSD'), *Virtual Reality* remains mainly a report of the carefree childhood years of VR, 89-91.

translation JIM BOEKHINDER

Versuch einer Geschichte der Rechenmaschine*

BY BERT MULDER

Versuch einer Geschichte der Rechenmaschine (Attempt at a History of Calculating Machines) gives an overview of known techniques and machines that make calculating more efficient. Just another historical overview, if it hadn't been published almost two centuries ago, in 1804: *with tables and drawings, in 2 volumes*. The writer, Johann Paul Bisschoff, is *Kriegs- und Domänenrat*, advising the court of Ansbach in Germany in matters of war and the land. It is a precisely written overview over known methods and machines with regard to calculating, ranging from the use of hands to the famous calculating engines like those of Hahn or Pascal.

The work has never been in print before. The manuscript was kept in the technical university of Berlin, and was lost during a fire in the second world war. Left with two undated written copies and photographs of the illustrations, Systema Verlag in Germany decided to publish it. As a technical report on the state of an art it is surprisingly modern in setup: an introduction contains definitions of concepts ('what it takes to calculate'), part 1 *Concerning the Simple Tools* carries an historical overview and part 2 *About Calculating-engines with Wheels* has technical descriptions of the engines. The book concludes with the 29 plates, all beautiful technical drawings.

Why would you want to read *Versuch einer Geschichte der Rechenmaschine* written in 1804? To the careless reader it might be nothing more than what it was meant to be: an overview. But the book deserves better than that. This publication shows all that is at the basis of information technology and western culture: numbers, methods and mechanisation. It tells us of the intense effort at the heart of western science and its fascination with the addition, multiplication, subtraction or division. What drives us to refine, time and again, our calculations into more and more powerful ones, and then apply them to all we see?

Of all the worlds' cultures, western scientific thinking clothes itself in numbers and mechanisation. Numbers guide the hands and

Mediamatic 7 # 1

1

pagina 78



JOHANN PAUL BISCHOFF
(1804),
Stephan Weiß (pub),
Systema Verlag,
München 1990,
ISBN 3 89390 306 2,
German text,
194 pp. illustr. 26

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tools with which we create our world and the eyes through which we view it. Today's world, its populations and cultures are supported by a powerful industrial and economic ecology that comes mainly from western-scientific thinking. Bisschoff's *rechenmaschinen* commemorate the beginnings of that.

The Dutch professor Van Praag mentions that in many developments one can recognise five revolutions: methodological, scientific, technical, social and cultural. The book highlights the very beginnings of the technical revolution within the field of 'number-crunching', a development that ends with computers as we know them. We find the shift from scientific to technical revolution in these very pages. We find the social and cultural revolution on the streets around us. They all have calculating engines at their heart.

In the 17th century preoccupation with numbering systems, codes and languages was intense. Many people were looking for a 'clavicula universalis', a universal code with the power to describe all that went on in the universe. Swedenborg did his work, Leibniz' binary arithmetic was born and Newton's mathematical descriptions of the physical world formed the basis of classical physics. The human mind was set to capture the universe in symbols. Numbers and method that could formalise the world around us. Method that needed calculation: enormous amounts of complex calculation.

The Scottish mathematician Napier (the name written as 'Neper' by Bisschoff in 1804) published his discovery of logarithms in 1614. Bisschoff writes about him at length, but more as the inventor of a 'tool', a precursor to the slide rule, than of logarithms. His treatment concerns the mechanical tools, and he describes the several enhancements and additions to Napier's tools.

Logarithm itself, based on the relationship between mathematical and geometrical series of numbers, is the enabling technology of 300 years of scientific development. It speeds up calculations by changing multiplication into simple addition and division into subtraction. Without them none of the sciences would have developed. Then in 1970 electronics turned algorithm into silicon. Taking away our direct manipulation of them by making the slide rule obsolete, algorithms disappeared from sight. But before the algorithms turned into digital binary silicon, many other ways to mechanise calculation had been tried.

Bisschoff declares his subject to be calculating engines, and he sticks to it. Mentioning Leibniz's calculating engine (that was never realised, although a sizeable amount of money was put into it) in the 'simple tools' section he says: *the realisation of his idea seems possible to me, but it seems like much work to me for little use and therefore I don't think it worth the trouble to lose more time on it. And then: all trouble so far couldn't improve nor replace Napier's counting sticks by better tools. Everything that was done to make them better or simpler to use concerned only the form, and not the essence.*

Bisschoff defines calculating engines in the introduction: *The expression 'calculating machine' we understand in a general sense to mean all and every tool, whereby movement or combination of its parts certain arithmetical operations can be done in a mechanical way. In this definition such a machine cannot be very simple, but must consist of several parts, because otherwise movement or combination of its parts cannot take place.*

Tables that are calculated for certain instances only, measurement sticks, can be regarded as mere tools, but not as machines. In that sense the simple lever in itself is only a tool, but becomes a machines through its connections. Harnessing advanced calculations is no simple venture: Hahn undertook the first attempts at a calculating engine

already in the summer of 1770, though many of his ideas, as he says, failed, notably very difficult case where one wants to add 1 to 9999. That is exactly the failure I found in all the machines described so far. After many years of troubled effort he finally conquered the difficulty and in the year 1778 he created his calculating machine.

Step by step, wheel by wheel they piece together the algorithm in matter. This is where western civilisation sets itself apart: mechanisation. The Chinese, the Indians, the non-industrialised civilisations never opted for this way of regarding life. There seems to be a link between numbers and machines. The urge to represent the world in numbers, and manipulate this representation according to its own rules is something strongly present in Western science. Here no longer the natural world, but patterns and consistencies in an inner, abstract world are of primary importance. Machines become abstract ends in themselves, faster and faster. Dijkstra describes this beautifully in his *Mechanisation of Culture*.

But how ignorant were other cultures? Bisschoff briefly mentions the Chinese abacus from a travel description published in 1742 as possibly the oldest known calculating tool known to man.

But in Werner Künzel's book on Leibniz we find, in Leibniz' explication on binary arithmetic (published in 1703) on page 87 and 88 a description of the Chinese I Ching as a system of ordering the cosmos. Though the Chinese used these systems for divination, they never developed a scientific or mechanised culture as we know it. (Künzel's inspiring venture into the basics of western information science is reviewed in Geert Lovink's article *The Archeology of the Computer Assemblage*).

Although Chinese counting systems appeared to be known about at that time, Indian systems were not, and Vedic algorithms go unmentioned. And though the Indian scriptures contained extensive algorithmic systems, they never aimed to mechanise them. Worse, they fell into disuse and were forgotten. They were rediscovered in this century by the Shankaracharya of Govardhana and described in his voluminous book on Vedic Mathematics. But arithmetic in Indian culture, where the powers of the human mind were of more interest than the powers of man in the natural world, carries another meaning. Joseph Howse, in his *Maths or Magic, simple Vedic arithmetic methods* mentions: *Quite apart from the other advantages of Vedic mathematics practice of Vedic mathematics is particularly helpful in developing the power of attention. It has the ability to clear and refresh the mind.*

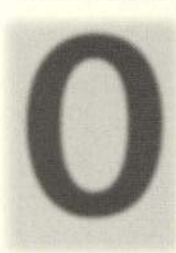
Even though mathematics is still a strong discipline in India and several Noble prize winners came from that country, they never based their knowledge on this image of reality and the constant urge to work with numbers, arranging and rearranging them, pattern them and using these patterns as tools shape the world as we know it.

Western civilisation takes on the natural world as its antagonist: a human development and future, where art and science both strive to elucidate that which is essentially human.

Such is the meaning of this book: it makes us conscious of the way in which we shape the world and the stories we tell ourselves.

Today, in keeping up with the speed of development, all our attention seems to be focused on the present, and we suffer loss of meaning. Information technology interferes with our memory. We need a view that lifts us out of this and gives us material for reflection. This book does that. Turning back to the first steps, the basic concepts on which our world is so absentmindedly based suddenly creates new viewpoints, new understandings that make the future more open. It lets us look at what we are, and therefore

Mediamatic 7 # 1



page 79

at what we are not, something we need. It enables us to choose better futures.

The illustrations, on glossy pages in the back of the book, show tables with numbers, but also renderings of wood and metal boxes, dials, springs and wheels. The water-colour drawings, using different greys only, are simple and almost tender in their photographic quality, created in the day that one drew to represent the outer world as it was. They draw our attention into the machines, making them almost tangible. But the book doesn't come with models, and the pages stay flat. It's our memory that makes us do that. *We* made these machines, and all the ones following them. *We* make them today, and *we* will make them tomorrow.

In some ways reading Bisschoff's 'attempt at a history' is like looking at a distant star. It sends us 'old light' that, when it reaches us, shows us the past in the present. Archaeology in real-time.

Cyberspace: First Steps

BY GEERT LOVINK

If you've already implanted cyberpunk sci-fi in your imagination, taken in a few articles and documentaries on Virtual Reality, maybe even had the goggles and datagloves on, you can now move on to the next round and start applying yourself to the science of cyberspace. If you aren't intimidated by hefty tomes, Benedikt's collection has a lot to offer. *Cyberspace: First Steps* is a collection of papers written for the First Conference on Cyberspace, which was held in May 1990 in Austin, Texas. As of 1992 this can be called the most interesting publication in the field. The contributions are well-written and the literature they refer to sounds promising.

Now that the euphoria that characterized the early reports by visitors to virtual reality has worn off, and the scientific journalists have moved away, disappointed (by the lame graphics), the American academic experts get a turn. As the earliest pioneers still happily work on the first commercial vr applications, a theoretical discourse is appearing around the magic word cyberspace. Models are being erected depicting how the matrix might be built up. This speculation on the architecture of cyberspace consciously presents itself as a fictional science. In this literature the permanent revolution being undergone by the hardware is a necessary a priori (to which it otherwise pays no attention). Benedikt's authors make it clear that the us has withdrawn de facto from the realm of software. The Japanese are implicitly expected within a reasonable amount of time to provide the chips needed for the real-time manipulations of visualized data in an immense network environment.

Cyberspace fulfils the American desire to take over immeasurably large continents. But in this case the jungle must be designed before it may be explored and conquered. Pioneer work is a creative act here, and Benedikt has mobilized all available imaginative power to get this tour de force of software innovation on the road. Every branch of knowledge, from anthropology, architecture and literature to mathematics and information science has its part to play. The interdisciplinary approach is put into practice with a vengeance, and it's no casual get-together, but essential for getting the imaginary reaction going. So it's funny to see all these papers, however rational and businesslike their reasoning, refer again and again with awe to Gibson and Sterling's descriptions of cyberspace. The strict logical approach of the East Coast (MIT) goes well with the subcultural utopias of the West Coast freaks this time; they even enhance each other. Yet to make the coalition workable, many have had to don blinders. Thus no mention is made of the fact that the 'cyberspace building' being

excavated is at the moment situated in a desolate urban landscape populated by the dataless. For Michael Benedikt cyberspace is *perhaps an unhappy word if it remains tied to the desperate, dystopic visions of corporate hegemony and urban decay, of a life in paranoia and pain* (as it is in Gibson).

The military origins of this new medium go unmentioned too, so the book does not directly add anything to the debate on media/technology and war. An assumption of Benedikt et al is that all possible virtual technologies will continue to develop unrelentingly. The writers are already in cyberspace and thinking from the inside out. It seems to have occurred to no one yet that cyberspace, just like space travel, might be feasible but is probably just as unaffordable. The time and money needed for the writing of all the software are factors the authors are not concerned with. Economists and political scientists aren't involved in this futurology, after all. Partly because of this, the scenarios sometimes look boundlessly naive on paper. But in the land of Hollywood and Silicon Valley we must be cautious about such hasty judgments. Here one would move the heavens and earth in order to enter dreamland. Hiding behind Gysin's credo *We are here to go* is an impressive libidinous economy of which Benedikt's *First Steps* is a fine example.

