A BRIEFING ON TRENDS, IDEAS, VISIONS AND POSSIBLE FUTURES

SCENARIO

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ANALYSES TRENDS IDEAS FUTURES

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PLUS: Fusion power | Ideas | Rayguns | Sugardating | A replacement for blood | Photo series: Mars | Innovations | Star Trek | Scenarios | Eva Stenram | JPG | Behavioural patterns worldwide | New convenience | Biological couture | The new avant-garde | The arctic region as an emerging market | Techtalk | Biofuel | Hi-tech democracy | Science & Technology | Science fiction as forecasting | Xe | Orwell | Trends, futures, and much more...

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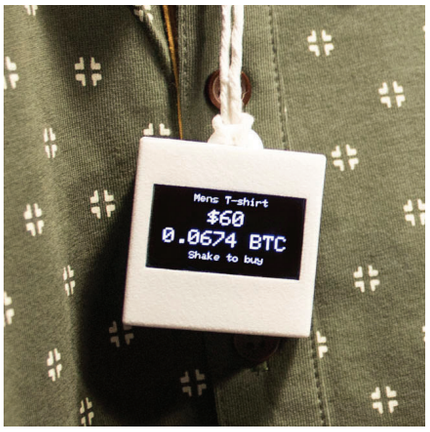

24 **NEW CONVENIENCE**

The concept of convenience is familiar, but in transition. The future keywords are individual, tailored, and 'here and now'. The reason is that we have begun to take both convenience and user adaptation for granted in most consumer situations, not least online, where we are used to rapid access and personal influence. This makes the traditional dimensions in high and low consumer involvement collapse.

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66 **A BLOG ABOUT SPACE**

"NASA's website offers a wide variety of blogs. There's something for technology geeks who get sweaty palms when they read manuals about building rockets. There's something for realists who want to know what they can use NASA for and where their tax money go. There's also something for dreamers like me who are in love with both the idea of space adventure and the optimistic human being's ability to look beyond the horizon of our little world, out into space." Anne Dencker reviews NASA Blogs.

CONTRIBUTORS

KASIA LUCZAK

ANNE DENCKER BÆDKEL

KASIA LUCZAK

Kasia Luczak has master's degrees in both Trend Forecasting and innovation & Entrepreneurship. In this issue, she writes for us about biological couture and hybrid materials,. In addition to her Polish background she has lived in many different cities and says that she can't really tell where her home is any more. She recently founded TRENDtank, a trans-disciplinary trend forecasting think tank, which aims at bringing fashion and science closer together.

ARTHUR I. MILLER

ANNE DENCKER BÆDKEL

Science fiction and the genre's significance for the real world and our society are subjects of particular interest to Anne Dencker. Readers are hence in good hands when she writes in this issue's main article about fictitious inventions that later became reality. Anne is a sociologist specialising in future narratives and the influence they have on how we think of, understand and shape tomorrow's world and the time that lies ahead. Star Trek — did you say Star Trek? Anne is a huge fan!

ARTHUR I. MILLER

Arthur I. Miller is fascinated by the nature of creative thinking; in art on the one hand and science on the other. He has published many critically acclaimed books, including *Einstein*, *Picasso*, *Empire of the Stars* and *137*, and writes for *The Guardian* and *The New York Times*. An experienced broadcaster and lecturer, he has curated exhibitions on art/science and writes engagingly about complex social and intellectual dramas.. He is professor emeritus of history and philosophy of science at University College London. For SCENARIO he has written about the new avant-garde that is based in art, science and technology. It all began fifty years ago in New York near the corner of 4th and 10th.

NICKLAS LARSEN

NICKLAS LARSEN

Our very own Nicklas Larsen, who usually handles PR and marketing of SCENARIO, debuts as writer in this issue of our magazine. The subject is "The Arctic Region as an emergent market", and in the article Larsen presents an original view of the troubled North Polar Region: that it in the future may become a business hub. Climate change rightly troubles the international community, but in its wake we also get entirely new opportunities and business ideas.