Now that cyberspace is no longer a rumour to make the imagination run wild, we can ask ourselves what exactly it is. To create workable models of cyberspace, the first necessary step is the creation of clearly demarcated definitions. *First Steps* is bursting with terse definitions. This can be seen as a preliminary stage before the writing of the software begins. As long as the essential hardware and interfaces are lacking, the cyber pioneer must work with the verbal instrumentarium, in order to make *the unimaginable imaginable and the imaginable real*.

Benedikt has succeeded in assembling a diversity of contributions which keeps all the options of Project Cyberspace open. We can, for example, classify them according to their attitude to time: some extrapolate the experiences to be presently had with networks and interactivity, while others reason from the future, requiring a dizzying leap be made to create an acceptable model of their daydreams. Benedikt sees four tendencies emerging from the *First Steps* collection: the cultural anthropology approach (*cyberspace will retain a good measure of mytho-logic*), thinking from the history of media technology towards a *post-symbolic communication*, cyberspace as a continuation of architecture by different means (the Heavenly City, Le Corbusier's *Ville Radieuse*, the Hollywood Hills) and as mathematics (*spatialization of arithmetical/algebraic operations*).

David Thomas opens *First Steps* with an anthropological analysis of Gibson's work based on terms from Michael Serres, Van Gennep's *Rites de Passage* and Victor Turner's transition from liminal to liminoid. *In cyberspace, the classical hardware-interfaced cyborg and the postclassical data-based cyborg or personality construct meet with new posthuman intelligences*. Their activities remind Thomas of shamanistic figures who mediate between traditional sacred and profane worlds. For him cyberspace is not merely a conventional parallel culture, but an original and inventive metasocial operator and potential creative cybernetic godhead.

The euphoria of computer animation artist Nicole Stenger knows no limits: *We will all become angels, and for eternity! Isn't it exciting to live twice? To experience the life of all creatures?* For her cyberspace is the realization of the May '68 Paris slogan *Power to the Imagination!*; it is a *sensory lava that will find its way through the cracks of consensus*. She rejects the prophets of the *Hypercalypse* and their fear of change and denial of the legitimate enjoyment that people might gain from these techniques. She also gives a remarkably cheerful



MICHAEL BENEDIKT (ed)
MIT Press,
Cambridge/London
1991.

ISBN 0 262 02327 X,
English text,
436 pp. \$33.75

Mediamatic 7 # 1

1

pagina 80



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reading of the contemporary French philosophers. Virtual sex would probably horrify Virilio. But Stenger apparently hears only positive notes in Paris. She does not mourn a possible loss of corporality: *How will your boyfriend know that you've been in your pajamas for weeks if you only meet in cyberspace? You won't need condoms anymore. Cyberspace will be the condom.* She warmly invites us into these *worlds of the fluids*. A short-circuit in our datasuits isn't her problem. The Reichian liberation of the bodily fluids seems to have disappeared from the agenda.

For Michael Heim, the author of *Electric Language*, cyberspace is a *metaphysical laboratory*. But before we get down to business, he says, we should answer the ontological questions concerning the nature of this reality. Plato's rule is still true: *Eros guides us to Logos*. Heim stirringly reminds us that *We are searching for a home for the mind and the heart. Our fascination with computers is more erotic than sensuous, more deeply spiritual than utilitarian.* He interprets Gibson's *Neuromancer* as a *translation of sex and personality into the language of information*. Heim correctly sees Leibniz as the founder of metaphysics, which ultimately resulted in the computer. Indeed, Leibniz's monad is highly contemporary, without windows, but with terminals and interfaces, and part of a network. Heim ascertains *deep inconsistencies* in this model. On the one hand the network functions as *computer antidotes to the atomism of society*, while on the other it *increasingly eliminates direct human interdependence*. They support revolutions (see Tiananmen Square) but also release the villain in us: *The barbaric tribes return, from within*. In order to combat *lurkers* intending to commit computer crimes Heim prescribes the *human remnant*, which is supposed to remind us of *the energies of the earth, to nudge us out of our heady reverie in this new layer of reality*.

After all this daydreaming, sociologist Allucquere Rosanne Stone appears with *boundary stories* from cyberspace-under-construction. An older, single, handicapped woman named Julie once appeared on a network. All the participants who came into contact with her felt great empathy for her. Until it transpired that Julie was a *net persona*, a piece of *computer crossdressing* by a male psychiatrist. Some saw it as a successful prank, but another revealed, *I felt that my deepest secrets had been violated*. The sysops just wearily smiled. They had understood from the start that the network would bring about radical changes in social conventions. In 1978, CommuniTree was one of the first Bulletin Board Systems in San Francisco. The teleconference participants saw themselves less as consumers than as part of a new social experiment. This changed after Apple came out on the education market. Students, it turned out, were not interested in communication. *Within a short time the Tree was jammed with obscene and scatological messages. In addition, young hackers enjoyed the sport of attempting to 'crash' the system.* As a consequence of *freedom of expression*, within a few months CommuniTree was done for. From this Stone concludes that individuals got used to a *textual space that is consensual, interactive, and haptic and to lucid dreaming in an awake state*. After giving a short biography of the 'discoverers' of cyberspace, Stone compares vr engineers to phone sex workers: *Both are in the business of constructing tokens that are recognized as objects of desire*. Her conclusion, then, is that the body factor cannot be eliminated. *To enter cyberspace is to physically put on cyberspace (...), to put on the female. Thus cyberspace both disembodies, but also reembodies.* We must continually be reminded that *life is lived through bodies*.

The chapter which speaks most to the imagination is an evaluation of the Habitat project, a commercial, multiplayer, on-line graphic virtual environment by the firm Lucasfilm (its current incarnation is called Club Caribe and there is also a version of it in

Japan). After logging on with a simple games computer the users could *communicate, play games, go on adventures, fall in love, get married, get divorced, start businesses, found religions, wage wars, protest against them, and experiment with self-government*. The experiences are so valuable chiefly because the programmers and operators in Habitat have put their lessons down on paper themselves, without mediation by scientists. They give us a glimpse behind the screen. For them *the idea of a many-user environment is central to cyberspace*. With a view to further developments they point out, for example, that communication bandwidth is a *scarce resource*, that object-oriented data representation and communications standards are essential, and that the implementation platform is *relatively unimportant*. *The goal is to enable the communications between machines to take place primarily at the behavioral level (what people and things are doing) rather than at the representation level (how the scene is changing).*

The inventors of Habitat found out that *real people are different*. The arrogant attitude of urban development specialists founders here. The 20,000 residents all needed their own 'houses', organized into towns with associated traffic arteries and shopping and recreational areas. *We needed wilderness areas between the towns so that everyone would not be jammed together into the same place. Most of all, we needed things for 20,000 people to do, interesting places to visit. Each of those is a distinct entity that someone needs to design and create. It is really not a problem if every apartment building looks pretty much like every other. It is a big problem if every enchanted forest looks the same. Attempting to play the role of omniscient central planners, we were swamped.* Residents got down to work themselves, and the system operators could often do no more than suggest new activities. Naturally, the do-it-yourself approach soon led to conflicts, resulting in the election of a Sheriff. *However, our view remains that a virtual world need not be set up with a 'default' government, but can instead evolve one as needed.* Yet they give a note of caution: *You can't trust anyone.* They argue for an absolute division between the *infrastructural level, where the laws that govern 'reality' have their genesis* and the *experimental level, which is what the users see and interact with*. Running cyberspace is not like *managing the world inside a single-user application or even a conventional on-line service. Instead, it is more like governing an actual nation*. In short, this proposition is not without strings. *Get real. Cyberspace may indeed change humanity, but only if it begins with humanity as it really is.*

For architectural theorist Marcos Novak, cyberspace is the *habitat of the imagination*. Through the *duende of poetics* (the unimaginable complexity), Malevich et al's *Space of Art*, and visionary architecture from Marinetti to Constant, he arrives at 'liquid architecture'. *Fluctuating relations between abstract elements: cities can exist within chambres as chambres may exist within cities.* What the consequences will be for the constructed/developed environment, which will remain behind in classical reality, and for the discipline of architecture, Novak does not tell us. The same goes for the pieces by Steve Pruitt and Tom Barrett, who sketch for us the future *Corporate Virtual Workspace*. The life of the virtual office clerk is painted in rosy hues, but what happens to all the other toiling earthlings? They're left to stew in their own juices. Like true monads, Pruitt and Barrett turn away from the global situation and develop a new high-tech apartheid: *Physical locations with high physical appeal will become popular. Separated from the stress caused by crowded and polluted urban areas and able to instantly turn to their real environments for recreation and exercise, cyberspace workers will lead highly productive and healthy lives.* Get real — or the cyberpunks will come round and hack you into the Hereafter!

In the chapter *Some Proposals* architect/compiler Benedikt gives us more than 100 pages of models examining the individual



character of the space called cyberspace and manners of visualization. He does this using simple illustrations and graphics and shows how this new space can be mathematically unfolded. He also draws up a list of conventions. Although he wonders, *are we not premature?* he also desires to get to work *as literally as possible* on setting up the Cyberspace Program. Benedikt argues for an integral manner of working which unites the literal and symbolic systems. For him Jaron Lanier's dream of post-symbolic communication lies far beyond the cyberspace project. Kellogg et al also follow the realistic path in the closing chapter. They reason in the opposite direction and ask *how a vr can be created in a real world*. Opposite the enclosed, simulated reality à la Pruitt and Barrett, they pose a distributed, augmented reality, *to bring cyberspace to the people*.

translation LAURA MARTZ

Computers as Theatre

BY RICHARD WRIGHT

Computers are not tools for processing data, but a medium for representing actions in which human beings participate. What started life as a way to make computers easier for people to use and evolved into 'computing and human factors', 'interface design' and 'direct manipulation', has become 'direct engagement'. Humans and computers are no longer separated by the 'interface', dressed up in its Macintosh desktop metaphor, but are joined in one 'designed experience'. To structure this practice we need a new conceptualisation for the computer, a new model. That model, Laurel argues, is theatre. It is expressed in the principles of dramatic theory.

Not all our uses of computers — like when I use a spreadsheet program or draw out money from an automatic cash machine — can be seen in such subjective terms. There are two broad categories of computer applications — the productive, enabling specific functions to be performed, and the 'experiential' which is for creative applications and entertainment. Many applications span both, but Laurel proposes that even balancing our monthly accounts should be a pleasurable activity, dramatically structured like, as Nicholas Negroponte suggests, a scene from *the play of your life*.

When the computer is thought of as a tool, as it was by earlier engineers and programmers, we are unable to think beyond the technical workings of its internal machinery. The 'metaphorical' interface developed at XEROX PARC and introduced in the Apple Macintosh gives the user a 'common ground' (the desktop metaphor) taking advantage of familiar objects, but restricts us to real-world representations that ignore the computer's full potential. Elements like the screen cursor have no real world equivalents anyway, and must be represented in terms of computer operations which are cognitively unnecessary for their use. The theatrical model (or meta-metaphor) encourages us to freely create new spaces for human/computer activities within the guidelines of dramatics. *Think of the computer not as a tool, but as a medium.*

Brenda Laurel studied and worked in theatre. She got into programming computer games early on as an extra source of income. Since then she has worked in all the well-known research laboratories, from Ohio State University to Atari to the Apple Computer Centre, mainly as a consultant in 'interactive fantasy' and entertainment, and speaks regularly on the computer graphics circuit. This is her first authored book, written in an accessible and conversational style, but occasionally falling into that glib did-you-know? manner that American academics seem unable to avoid when writing their 'popular book'.

For most of the first part of the book Laurel takes us pedantically through the basics of dramatic theory, using Aristotle's *Poetics* as our authority. Current deficiencies in interface design are seen in terms of a failure to observe the elements of dramatic structure such as enactment, pattern, character, action. In order to keep the theatrical conceptualisation as relevant as possible however, Laurel has to take on a massive recontextualisation task to allow for its deviations from the dynamics of computer interaction — most obviously that it is not for the benefit of an 'audience' when we are using the computer and that the flexibility in engaging with the computer that Laurel wants to retain is excluded by the practice of working to scripts. This is the least successful part of the book.

What is left is the importance of 'representing action', and theatre is recast as 'mediated improvisation'. The functions of the computer now consist of a number of agents or 'characters' of which the user is one, which interact and evolve into a performance. The importance of relating activities to a central 'plot' is emphasised, which can be non-linear and context-dependent, but must always be neatly concluded after the usual build-up, climax and epilogue. *Basically the system functions like a playwright working with one bizarre constraint: one of the characters (the user) is walking around in the playwright's study, inserting actions and lines of dialogue at will, which must be incorporated into a pleasing dramatic whole.*

All in all, there are not a whole lot of models in our current culture that can provide a promising model for such an open-ended new means of communication, playing and learning. If you're a passive receiver of something, then the obvious similarity is with tv; if you're an active participant then it must be a game. Is there something between the two, active and engaging but poetic, fluid and non-linear? Perhaps dancing is the most appropriate metaphor for the non-metaphorical interface, people interacting on the dance floor and interfacing with the dj, or even sport. But this would not preserve what Laurel considers the most important aspect of interactive activities, that meaning can only be embodied in dramatic characters, causal relations, actions and plots. Here we can perceive the limits of Laurel's approach — the difference between the theatrical model and, say, a dance model would be like the difference between cinema and MTV.

In the last section of the book, we consider the implications of the ultimate interactive fantasy, virtual reality (never far from any discussion of the future of computing and media). Laurel criticises the views of virtual reality guru Jaron Lanier and his idea of 'post-symbolic communication' (is that a contradiction?) in which *when you're able to improvise reality (...) and when that's shared with other people, you don't really need to describe the world anymore because you can simply make any contingency (...) you can create any action*. But for anyone else to understand what you're doing there needs to be some common language — *Yes I can do 'anything' in a virtual world, but how does the world respond? According to what principles?* Dramatic principles are a start, although they are not the only strategy. But hopefully Laurel's contribution to the debate will mean that 'designing your own reality' is not just a choice between Nietzsche and Timothy Leary.

Hypertext

The convergence of contemporary critical theory and technology

BY DIRK VAN WEELDEN

The now legendary *Les Immatériaux* exhibition, which took place in Paris in 1985, did not only comprise the exhibition in the Beaubourg



BRENDA LAUREL
Addison Wesley,
USA 1991,
ISBN 0 201 51048 0,
English text, 211 pp.

Mediamatic 7 # 1

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pagina 82



GEORGE P. LANDOW
Johns Hopkins
University Press,
Baltimore and London,
1992,
ISBN 0 8018 4281 6,
241 pp. DFL 40,70

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and the publication of the catalogue. A lesser-known component was the network project in which a select group of writers, critics, artists, administrators, architects, philosophers, art historians and natural scientists were directly connected to each other for a few months via the French phone company's Minitel system.

Only the last group really managed well in these new surroundings. Almost everyone else devoted most of their time in front of the screen to reflecting on the new system. This led to a stream of pedantic objections, annoyances and pontifications on the dangers of electronics. Those who had no problems with the system were often forced by the others into the role of peddlers of newfangledness, resulting in rows.

The project may safely be considered a failure, though the book of the repercussions of the exchanges contains much to fascinate. The strongest texts come from two people who in fact hardly paid any notice to others, but every few days electronically published a sample of their activities. They are Michel Butor and Jacques Derrida.

Their names frequently pop up in Landow's *Hypertext*. His book is an attempt to understand the possibilities and consequences of the hypertext medium in terms of the philosophical and literary-critical theories of Barthes, Foucault, Derrida and Lyotard. His thesis is simply that these French theorists' idea of the text comes out of the investigation into the boundaries of the universe of the printed word. Their terms describe a new type of textuality and are the preparation for a new universe, namely Hypertext. By now it has long been more than an abstraction, but rather a new, promising technology which is outgrowing the experimental stage in rapid tempo.

Landow considers books like Derrida's *Glass*, Barthes' *s/z* and *A Lover's Discourse*, and the literary work of Michel Butor as attempts to make hypertext—like reading experiences possible within the limitations of the old medium of the book.

Along with a short history of hypertext, Landow's book contains a clearly written and systematic exploration of the various properties of the textuality which arises with hypertext. Great emphasis is placed upon the non-linear character of texts. One might envision a web of documents which are connected to each other at thousands of interfaces, or reference points, without there being a beginning or end.

It is impossible for the reader to remain passive; there is no argument to lead him by the hand. Hypertext consists of multiple perspectives, kinds of texts, and approaches, and reading it presupposes a route chosen by the reader himself.

Following poststructuralism, Landow speaks of a radical intertextuality: there is no longer any clearly demarcated boundary between the inside and outside of a text, since every 'link' in the text is a hole in which the outside of that text is located. The traditional boundaries between primary and secondary work, between essay and footnote, between statement and reference, thesis and quotation become elastic, since hypertext lets all text appear equally easily, equally quickly and in the same space.

The most important boundary lost is that between the writer and the reader. Since the reader becomes a user and can only read by actively choosing, he 'writes' his own version into being from the network of documents to which he has access. In addition the structure of hypertext invites users to create 'links' themselves, and add documents (their own or otherwise) to the web. Landow bases his optimistic interpretation of these properties of hypertext on his years of experience with the system in teaching at Brown University. The enthusiasm of the students and the quality of their papers increased by leaps and bounds.

Of course, in the second half of his book Landow also devotes attention to arguments against hypertext. He consistently compares these to the opposition encountered by the printed book during the Renaissance. He sees hypertext as a true threat to the sort of scholarship, the cultural economy and the education which are based on the printed word. Fortunately, he does not hazard too many prophecies and limits himself to describing the copyright problems which will arise should hypertext really exist in the form of public access networks.

Weak spots in the book are the passages where Landow tries to describe the social consequences of hypertext as a competitor to the printed word. Here he is embroiled in a hazy debate with enlightened Marxist critics without taking a clear standpoint himself. The chapter in which Landow discusses narrative in hypertext is a bit vague as well. It is abundantly clear that hypertext has immense potential where texts are concerned whose principal content are information and knowledge. Scholarship, research, commentaries and cooperative projects—hypertext is made for these. But a narrative traditionally exists by grace of a beginning, a middle and an end. This classic story form is impossible in hypertext, and notions like 'protagonist' and 'plot' lose their contours. Landow refers to the literary tradition which reaches back to the late middle ages, in which these ingredients of the narrative have been sabotaged, ignored and derided. He extensively discusses successful literary hypertext fictions, like Michael Joyce's *Afternoon* and an adaptation of Borges' *Forking Paths* by Stuart Moulthrop. These leave me with an impression of being a hybrid between the knowledge system that is hypertext and the old literary text. That the relationship between this new genre and linear narrative is a very different one from that between the old-fashioned textbook and a hypertext web in the computer of a university seems clear to me, but Landow does not draw this conclusion.

Landow's book is a highly valuable publication which links the most important theories in the field of textuality with new technology in a critical and lucid manner, without degenerating into futuristic generalities. He speaks from years of practice, which he painstakingly describes. Landow is an enthusiastic champion of hypertext, but without fanaticism, without the ecstatic yapping.

Hypertext appears through this book as a medium which concerns everyone, for it just might turn out to be the Noah's Ark inside which knowledge and scholarship will have to survive the future.

translation LAURA MARTZ

Pastoral Instruction 'Aetatis Novae' on Social Communications

BY LEX WOUTERLOOT

There can be no doubt that the Roman Catholic Church is going through a crisis. The energy Pope John Paul II displayed in visiting the most remote archdioceses contrasts sharply with the Church of Rome's sluggishness in making use of the media revolution. For good reason, the recent pastoral brief about 'means of social communication' opens with the statement that *today, people everywhere feel the strong influence of the media on religious and moral attitudes, political and social systems and education*. But one certainly need not be a catholic to add that it is not the catholic media which are producing this effect.

The Catholic Church displays a peculiar conservatism with regard to the media. While the *Laudate Jesu* has been heard for years on the frequencies of Vatican City Radio, a Roman Catholic tv satellite has not yet appeared in the firmament. The Catholic

Mediamatic 7 # 1



page 83



PONTIFICAL COUNCIL FOR
SOCIAL COMMUNICATIONS

Vatican City 1992,

Dutch translation:

'Kerkelijke Documentatie',

jrg. 20, nr. 4, Utrecht 1992,

ISSN 0922 3517

Church's apparent inability to make use of the new media is reminiscent of the Church's long period of impotence following the invention of printing, from which it recovered only through its own counter-reformation.

The religions now advancing are Islam and evangelical Christianity. Neither shy away from modern media technology in pursuing and spreading their faith. JP II's international travels are a late recognition of the religious significance of the transportation revolution caused by the invention of the jet airplane, but compared to the size of the annual airlift to Mecca, these Catholic logistics make a meager impression. So too does the Catholic presence in the media when contrasted with the ecstatic praises to Jesus that boom through the evangelical-electronic churches.

The Catholic Church has every reason to follow the development of the media with concern. On the occasion of the 20th birthday of the *Communio et Progressio* pastoral instruction, and more than a quarter century after the Vatican II's *Inter Mirifica* decree on the media, the Papal Council on Social Communication, led by Archbishop John P. Foley, has turned its attention to the problem.

The most noticeable thing about *Aetatis Novae* is the vagueness with which both the newest electronic media and the most traditional Catholic forms are discussed. Only a passing reference is made, in the form of a brief summary, to the church's perception of the form taken by this swift technological development: *satellites, cable television, fibre optics, video cassettes, compact discs, computer-generated imagery and other computer and digital techniques, and much more*. Only very rarely are the common names of the equipment and techniques which are the subject of the discussion used at all. One gets the impression that the writers are better acquainted with theological jargon than media use. No less astonishing in this pastoral missive is that even less attention is paid to the Mass, which might be called the medial basis of the Roman Catholic Church. This Catholic rite is introduced as a 'traditional means' in a series of other religious practices which are *testimony of life, catechism, personal contact, piety, the liturgy and other such celebrations*.

It is obvious in *Aetatis Novae* that the members of the Papal Council on Social Communication are not aware of the pastoral problems evoked by the mass experience of Virtual Reality in confrontation with the conventional celebration of Holy Communion under vaulted stone ceilings. The contents of this pastoral instruction illustrates once again that the Catholic Church's media theology is non-contemporary. Indeed, 25 years have passed since the second Vatican Council. This causes the instruction to make a somewhat unreal impression. The media are called *grosso modo* a medium for the transfer of information, which takes place in a vague realm known as 'leisure time'. This limited interpretation of the media amounts to a negation of the pastoral effects of the media revolution on labour, war, recreation and management, to cite some more obvious examples.

Upon reading this pastoral brief, one might almost forget that the modern media appear to our senses as a proliferation of electronic images. In *Aetatis Novae*, 'radio/television' is still discussed as though in Rome they still don't know what to make of the social reality of video as a mass medium. One almost gets the impression that after centuries of visual contra—reformation, a sort of mental iconoclasm has formed in the Vatican. Because this text is in full opposition to the medial realm of images as the realm where religion can be experienced. In opposition to the audio—visual media, it opts for the formation of a somewhat disjointed social community of speaking faithful.

The Christian religion is presented as the religion that reveals itself in language par excellence. The Catholic church approaches the multi-sensory media with a linguistic theology. *Here, in the word become flesh, God's self communication is definitive. In Jesus's words and deeds, the Word is liberating, the salvation of all of humanity. This loving revelation of God, combined with the religious response of humanity, forms a profound dialogue*. Concern about the negative effect of the media takes the form of fear of the repression of language as a medium. *Thus, in fact, silence can be imposed on persons and groups to whom the media does not pay attention; even the voice of the gospel can be weakened, but not completely silenced*. In opposition to the media's power, the church proposes the community of faithful as a discussion group which offers the opportunity for *discussion of films and radio broadcasts*.

While the claim is made that *the use of the media is essential in preaching the gospel and in catechism today* and that it is necessary to *integrate the message itself into this 'new culture'* which is formed by modern communication media, the chosen medium of Christianity is another one. The media are consistently called *means of social communication* in the certainty that the modern media are neither social nor do they facilitate communication among people. This use of sociological terminology expresses resistance to developments in which *human interaction is replaced by the use of media* and social bonds make way for *attachment to fictional figures*. But the question would seem to be whether the Roman Catholic church's medial asceticism will appeal to the masses yearning for faith in a world order which is based not lastly on modern electronic media.

translation JIM BOEKENDER

Book for the Unstable Media*

BY SONJA SNOEK

The technology question, the one which addresses the influence of the new technologies on perception and world view, is one which constantly comes up. Not only because of the advent of the new media, but because it has become part of the postmodern repertoire. The technology question is posed in every imaginable territory, from war to art and the body, to the extent that it has become an area of specialization in its own right, a shelf in the bookcase, a theme anyone can hook latch on to and talk about.

In the *Book for the Unstable Media* the technology question is formulated as the question of 'unstable media', the term the artists' enterprise v2 has given today's technologies when addressing their relationship to art.

v2 is not a new organization: the club has a ten-year history of creating multimedia art, audio performances and avant-garde music. In addition to radio art, 'moving sound creatures' (F. Hess), 'sound therapy' (D. de Ruyter) and 'mental rotation' (A. van Kerckhoven) — performances of which can be seen at the annual *Manifestations of the Unstable Media* — there is now a collection of essays in which artists and scholars philosophize about the unstable media.

Interactive art confronts the audience with (digital) installations in which they become directly involved in making an audio-visual performance. The book delves deeper in to the advantages of such a confrontation, by asking: *What should art do with the image of reality which is created by the new technologies?* This is answered fairly unanimously in pieces by visual artists like Jeffrey Shaw and Gregory Whitehead and theorists like Peter Weibel, Florian Rötzer and Paul Virilio: art and technology are on the threshold of a new era which will unlock exciting, as yet

Mediamatic 7 # 1



pagina 84



ALEX ADRIAANSENS

e.a.(eds.),

v2 Organisation,

's Hertogenbosch 1992,

ISBN 90 9004840 5,

Dutch / English text,

170 pp. Dfl 37,50

undiscovered realities. Whether they view this positively or with pessimism makes no difference.

They agree that it is high time for contemplating the effects of present-day high-tech. The artist and architect can play key roles in this. Jeffrey Shaw, creator of video installations like *Legible City*, which lets the viewer wander about in a three-dimensional book, sees possibilities in his work for making the art viewer an explorer in the future, *a discoverer in a latent space of audio-visual information whose aesthetics are embodied both in the coordinates of its immaterial form and in the scenarios of its interactively manifest form.*

In the recent installation *Alice's Rooms*, Shaw equips a space with several monitors upon which a room is visible through which one can move using a joystick. The rooms behind the screen turn out to have the same dimensions as the space in which the work is installed. Virtual and actual space, paradoxically enough, can coincide.

Theorist Florian Rötzer emphasizes the limitless possibilities of 'techno-aesthetics': *It is the exceeding of the inner, virtual worlds of dream and fantasy which fascinates techno-aestheticians, the overcoming of the distance to the real and the perceptible which these allow. The virtual worlds of the wishing machines must fulfil the imagination and, at the same time, leave it behind.* Peter Weibel adds in his essay that contemporary environmental art is, or in any case could be, the door to the electronic world towards which we are heading.

This is a valuable collection for practitioners and aficionados of media art, because it offers insight into a body of thought and future fantasies shared by a group of artists making the stuff. In fact the book is a manifesto, a snapshot of an artistic stream and its philosophical supporters at a given moment. What is most striking about this interdisciplinary clique is its (deliberate) lack of art-historical awareness. They do not place their own art in the tradition of interactive art, but in the context of older, static art. Video artists like Nam June Paik and Bruce Nauman, who were already making art 'talk back' to the media in the 60s, and who experimented with dislocating new technology and using it to their own ends, are not reference points here.

v2 prefer to see themselves as cultivators of new artistic territory, pioneers rowing against the current of 'existing art'. Their name for this art is 'the museum system', which they one-sidedly associate with massive Van Gogh exhibitions and the unique, absolute and faithful nature of the art object. With such a portrayal of things, sidetracking as it does the majority of twentieth-century art, they seem to want to reinvent the wheel. At the same time, there lurks a peculiar nostalgia in their stress on technological change as the *cause* of unstable media art.

As v2 remark: *The proposition that traditional art has come to a deadlock because it cannot adequately cope with the problems of our time, and that media art takes over from there, is a bold one, but one which makes sense. Indeed, art which holds on to, and is based on, a static world vision, in which the idea of the absolute determines the conditions as to how we perceive and interpret the world, will gradually get out of step with a society such as ours, which has already changed into a dynamic, non-static society, where sign, language and tools are developing rapidly and communication is already largely determined by these new tools (such as telephone, television, fax and computer).* It looks as though they aim to whistle art back to the ancient idea of representation: art should make use of the unstable media because they are determinant in the environment. Art, however, deserves more than a representative role in the technological society. Reflection is possible in any medium, old or new. It is up to the artist to exploit these possibilities, and put them at risk when necessary.

In many of the contributions to *Book for the Unstable Media* we encounter the same references, speculations and discoveries. The fusion between the different disciplines which is being called for — architecture, philosophy, performance — has evidently not yet crystallized. The pieces by Georges Teyssot and Kristine Stiles, for example, are disjointed, barely readable cases of name-dropping. Dispersal, pretension and opacity: it may be a good diagnosis of the state of (media) art. So for recalcitrant artists and those involved in interactive media, the *Book for the Unstable Media* is an asset — as a source of questions, irritation and inspiration.

translation LAURA MARTZ

A Pattern Language* Towns Buildings Construction

BY BERT MULDER

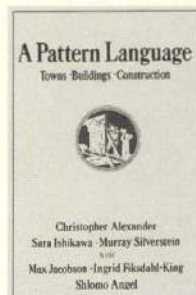
We build information systems: hundreds of people sitting in front of screens that glow and that, interconnected, create an environment supporting their works and desires. 'Enabling technology': it makes them increasingly powerful, extending their ability to draw in, transform and materialise information in many forms. We deal with hardware, software, networks national and international, and data in the form of numbers, text, graphics, audio and video. In this constantly changing, moving and self-transforming world of millions of guilders investment, where hundreds of machines large and small and hundreds of units of software large and small determine what we do, we hardly know what tomorrow will bring. We're computer people, but do we *build* information systems or do they 'happen to us'?

Computer power doubles every 12 to 18 months: fast changing technology forces attention to be paid to tools. Applying these brings us among increasingly complex systems that affect our life more and more intimately. Tools grow from simple to complex, information systems turning into information environments: man and information system living in symbiosis, the systems determining us as much as we determine them. How do we build these new forms of co-existent living?

Design precedes building. To build new information environments, we need to look for new methods of design. Methods with which man may clothe himself in technology without leaving his humanity behind. In our methodological search we turn to architects, as theirs is the oldest field of designing environments for human activity. Information environments may well be described in spatial metaphors: they deal with the proximity of information in time, space and concept. Maybe we can adopt these metaphors to look at the familiar and learn.

There are two reasons why looking at architecture may be useful: architectural metaphors may inspire us to see new possibilities and architectural philosophy may show us different attitudes we can adhere to in the creation of environments.

Christopher Alexander is an architect who tries to create a 'human-oriented' methodology in architecture. His book *A Pattern Language* describes a language for building and planning and is a companion to his, *The Timeless Way of Building*. The former one is the source book; the second one its practice and origin. In other volumes, such as *The Oregon Experiment*, *The Linz Cafe* and *The Production of Houses* Alexander describes actual implementations of the methodology. Just like the work of Christian Norberg-Schulz, Alexander tries to do justice to existential values in architecture:



CHRISTOPHER ALEXANDER
e.a.,

Oxford University Press,

New York 1977,

ISBN 0 19 501919 9,

English text, 1171 pp.

Mediamatic 7 # 1



page 85

The core of these books is the idea that people should design for themselves their own houses, streets and communities. ...it comes simply from the observation that most of the wonderful places of the world were not made by architects but by the people.

Alexander presents in it a new theory of architecture, building and planning which has as its core that age-old process by which the people of a society have always pulled the order of their world from their own being.

The book is divided into three parts. The first part of the language defines a town or community, the second part gives shape to groups of buildings and individual buildings

(If you have followed the patterns given, you have a scheme of spaces, either marked on the ground, with stakes, or on a piece of paper, accurate to the nearest foot or so. You know the height or rooms, the rough size and position of windows or doors, and you know roughly how the roofs of the building, and the gardens are laid out.)

The last part of the language tells you how to build it, in detail. All in all the language contains 253 patterns.

The elements of this language are entities called patterns. Each pattern describes a problem which occurs over and over again in our environment, and then describes the core of the solution to that problem, in such a way that you can use this solution a million times over, without ever doing the same thing twice.

and
 (...) the solution — the heart of the pattern — which describes the field of physical and social relationships which are required to solve the stated problem (...) is always stated in the form of an instruction — so that you know exactly what to do, to build the pattern.

Suppose we compare towns with the information environments of organisations, and buildings with the parts within it, such as databases and other applications. The first patterns, those that define a town or community

(...) can never be 'designed' or 'built' in one fell swoop — but patient piecemeal growth, designed in such a way that every individual act is always helping to create or generate these larger global patterns, will, slowly and surely, over the years, make a community that has these global patterns in it.

This is design for environments where detail is unpredictable and the system cannot be laid out in advance. Order is not explicit, but implicit, slowly coming forth from the parts of the system and their interactions.

If we want to create environments where every individual act supports the continuing evolution of an information system, how do we go about? The pattern language says there should be a healthy balance between the great and small in 'the distribution of towns' (# 2):

If the population of a region is weighted too far toward small villages, modern civilization can never emerge; but if the population is weighted too far toward big cities, the earth will go to ruin because the population isn't where it needs to be, to take care of it.

Encourage a birth and death process for towns within the region (...)

Crucial in this is 'to take care of it': an active attitude of responsibility. How do you create a population that cares? The 'network of learning' (#18) states:

In a society which emphasizes teaching, children and students — and adults — become passive and unable to think or act for themselves. Creative, active individuals can only grow up in a society which emphasizes learning instead of teaching.

(...) work in piecemeal ways to decentralize the process of learning and enrich through contact with many places and people all over the city: workshops, teachers at home or walking through the city, professionals willing to take on the young as helpers, older children teaching younger children, museums (...)

This quote describes the structure of help support systems in information environments where people care. Even if you can't connect these patterns to direct practical implications, they still serve as a strong example of a memo pool that takes human existence as a starting point, and does not destroy it.

Direct applicability of this work is only one part. The other is the method, the turning, again and again, to basic questions. The architects of new information systems are at the same crossroads, having to rethink their basic premises, as Alexander does for building and architecture. Research into the application of computer based tools to support the work of groups of people introduces 'existential meaning' into our design.

In future client-server environments, where data will exist close to its source, and consistency lies in the hands of communication with distributed data dictionaries, information environments will follow pattern 87, 'individually owned shops':

When shops are too large, or controlled by absentee owners, they become plastic, bland, and abstract.

Do what you can to encourage the development of individually owned shops. Approve applications for business licenses only if the business is owned by those people who actually work and manage the store. Approve new commercial building permits only if the proposed structure includes many very very small rental spaces.

The development of Alexander's work shows interesting parallels with information science. In his first works in 1964 he uses a much stricter method to do justice to the complex requirements of the domain:

We face the following specific, purely mathematical problem. Given a system of binary stochastic variables, some of them pairwise dependent, which satisfy certain conditions, how should this system be decomposed into a set of subsystems, so that the information transfer between the subsystems is a minimum?

In the appendix the design for an Indian village serves as the application of the mathematical approach to the problem. It seems an elegant method that tries to do justice to humane values while structuring the process of design. This approach, that uses mathematics to chart the manifold desires of the inhabitants of the village, attracts much attention. But seven years later, in 1971, he writes in *Notes on Form*:

Indeed, since the book was published, a whole academic field has grown up around the idea of 'design methods' — and I have been hailed as one of the leading exponents of these so-called design methods. I am very sorry that this has happened, and want to state, publicly, that I reject the whole idea of design methods as a subject of study, since I think it is absurd to separate the study of designing from the practice of design. In fact, people who study design methods without also practicing design are almost all frustrated designers who have no sap in them, who have lost, or never had, the urge to shape things. Such a person will never be able to say anything sensible about 'how' to shape things either.

Seven years after the *Notes on Form* (in 1977) he publishes *A Pattern Language* and in 1979 *The Timeless Way of Building*. Both are used in real life: *The production of Houses* (1985) describes the Mexicali project in 1976 with people in northern Mexico. It's only one of the examples.

Alexander tries to do justice to the existential meaning of built structures around us. In that he is not alone. Christian Norberg-Schulz mentions the same problem in his *Genius Loci*:

(...) a certain change in method has become manifest. In Intentions in Architecture art and architecture were analyzed 'scientifically', that is, by means of methods taken over from natural science. I do not think that this approach is wrong, but today I find other methods more illuminating. When we treat architecture analytically, we miss the

Mediamatic 7 # 1



pagina 86

concrete environmental character, that is, the very quality which is the object of man's identification, and which may give him a sense of existential foothold. To overcome this lack, I introduced in *Existence, Space and Architecture* the concept of 'existential space'. 'Existential space' is not a logico-mathematical term, but comprises the basic relationships between man and his environment. (...) The concept of existential space is here divided in the complementary terms 'space' and 'character', in accordance with the basic psychic functions 'orientation' and 'identification'.

There are several reasons why this material is important for the designers of information environments. It seeks to introduce the existential into methodology and design, accepting man as a central, creative and originating 'locus of design'. In information science this development is seen already and will become more apparent in the next couple of years, when technology will maintain its own consistency and allow us more freedom.

The material is a strong example of the relationship between philosophy, its ensuing method of design and the results of its application. Its idiosyncratic character makes us 'stand apart' and creates an awareness of our own assumptions refining our perception and making us wonder.

I think this material is required reading for people involved in the design of environments of any kind. It would certainly serve to infuse the ossified methodologies of information science with new life. The books are expensive, but I use them again and again as sources of ideas and reference material.

Alexander creates life by using the force of creation as the source for design. This is his first statement in *The Timeless Way*:

A building or a town will only be alive to the extent that it is governed by the timeless way.

It is a process which brings order out of nothing but ourselves; it cannot be attained, but it will happen of its own accord, if we will only let it.

To seek the timeless way we must first know the quality without a name.

There is a central quality which is the root criterion of life and spirit in a man, a town, a building, or a wilderness. This quality is objective and precise, but it cannot be named.

Crack Wars Literature Addiction Mania

BY ARJEN MULDER

There is no theory of drugs concludes Ronell in her new book. Jumping on the bandwagon of the current war on drugs, she focuses attention on the 19th-century, the period when heavy use became widespread in the West. However, Ronell does not write about drugs, but about addiction; 'crack' is the drug that offers addiction and nothing else. Addiction is the behavioural model that underlies everything in technological culture, from the Industrial Revolution onwards. Ronell opens with a quote from Heidegger, who expressed this insight in its most basic form: *Addiction and urge are possibilities rooted in the thrownness of Dasein*. Upon re-reading *Sein und Zeit* (Being and Time), Heidegger's own drug experiences (acquired on the advice of Ernst Jünger) emerge as crucial in his metaphysics of decision. Confronted with the thrownness of *Dasein*, the human being must make a decision, according to Heidegger, and only one decision can be possible: to say yes to the world as the place where *Dasein* can be. We have no other choice, or, in more modern terms: *We're stuck here for a while and we better work it out.*

Why, actually? Why accept the world, the thrownness, the certainty of death? Because this is precisely what dope, or addiction, rejects. The addict decides to say no to the world as the place for the realisation of *Dasein* (because of the injustice, the inadequacy of that world), but the addict does this by saying yes to one particular possibility of the body, its thrownness. He refuses to replace it with mind or religion, the institutions settled on by Heidegger after his decision. For Ronell, addiction is tantamount to a materialist critique of the decision. 'If this is the only choice, then I say no.' To quote Ronell: *There can be no doubt about it. What is required is a genuine ethics of decision.*

This decision to say no can be typified as the strong, positive aspect of 'being on drugs'. The need for this rejection is developed by Ronell into a re-interpretation of *Madame Bovary*, Flaubert's classic novel, which she perceives as the first extensive analysis of the model of addiction in a technological world. *Madame Bovary* was first addicted to dreams, then to romantic books. Only afterwards did medicine enter the picture as the temptation of the pharmacist (the dealer). One is already addicted before the introduction into the body of a substance called a 'drug', a substance that indicates a way out of the rejected world. Drug use is aimed at the outside, the Other, the promise of an escape, the possibility of contact with that which is alive outside the body. While Ronell never says it out loud in her analysis of the novel, her description of the course of *Bovary's* addiction, of the possibilities contained in the immense boredom offered by the technological era, makes an implicit claim: why introduce a substance from outside into one's body, when the possibility is already present within the body itself — in the form of love.

Ronell rejects the presumption of literate users that chemical drugs offer a way to the outside. She claims: *Drugs, it turns out, are not so much about seeking an exterior, transcendental dimension — a fourth or fifth dimension — but rather they explore 'fractal interiorities'*. This was already hinted at by Burroughs' 'algebra of need'. Drugs only penetrate deeper into more of the same thing. This same thing is called transcendence, mind, decision. But the Other is only to be found outside the self (it is the body of others which causes one's own body to realise itself and become real). The tendency in technological culture to render the body superfluous and cause it to disappear, recurs in the drugs that belong to this culture. He who thinks beyond this terrorist social order, thinks himself beyond drugs or, what is more, beyond addiction (with love as the non-addictive bond with something other/the other outside of one's own technologised body).

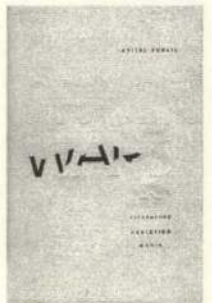
This is an interesting position, a stimulating contribution to the debate on the question of what exactly the 'war on drugs' is fighting. Like *The Telephone Book*, the book beautifully designed. The text is consistently profound and the various genres that Ronell uses as moulds for the formation of her theories are varied and mind-expanding (though Ronell's attempt at cyberpunk gets somewhat off course due to the unlikely plot). But, curiously enough, *Crack Wars* produces nothing new, no novel concepts, no fresh fields of knowledge. It does not pass beyond the level of analysis and criticism, and when it tries to go one step further in the concluding pages (with an imaginary round-table discussion between Heidegger, *Bovary*, Duras, Jünger, Gretchen, etc.) its arrives at an answer that is bound to sound very familiar to religious readers.

The rejection of the thrownness of *Dasein* by addiction, if thought through consistently, leads to rejection of addiction itself. Ronell's perception of this is not as simple as I am presenting it here. She tackles the suspicion that she simply belongs to the

Mediamatic 7 # 1



page 87



AVITAL RONELL
University of Nebraska
Press
Lincoln & London 1991.
ISBN 0 8032 3903 3.
English text, 175 pp.

O

moral majority with a quote from Walter Benjamin on practically the last page: *I was suddenly seized by a ravenous hunger. I was incapable of fearing future solitude, for hashish would always remain.* (Hashish is the emotion-drug; expressing hunger for direct contact with the outside world.) But, when all is said and done, with all the explicitness one can expect of Ronell, this is what her book comes down to: realisation of love is the purest form of rejection of the world, without drugs, *Dasein* in all its glory. What do you mean, love? The post-millennium era casts its shadows ahead.

Ronell: *Nietzsche committed this thought to writing*: Who will ever relate the whole history of narcotica? It is almost the history of 'culture', of our so-called high culture. *Our work settles with this Nietzschean 'almost'*. It is exactly this position — the *a priori* idea that somewhere in the world neither culture nor narcotica is dominant — which is both the strength and the weakness of Ronell's book. She locates this *herrschaftsfreie* spot in the final sentences of *Crack Wars* in the future as seen from the present. A view in the right direction, it seems to me. Had it been aimed at the past, it would have had to admit that so-called high culture, including technological culture, had been founded for twenty centuries on the religion of love, Christianity.

I cannot escape the feeling that Ronell has underestimated another characteristic of drugs not explicitly dealt with in her book: their promise to the user of real experiences without technical media entering the picture: drugs as defense against the culture of the secondary text. But drugs themselves are also clearly media as plant extracts or syntheses. For Ronell, love offers the same extra-medial promise that the needle offers the week-end user: love is what people 'really' experience. In the final analysis, I cannot help but find that Ronell does not succeed in locating the 'outside' of her metaphysical-psychoanalytical discourse; this leaves the before and after in the discourse of desire unresolved (desire as the truth of being) thus rejecting the world outside of that discourse as 'only simulation'. But if Christianity has proved anything, it is that the argument of love can serve any (mis)deed. I will short-circuit my doubts and close with a quote from Multatuli: *Love is a beautiful thing / A diversion for all humanity.*

translation JIM BOEKENDER

Mediamatic 7 # 1



pagina 88



Piazza Virtuale*

BY BERT MULDER

It's three o'clock in the morning in Davos, Switzerland, and I turn on the tv set. I can't sleep. 3sat runs *Piazza Virtuale* — interactive television. I hang out.

The screen is crowded: the upper half shows two video windows, where real people look down into the camera, virtually into my living room. Their heads loom large and I can hear their voices. The lower part shows text: a bulletin board conversation by modem between three people. In the middle of the screen it shows the phone numbers for voice, modem and fax. Everybody is talking to everybody: the people in the video windows (one says ENTRY POINT KASSEL), the three people on the BBS, and others on voice lines. One of the modem users types in the lower part of the screen: *Hey you guys up there, show us more than your heads!* The people in the video windows laugh. One head moves its body into the picture, draws up his T-shirt and shows his belly. The modem reply is favourable. Someone else plays with a mirror in front of the camera. The modem person types: *I can look myself in the eye, ha ha...*

The screen changes. It shows a room filled with computer gear, and someone working at least four keyboards and ten screens. The control room? The program schedule appears. There is a 'piazza' linking Kassel with another location throughout every hour and 15-minute special 'piazzetta's'. The next piazzetta begins:

PLEASE WAIT...

unsere computer laden jetzt / our computers are loading...

Classical interactive orchestra...

It starts. *Call now if you want to participate*. The screen is split into four, showing four telephone touch-tone pads. *This is the SOUNDCHECK. Push the buttons and hear what happens*. Callers push their phone pad buttons, and on my screen their equivalents turn red. There is a piano sound, a kind of violin and something else. Then the soundcheck is over. The screen switches to a video image with people in ENTRY POINT KASSEL again, and four small micons on the left side of the screen show when there is an interactive musician online. The virtual musicians play. At the top of the screen it says: *singing: 0561-719020*. Several callers are heard mulling it over, and then singing. Everybody's is trying: a concerted effort seems far away. It'll take at least a decade before quality virtual opera.

After 15 minutes exactly (precision tv timing imposing its limits on virtual reality):

VAN GOGH TV / presents / THE / DEUTSCHE / PIAZZETTAS

The screen comes on in fully interactive set — up: two video windows, the bulletin board area below, and a second bulletin board superimposed over one of the video pictures:

<mr> Yeah, live on German tv
<microbyte> How many people are watching?
<mr> I'm one
<mr> I guess not many because it's 4 am
<microbyte> Hello Germany
<mr> Hello USA

Berlin talks to Kassel. The Kassel picture is jumpy — *ISDN?* People in the Kassel picture have a mike and one asks if the green BBS text scrolling over their faces can be changed. Can they put up their own text? Immediately the green text reads: */shut up kassel/ we stay/ I have a problem*. Kassel says. Somebody digitizes that piece of text, and slows it down. *I have a problem...* dark-sounding and slow, it becomes a background sound, and is used as such for the next five minutes.

Dirty Harry, Tom and Frog talk to each other on the lower half of the screen, complaining about the lack of attention from the heads in the ENTRY POINT KASSEL screen, whom they call 'voicers'.

*/dirty harry: who is tom?/tom: moment/tom: hi
jessica/dirty harry: hi voicer. berlin charlottenburg greets/dirty
harry: voicers read downhere/frog: the voicers read
seldom/goodbye/goodbye/*

The time limits cut off the callers. */welcome/* And processes the next call.

PLEASE WAIT...

our computers are now loading / unsere computer laden jetzt...
muskart, die robotcamera...

The screen shows a picture of a phone pad and a drawing of a camera hanging from the ceiling on a rail. A voice explains that pushing buttons on the telephone pad moves the camera. The screen switches into a room, the tel pad in the lower left hand corner, and in the upper right, a counter counting down from 3350. One of the buttons of the tone pad lights up, and the camera moves. It slides on a rail and turns, showing a large room crammed



VAN GOGH TV
Documenta IX Kassel
ZDF/3sat Mainz, 1992
PONTON EUROPEAN MEDIA
ART LAB Koppel 66,
2000 Hamburg 1,
tel. 040 241404,
fax 040 240511

with computers, screens, and people watching and typing. The people are the ones we saw inhabiting the ENTRY POINT KASSEL screen before. A guy with headphones comes into view and asks the viewer to focus on his head, guiding him: *A little to the left, no that's enough. Where do you live?* Bielefeld. *Shall I arrange a meeting for you?* OK *You like the station there?* yeah, OK. Suddenly the camera jerks into movement, racing past the guy's face. The caller pushes another button and it moves back, as jerkily as it moved forward. OK *tomorrow at six what's his name will be at the station in Bielefeld for any girl interested.* The counter in the upper left hand corner is down to zero and there is another caller. *Hi, where do you call from?* Bremerhafen! *Turn to me. How? Turn the camera. Left or right? What do you think?* The camera turns. Then it stops. No movement. *Are you there? Push arrow-star-arrow. You have to move the camera otherwise it will disconnect you. Move the camera.* The caller is gone and a click gives way to the next one. This guy knows what he's doing. *What is your name?* But the camera slides fast along the track, and turns are exercised expertly. He seems to look into the different spaces between the racks with stuff. One, two, three, four. People wave absent-mindedly, while working and talking into phones. It's late, and the flying camera was news long ago. The caller seems satisfied. He says *Yendo isn't there is he?* No — who are you? *I'm Matt, and I was here yesterday.* He disconnects before the timer is down to zero.

Who are you? Somebody from Berlin. *Somebody?* Yes. *East or West?* There is no East or West.

PLEASE WAIT...

our computers are now loading / unsere computer laden jetzt...

Silvia and David...

Text on screen and a voice explains that callers may control a couple, who, like all couples after a while, have their moods. The ** key switches moods (loving, day-to-day, fighting, making up) and the numbers let you choose texts. (Please let the speakers finish their text, otherwise they start stuttering!) The two callers (the first to call controls Silvia, the second David) push buttons selecting moods and texts. Silvia and David, close-up shots of a woman (left) and a man (right), talk to each other ('movie now being loaded'). Under their heads their mood is printed while they talk: *I don't understand why you are so stupid and I can't stand it any longer. I love you. Come over here and let's have fun!* When the time is up, a sign saying 'divorced' disconnects the users, and lets others play. The callers let Silvia and David experience violent mood swings while pushing their ** button. It's virtually real life.

In the background telephone conversations go on (*what's your name and what can I do for you?*)

The piazzetta gives way to the piazza again.

VAN GOGH TV / the coffeehouse / communication with fax, minitel, modem and telephone / dial germany and / 0561 kassel send your FAX to be displayed here

The last piazzetta is *Do You want to Confess?* where, while the screen is black, callers may confess and a priest ('this is a pre-recorded voice!') offers little sound advice. Calls end with *no absolution is granted!* It's not very interesting, and I zap for a while, waiting for the end to come.

At six o'clock the program signs off. Now we get to see the architects and the owner of the piazza. It's the early morning of September 6, 1992. The piazza is a special feature from the DOKUMENTA IX in Kassel, thanking all the people, all hard- and software suppliers, and proudly announcing that they were switched into Lithuania, Latvia, Russia and a couple of other eastern European countries. It's broadcast by the largest German TV station: © ZDF 1992.

Het Buitenmediale

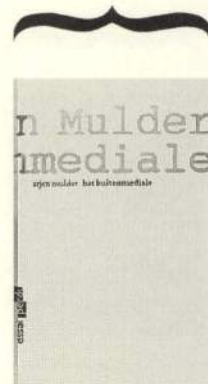
DOOR GER PEETERS

Al lezend in het *Buitenmediale* van Arjen Mulder moet ik aan een ooit op een andere plek gelezen anekdote denken. Daarin wordt het verhaal verteld van een toerist die de toppen van de bergen wil beklimmen. Helaas voor hem; het regent al geruime tijd. Op een wandeling langs de stroom van een rivier ontmoet hij een oude bergbewoner en vraagt hem of het weer nog lang zo zal blijven. De bergbewoner bekijkt het stijgende water in de rivier en zegt dat het bijna voorbij is. De toerist is hoogst verbaasd en vraagt hoe hij daarbij komt. De ander kijkt hem op zijn beurt verbaasd aan en zegt dat anders de rivier immers zou overstromen.

Het nieuwe probeert het oude te overweldigen, maar het oude laat zich niet in één keer verwijderd. Zoals Mulder in zijn inleiding schrijft: *De verworvenheden van de voorbije tijd moeten vernietigd worden om ruimte te maken voor een nieuwe kracht, die van een positieve benadering van het menselijk tekort. De voorbije tijd, waarin niemand deugde en de negativiteit vrij spel leek te hebben is echter halsstarriger dan verwacht. Het nieuwe, het buitenmediale, vormt in de hier verzamelde essays eerder een aanleiding; een motief om terug te keren naar het mediale, naar het schrift. Om tenslotte te proberen de negativiteit in de nieuwe stroom van de rivier te verbergen. Of zoals een van de vier behandelde auteurs, Gottfried Benn in *Block 2, Zimmer 66* schrijft: *Waar je ook luistert, het is nagalm, steeds einde, finale lust...**

In het eerste essay komen op een van die magische momenten uit de taal vier schrijvers, Gottfried Benn, Gertrude Stein, Cesare Pavese en Sorley MacLean, samen. Geografisch van elkaar gescheiden, maar wel met *de gemeenschappelijke aanwezigheid in een elders*. We schrijven het jaar 1943, maar het had ook een ander jaar kunnen zijn, want *to wish to remember that every year is a change if it is to be considered historically*, zoals Gertrude Stein al schreef in *Lucy Church amably*. Alleen zouden we dan bij andere schrijvers zijn terechtgekomen, bijvoorbeeld Rilke en Mann op de vooravond van de Duitse Revolutie. De negentiende eeuw wordt hier in 1943 afgesloten en ook weer niet. In hun schrijven nemen de auteurs afscheid van de werkelijkheid en betreden wat Mulder een 'mogelijkheidsruimte' noemt: een parallelle wereld die er altijd net naast zit, zonder nut en zingeving. Deze wereldruimte is de negativiteit en wordt mogelijk door het afwezig.

Mulder neemt ons mee op een dooltocht door de teksten van vier schrijvers waarbij de dood, de kindertijd en de liefde nooit ver weg zijn en hij grotendeels leunt op Gottfried Benn en Cesare Pavese. Met name Benn balanceerde vol overgave op de rand van het niets. Hij noemde zijn niemands- of nietservaring *de rand waarin het bestaan valt en het ik begint*. En dan verstopt, duikt plotseling het achteloze zinnetje *Someone was hurt long time ago* op, dat Pavese voor zijn dood aan een Amerikaanse vriendin schreef. Het lijkt me de stuwende kracht achter het eerste deel van het *Buitenmediale*. Daar aangekomen vraag ik me af in hoeverre negatie en vlucht in deze schrijvers en in Mulder samenkomen. Het lijkt op *Ketman*; een spel dat afkomstig is uit het Midden-Oosten en op veel plaatsen in de wereld vol gratie wordt gespeeld. Ter bescherming van jezelf vlucht je niet naar de Riviëra maar in een inwendig asiel. De Fransman Gobineau schreef: *Ketman fills those who play it with pride. Thanks to it, a believer raises himself to a permanent state of superiority over the man he deceives (...) while you, tattered and dying of hunger, tremble externally at the feet of duped force, your eyes are filled with light, you*



ARJEN MULDER
Uitgeverij Perdu,
Amsterdam 1991,
ISBN 90 5188 0537,
Dutch text, 94 pp.

Mediamatic 7 # 1



page 89





NO. 0, 1 and 2,
(spring, summer,
and autumn),
Tokyo 1992.
ISSN 01771 10.
Japanese text.
tel. 81 3 3585 4444.
fax /4454

Mediamatic 7 # 1



pagina 90



1992 by GRYPHON
SOFTWARE, POB 221075,
San Diego, California.
\$ 149, requires a fast
Macintosh computer
with Quicktime, 32 bit
Color QuickDraw, a lot
of memory & hard disk
space.

walk in brightness before your enemies. It is an unintelligent being that you make sport of; it is a dangerous beast that you disarm. What a wealth of pleasures!

Zacht, bijna achteloos uitgesproken *Someone was hurt long time ago*. Zoals we ook schijnbaar voorzichtig naar het tweede essay worden gevoerd, waarin de leegte van de negatieve ruimte in volle omvang wordt opengebroken. Een ruimte waarin de schrijver zelf, zoals hij al in de inleiding schrijft, enige tijd heeft doorgebracht en waarnaar hij altijd kan terugkeren. *Iedere generatie heeft een eigen soort herrie die gedoofd moet worden voor het stil kan zijn, een eigen soort woede*. Gelukkig lukt het Mulder niet om in dit essay zijn woede te doven. Pagina na pagina worden we meegezogen in een roes vol liefde, geweld en uiteindelijk de verlossende dood. De roes wint nog aan extra kracht door de door Roelie Zanting gehanteerde typografie.

Dat is het geheim: het moment van de bevrijding is het moment waarop je je opgelegde uniciteit overhoord gooit en er onbedachtzaam tegenaan gaat. Weg identiteit, weg conformiteit, schrijft Mulder. En later: De wil tot doorbraak: escapisme, vlucht naar voren. Vluchten is verdedigbaar. Een wereld vol verrassingen ligt verscholen in de leegte. Althans. Toch twee jaar. Definitief is niets natuurlijk. Dat is de kracht van de leegte. Ketman. Terminale toeristen.

Nog lange tijd blijft het onrustig op de pagina's en pas met de opnieuw tot leven geroepen meisjes uit Hallaig in een gedicht van MacLean keert de kille kalme uit het eerste deel weer:

*coming back to Hallaig in the evening,
in the dumb living twilight,
filling the steep slopes,
their laughter a mist in my ears.*

*and their beauty a film on my heart,
before the dimness comes on the kyles,
and when the sun goes down behind Dun Cana
a vehement bullit will come from the gun of Love;*

*and will strike the deer that goes dizzily,
sniffing at the grass-grown ruined homes;
his eye will freeze in the wood,
his blood will not be traced while I live.*

Wat rest is de nagalm in de media.

InterCommunication A journal exploring the frontiers of art and technology

BY PAUL GROOT

As a media between scientists, intellectuals and artists, *InterCommunication*, the Japanese journal which, already in its name, *metaphorically* reveals its intentions towards communication at the level of computer programming, functions primarily for the Japanese. That is to say, at face value it has little to offer to people who have no command of the Japanese language, except for the list of contents and for the notes accompanying the articles. But because of the eloquent way in which this journal is designed, it is not at all devoid of appeal for the interested outsider.

Certainly since I have spent many hours perusing the Sony Electronic Book and have browsed through dictionaries in which English words were translated, letter by letter, into Japanese characters (which, moreover, is apparently done with the help of a sort phonetic Japanese as a intermediate language), I can become totally immersed in the study of Japanese text columns. Experimental traffic signs, bizarre architecture, exotic logos, disordered iron filings, shattered crystals; I recognize one structure after another in the texts. *InterCommunication*, in its letter forms and in its accompanying photos and diagrams, has so much to say that I really almost regret that *Mediamatic*, from the next issue onwards, will start to publish summaries of the articles from this journal. The fascination will then once and for all be tempered by the reality of the contents. Indeed, it is precisely the exotic aura that works so well. The list of contents, on a *spread*, is an ideal *desktop* until now only realized in my dreams. This is where the Japanese characters look their most beautiful: the ideal logos for buttons which refer to the most fantastic applications and programmes.

In fact, with my untranslated *InterCommunication* I find myself in an ideal ambience. Here I design, step by step, the elements and building blocks for an ideal *megastructure*, a setup for a sophisticated empty *tree*, the material for a philosophical *plan*, for a world view in which the worlds of sound, image and text can be reduced to a single element. While scanning, in an almost mechanical practice which is still improving with each new volume, I collect packages of elements to determine their common basis.

However, I also enjoy myself to my heart's content with, for example, Nishioka Fumihiko's *Pixelism: Art History Repeats Itself*. Only later did I find out that Fumihiko might be concerning himself with the banality of the various 'paint'-like programmes, while I had more or less the idea that he was probably unfolding a theory on the influence of 'computing staring' on our looking and painting.

Finally, to be honest: of course these exercises in intercommunication serve another purpose as well. Perhaps my desire is too humanistic amidst these mechanical practices, but it is also my aim eventually to bring this package of Japanese characters in my mind suddenly to life. So that I will actually be able to read *InterCommunication* in the original language.

translation OLIVIER/WYLLIE

Morph for Macintosh a 'two dimensional spatially-warped crossfade programme'

BY PAUL GROOT

The Morph program provides (a reproduction of) a black boy and a white girl with the instructions. A smile plays about the faces of Ron and Sandra, as we soon dubbed them; one smiles back and wonders what it is they want from one. It quickly becomes apparent that they are waiting for interventions that will encroach upon their beauty. Subsequently, they are digitally molested, assaulted and raped by objects, symbols and human forms to one's heart's content. The amusement value is unmistakable. But there is more.

Ron and Sandra represent the dream of a new society: arrange their portraits in a series and before you know it, you've forced them into a mutually penetrating form that they did not select and have nothing to do with. And thus the image

suddenly appears: the twentieth century Rodin's *Kiss*, realised in the bloodless kiss of Ron and Saundra. Suddenly the new esthetics appears: sterile, seamless and gruesome. When we have finished goggling at the idea of genetic manipulations shown in Michael Jackson's Morphed video from *Black and White*, in which the sweetness of the ladies and gentlemen covered the cruelty of the manipulation (and at a less bourgeois form of the same thing in *Terminator II*), we can get started ourselves with Morph on our personal computers. It is not enough to effect a deformity with a program like Photoshop, we want to see it performed step by step, with great precision, in front of our eyes.

Ron and Saundra's question is clear: how far do you dare to go with us? We offer you our faces, do what you want with them, may the gleam in our eyes accompany you. We are the first step in a series of interventions you can carry out on us. That is what we are here for, but not what we are responsible for.

The observant *Mediamatic* reader will have noticed already: these models came to a bad end. Minimalized, recognizable only to the precision-observer, they function as a logo in the picture that recurs on every page. Their morphology adapted to the shameless fantasy of the designer who, after the fairy-tale like approach of the first generation of computer users, has displayed a surgical bent. Leaving behind the soft romanticism of the original Ron and Saundra, the abstract-binary phases of the morph are portrayed, creating a pornographic gruesomeness. A gruesomeness completely hidden in *Black and White* by smile, song and angel hair. A gruesomeness misinterpreted in *Terminator II* as the suspense of the film.

These are the experiments in virtual reality that we would rather not imagine. These are the evil dreams of a new, manipulated reality in which not the romanticism of a new world order, but everyday cruelty reigns. *Morphing*, *Plastic Surgery*, *Genetic Manipulation*, *Virtual Reality*, *SmartDrugs*. The adaptations and improvements are accomplished more and more seamlessly. Unnoticed. Our great grandchildren will no longer even notice when they've been raped.

translation JIM BOEKBINDER

BitPull Postscript bit-font system

BY WILLEM VELTHOVEN

Mediamatic is usually typeset in *Albertan*, a typeface designed by Jim Rimmer for his own company (Giampa Textware) in Vancouver. But, for this number, we had a testversion of *Bitpull* at our disposal.

The young Dutch typographers Erik van Blokland and Just van Rossum are known for their radical, experimental approach to computer type face design. They do not spend much time on the traditional, everyday duties of the typographer, like inventing original forms and applying them to the entire alphabet, along with sensible spacing. Van Blokland and van Rossum are more occupied with rooting around in the digital dirt letters are made from nowadays.

In modern computer typography, shapes and interrelations of

letters are no longer preserved in a drawing, a copper template or a photographic negative. They are stored in a digital form-description. Only at the moment of use is the letter drawn on a screen, printer or some other computer-driven device, using this description. This allows changes in the forms of letters to occur during use. Trite examples of this are changes in size or slant of the letters, tricks that produced a great deal of ugliness during the emergence of digital typography in the 80's.

Van Blokland and van Rossum are more interested in the structural possibilities of programmed letter forms. This led to the creation of *Beowulf* in 1990, a group of letters whose form is determined more or less randomly. (See *Mediamatic* vol.5#3, autumn 1990)

In the same period, rumours were making the rounds about a letter virus capable of violent seizure of power over the typography of Macintosh computers. However, it seems that this virus never escaped the laboratory in the Hague. Is the name of the (very irregular) typography periodical *Letterror* in any way connected to this?

In 1990, there was also speculation on the possibility of context-sensitive letter types. An example of this might be handwriting; the letters are always related to their neighbors. But other possible sources of influence are the length of words or sentences, the placement of letters and words in a sentence or a column, or even the meaning of the word the letter is part of.

Apple is planning to market Quickdraw GX next year, a new version of Macintosh graphic routines. Quickdraw GX is still secret, but is said to contain the basics necessary for context-determined typography; Apple's aim is to increase the possibilities for using Japanese, Chinese and Korean characters. With a glint in his eye, Erik van Blokland assured me that he can imagine a few other applications for these routines. Next year at about this time we can expect to see the first intelligent fonts...

In the meantime, *Bitpull* is a peculiar aid for the computerised retro-typographer. Upon its official release, van Blokland predicts a revival of cash register typography. The typeface flirts with the visible pixels of monitors and matrix printers. The basis of *Bitpull* is the rough raster of an arbitrarily chosen screen font. The Bits that were pulled in this issue of *Mediamatic* were borrowed from Apple's *Chicago*. The *BitpullChicago* letters are made of image particles, each of which is, technically speaking, a letter. This means that the particles are manipulable both individually and as a group. The form of the particles is established in the actual *Bitpull* fonts: *Twelvebits Regular*, *Twelvebits random*, *Twelvebits Round*, *Objects*, *Screen*, and *Worm*.

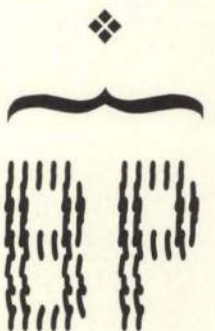
The choice of pixel forms (characters) in a font is a random one, accomplished by the *Bitpuller* program. In this way, letters are created that resemble primitive bits of printing. But as soon as the adventurous designer begins to pull the bits, they start resembling roadside filth, a grab-bag or chocolate sprinkles. Because the letters consist of clouds of separate pixels, individual interference is mortally dangerous. *Bitpull* disintegrates under one's hands. Letters become extremely unreliable and the typographer must be constantly on his guard not to get lost in the micro-typographic chaos of ByteHappy BitPixels.

translation JIM BOEKBINDER

Mediamatic 7 # 1

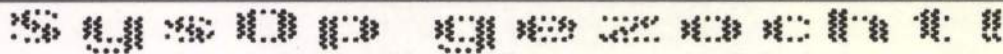


page 91



ERIK VAN BLOKLAND &
JUST VAN ROSSUM
Den Haag 1992

Possible distribution via
FontShop, later in 1993.



Mediamatic zoekt een systeembeheerder voor het opzetten van een cultureel bulletin board.

Vrijwilligerswerk. Maar wel leuk! Bel Willem Velthoven op 020 - 62.41054. Of een mailtje naar een van onze adressen natuurlijk...



Mediamatic 7 # 1



pagina 92





edited by JANS POSSEL

The next Mediamatic calendar will run from April till July 1993. Please send your info before 1 March 1993 to: Mediamatic, Postbus 17490, 1001 JL Amsterdam, the Netherlands, or fax to +31 (0)20 623 7760. Thank you.

BELGIUM

.....
Antwerp 20 Feb - 28 Feb '93
5th European Youth Film Festival,
ANTWERPEN 93, CENTURY CENTER,
tel. 03 2341188

Antwerp 26 Mar - 15 Jun '93
European photographers see
Antwerp, exhibition,
ANTWERPEN 93, Grote Markt 29,
tel. 03 2341188

Antwerp Mar - Dec '93
Eldorado, film, video and new
media, ANTWERPEN 93, CENTRUM
VOOR BEELDCULTUUR, Koninklijk
Paleis, Meir, tel. 03 2341188

Brussels 14 Jan - 25 Jan '93
Festival international du film de
Bruxelles, K COMME
KOMMUNIKATION, tel. 02 2181055

CANADA

.....
Toronto 13 Nov - 3 Jan '93
Abstract Practices II, YVES
GAUCHIER, paintings; THE POWER
PLANT, tel. 416 9734949

FRANCE

.....
Avoriaz 16 Jan - 23 Jan '93
Festival international du film
fantastique. PROMO 2000,
tel. 01 46225265

Cannes 24 Jan - 28 Jan '93
Festival international de
l'audiovisuel musical. MIDEM,
tel. 01 45051403

Paris 25 Nov - 24 Jan '93
Gary Hill, installations 1987-
1992 and video tapes, CENTRE
GEORGES POMPIDOU,
tel. 01 44784988

Paris 25 Nov - 24 Jan '93
Peter Fischli and David Weiss,
photography, video, film,
sculpture, CENTRE GEORGES
POMPIDOU, tel. 01 44784988

Paris 9 Dec - 13 Dec

Festival international du film sur
l'environnement. FONDATION
EUROPEENNE POUR
L'ENVIRONNEMENT,
tel. 01 40290613

GERMANY

.....
Berlin 18 Feb - 28 Feb '93
Videofest Berlin, international
videofestival, contact:
MEDIEN OPERATIVE BERLIN

Kassel 22 Nov - 31 Jan '93

Bilder für den Himmel,
international exhibition,
DOCUMENTA HALLE,
tel. 0561 770034

Oberhausen 22 April - 28 April '93

39th International Short Film
Festival, INTERNATIONALE
KURZFILMTAGE, tel. 0288 887888

GREAT BRITAIN

.....
Bristol 21 Nov - 10 Jan '93
Trophies of Empire, fifteen artists
have been created new work
which investigates the legacies of
empire, ARNOLFINI GALLERY,
16 Narrow Quay,
tel. 0272 299191

Bristol 16 Jan - 28 Feb '93

Ben Jakober - MVSEV, multi-
media installation,
ARNOLFINI GALLERY

Bristol 16 Jan - 28 Feb '93

Pamela Golden, paintings,
ARNOLFINI GALLERY

London 25 Nov - 10 Jan '93

Words are Things, JOAN BROSSA,
poems, objects and installations,
RIVERSIDE STUDIOS, Crisp Road,
Hammersmith, tel. 081 7483354

London 7 Dec - 8 Dec

HDTV & Future television 93,
symposium, MEBCKLER LTD,
tel. 071 8248257,
fax 071 7304293

ITALY

.....
L'Aquila 15 Dec - 19 Dec
Une Ville Cinema, conference on
régie and montage, ISTITUTO
CINEMATOGRAFICO,
tel. 0862 62510, fax 0862 61947

THE NETHERLANDS

.....
Amsterdam 14 Nov - 5 Mar '93
En Scène, international exhibition
in five parts, diverse media,
w139, Warmoesstraat 139,
tel. 020 6229434

Amsterdam 20 Nov - 7 Feb '93

Glasgow 1900 Art & Design,
exhibition on art and design
1875-1914, VAN GOGH MUSEUM,
Paulus Potterstraat 7,
tel. 020 5705200

Amsterdam 28 Nov - 3 Jan '93

Jeff Koons, KOONS' retrospective,
STEDELJK MUSEUM,
Paulus Potterstraat 13,
tel. 020 5732911

Amsterdam 5 Dec - 24 Dec

En Scène, part 2: SYLVIE BÉLANGER
(CDN), DORA GARCIA (E), RON
HASELDEN (GB), AD DE JONG (NL),
MAT VAASSEN (NL), COLETTE WHITEN
(CDN), w139, Warmoesstraat 139,
tel. 020 6229434

Amsterdam 13 Dec - 7 Feb '93

Wallace Berman, the guru of the
American 'beat generation',
collages, film, verifax, posters,
ICA, Nieuwe Spiegelstraat 10,
tel. 020 6201260

Amsterdam 20 Dec - 31 Dec

Fodor Longa, Res Brevis, final art
manifestation, MUSEUM FODOR,
tel. 020 6249919

Mediamatic 7 # 1



page 93

Amsterdam 4 Jan - 28 Jan '93

En Scène, part 3: JEAN SYLVAIN BIETH (F), KRIJN DE KONING (NL), ALAN MURRAY (GB), MARTINE NEDDAM (F), LYDIA SCHOUTEN (NL), VERSTAPPEN/DRIESSENS (NL), W139, Waimoesstraat 139, tel. 020 6229434

Amsterdam 8 Jan - 10 Jan '93

The Next Five Minutes, international conference of television subcultures, PARADISO, Weteringschans 6-8, tel. 020 6264521/6237348

Amsterdam 23 Jan - 14 Mar '93

Annie Leibovitz, photographs 1970-1990. STEDELIJK MUSEUM, Paulus Potterstraat 13 tel. 020 5732911

Amsterdam 30 Jan - 18 Feb '93

En Scène, part 4: HANS VAN DE BAN (NL), CHARLIE CITRON (USA), AB VAN HANEGEM (NL), KATRIN LAADE (D), JAN VAN DE PAVERT (NL), W139,

Amsterdam 4 Feb - 5 Apr '93

Van Binnenhof naar Buiten, parlement en pers sinds 1795, NEDERLANDS PERSMUSEUM, Cruquiusweg 31, tel. 020 6685866

Amsterdam 20 Feb - 5 Mar '93

En Scène, part 5: FORTUYN/O'BRIEN (NL), THIERRY HAUCH (F), GERALD VAN DER KAAP (NL), SHARON KIVLAND (GB), DOMINIQUE PELLETÉY (F), W139

Amsterdam 21 Feb - 18 Apr '93

Pieter Laurens Mol, ICA, Nieuwe Spiegelstraat 10, tel. 020 6201260

Arnhem 28 Nov - 17 Jan '93

Jan Siebers, furniture, GEMEENTEMUSEUM ARNHEM, Utrechtseweg 87, tel. 085 512431

Arnhem 12 Dec - 7 Feb '93

Art Nouveau and Art Deco, exhibition, GEMEENTEMUSEUM ARNHEM, Utrechtseweg 87, tel. 085 512431

Breda 10 Jan '93

Het verdwenen Plein, symposium on the medialisation of art, NIEUWE BRABANTSE KUNSTSTICHTING, Reigerstraat 16, tel. 076 205333

Den Haag 20 Nov - 17 Jan '93

Pierre Weiss, HAAGS GEMEENTE MUSEUM, Stadhouderslaan 41, tel. 070 3381111

Den Haag 1 Dec - 1 Feb '93

Van Binnenhof naar Buiten, parlement en pers sinds 1795, INTERNATIONAAL PERSCENTRUM NIEUWPOORT, Lange Poten 10, tel. 070 3469440

Den Haag 18 Dec - 21 Feb '93

Serge Spitzer, HAAGS GEMEENTE MUSEUM, Stadhouderslaan 41, tel. 070 3381111

Den Haag 19 - 25 April '93

World Wide Video Festival, KIJKHUIS, Spui 189, tel. 070 3644805

Rotterdam 5 Dec - 10 Jan '93

Boris Michailov, recent photographic work, PERSPEKTIEF, Eendrachtsweg 21, tel. 010 4780655

Rotterdam 21 Jan - 31 Jan '93

Film Festival Rotterdam, tel. 010 4118080

Rotterdam 13 Feb '93

Mode and Design Auction, 10.00—18.00, GEBOUW STUDIO WATERSTAD, Schiedamsedijk 130

PORTUGAL

Porto 5 Feb - 12 Feb '93

Fantasporto, festival international de cinema, CINEMA NOVO, tel. 02 320759

SWITZERLAND

Zürich 11 Dec - 7 Feb '93

Ernst Scheidegger, photographer, cineast, publisher, painter, graphic designer. KUNSTHAUS ZÜRICH, Heimplatz 1, tel. 01 2516765

USA

Chicago 14 Nov - 9 Jan '93

Advertising & Social Issues: United Colors of Benetton, THE MUSEUM OF CONTEMPORARY PHOTOGRAPHY

Mediamatic 7 # 1



pagina 94

GALERIE RENÉ COELHO

Vijftigste en voorlopig laatste tentoonstelling:

RENÉ REITZEMA *One, two, one, two...* (songs of war #2)

opening zaterdag 5 december 17-19 uur, tentoonstelling 8 - 31 december, di t/m za 13-18 uur

Montevideo/Time Based Arts is op zoek naar een nieuwe locatie.

Met ingang van 1 januari 1993 zullen er tot nader bericht geen tentoonstellingen meer in eigen huis kunnen plaatsvinden.

De videodistributie en apparatuurverhuur zijn dan gevestigd in Spuistraat 106-108

MONTEVIDEO

Time Based Arts

Singel 137, 1012 VJ Amsterdam, 020 - 6237101



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Mediamatic 7 # 1



page 95

NEWS ROOM AMSTERDAM®:

Accumulating Evidence of a Hidden Struggle for Access to Tibet

During the last week of October 1992, a death notice repeatedly appeared in the International Herald Tribune claiming that We, the people of Tibet, are greatly indebted to the just-deceased 'Members of the German Parliament', Petra Kelly and Gert Bastian.

Evidently, at least according to those paying, the Tibetan Community in Switzerland, the Tibetan Youth Community, the Tibetan Women's Association, and others, the two pioneers of the Green Party in the German Parliament had had a lot to do with Tibet. They had made 'valuable contributions to (the) cause'. We presume this means Tibet's Independence from China.

Precisely this cause was fiercely defended to us by a one-time art dealer and sometime professional colleague of Marina Abramovic, someone who also frequently visited Tibet, and with other places 'in transition' such as Thailand, and who last summer developed a plan to give NEWS ROOM a solid direction and base, in the Brussels' intelligence community. After asking testily 'Who are you working for?' (as if one must be working for some government), he declared that the 'liberation of Tibet' would be achieved within five years. That is: with sufficient covert assistance and timely military or other coercive action, the thirty years of Tibet's incorporation within China could come to an end. Artists such as Abramovic (or, at other times, Josef Beuys, Les Levine and Newton and Helen Harrison) could make themselves useful by doing the groundwork.

This person's business came to our attention when, after having been caught photocopying the contents of a NEWS ROOM briefcase at the Abramovic house, he proceeded to send correspondence and faxes regarding whatever might better become of NEWS ROOM under the label 'Stichting ARM'. One artist who was thinking of collaborating on NEWS ROOM, named Rob Scholte, began receiving:

- a letter to him at the alleged address of Stichting ARM referring to his alleged request for documents about the Serbian partition of Yugoslavia from the Serbian Academy of Sciences

- a proposal for a NEWS ROOM type newspaper for distribution parachute inside Yugoslavia to be called 'SNIPER'

- an assortment of newspaper articles about either Yugoslavia or AIDS, mostly incomplete, usually with references to ARM.

When people get this kind of mail, the security police might arrest them on suspicion. We discussed the matter with Rob Scholte. He decided to demand an explanation, and the return of private documents on a business proposition. The explanation eventually given, after several days silence, was that one does not study political science in Paris for nothing, and well, in his case, the service is for France.

Does this mean that France, like the United States and Great Britain, is working for the 'liberation' of Tibet?

Probably not entirely. Probably, in view the French tradition of hedging bets, it seems more likely that one intelligence branch is working for the liberation of Tibet, while another is doing the opposite: chumming up to China.

However, in Germany, we have heard from high places, and as anyone can surmise from recent comments on human rights by Klaus Kinkel, the choice is China. It has become fashionable to say that, while Japan is great, China will be greater: China is the new friend to have, the country to know, the market for growth. Neither Germany nor China would appreciate the 'valuable contributions to our cause' advertised by the proclaimed 'people of Tibet'.

The full scope of all this becomes clear with an inventory of the estimated mineral resources of Tibet: up to 40% of the world's uranium, probably the largest reserves on earth, and large quantities of the rare precious metals platinum and titanium, for which until now the West has to rely mainly on South Africa. Aircraft or rockets cannot be built without the rare metals, and, according to economics ministers from Germany, France and China, a viable economic future, including a strong industrial export programme cannot be built without nuclear fuel. To sum up: Tibet appears to be, together with the Gulf and South Africa, the next World Prize.

And any country that hopes to get access to this Prize, can do without foreign policy-complications caused by such anti-nuclear politicians as Bastian or Kelly who think that a place like Tibet can be both 'liberated' and 'Green'.

Speaking from experience: shortly after the NEWS ROOM SARAJEVO proposition at PS 1 in New York in April, a key figure involved found herself being invited to stay at the house of, and occasionally (if she wanted to) share love with, a rugged young man who made a living out of climbing mountains in Tibet, carrying with him several million dollars worth of advanced photographic equipment. By August it became clear that the man was not so much a film-maker as a 'surveyor', the problem with his work being that, while inside Tibet, he must remain undetected. As was being indicated by e-mail correspondence from London, he should avoid certain places, should send postcards frequently as if he were a tourist, and should be prepared to endure severe hardship...

Suffice it to say that, for the governments in Washington and London, and probably also in Paris, Tibet could be a wonderful asset to the West, the chief problem being, however, that China might have a different idea about access for some Western countries (in view of its already evident support to Yugoslavia in defiance of Western policies) and might prefer to make the assets of Tibet available to others.

Only think of Germany's new friendship for China. And the visit to China of Akahito from Japan. Or the Chinese-Japanese climbing team which has just conquered a key peak in Tibet. A war from the past can be forgiven with a view to the needs of the future. Particularly when other countries — such as France or the US — make a habit of complaining about the violation of human rights.

Nowadays, to maintain a strong economic link, France and the United Kingdom supply Japan with enriched plutonium. Germany is not a part of this deal.

Moreover, quite suddenly relations with India have warmed up, and the US is conducting joint naval manoeuvres with them, France is sending weapons, and all the Western countries are celebrating the new capitalism. After all, those who want to gain access to a Tibet independent of China, will need an ally close-by.

Once again, the alignments of the last world war re-appear, and once again, the classic polarity of Eurasia core land mass versus outlying maritime powers re-appears.

All this must be quite difficult for Marina Abramovic, who allegedly kicked Mr. ARMS out of her Amsterdam house for his lack of sympathy for Serbia. Abramovic, who supports the Serbian cause, would therefore be sympathetic to China's geopolitical programme. At the same time, she has become a key proponent of Tibetan religion. Would she also be interested in helping to achieve a policy for Tibet in opposition to China's geopolitical programme? We might well invite her to present her views in the next issue of this column.

Mediamatic 7 # 1



pagina 96

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