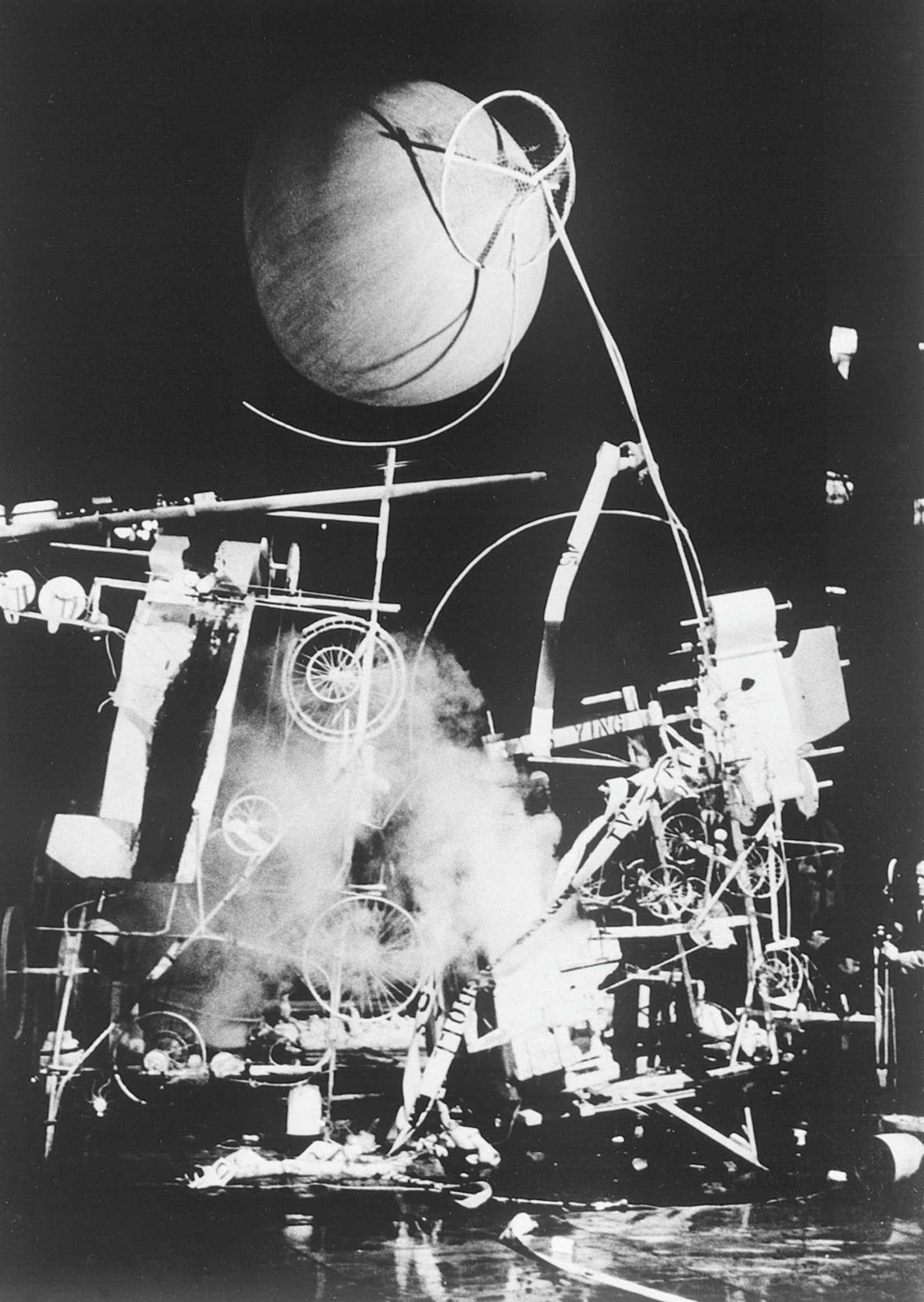
EVA STENRAM

EVA STENRAM

Swedish Eva Stenram is trained at the *Royal College of Art* and resides in London. She is responsible for this issue's photo series that we bring as a teaser for a future main article about colonising the planet Mars. Stenram made negatives from NASA's photos of the planet's surface and left them to collect dust under her furniture for some weeks and then developed them. The results are beautiful, and according to the artist herself, the photos "depict extreme proximity and extreme distance at the same time".

SCENARIO is the magazine of ideas, visions, trends and scenarios. The content is developed at the Copenhagen Institute for Futures Studies in collaboration with leading researchers, practitioners, writers and photographers. Regular contributors in this issue:

JOHAN PETER PALUDAN, futurist



Science and technology have always played a major role in the arts, but in recent years, the influence has increased. We have seen the birth of Artsci. This art movement harks back to the modernist experiments of the 60s, but most of all points towards the future, driven by technological change.

THE NEW AVANT-GARDE

By Arthur I. Miller

Computers and algorithms of stunning power are the catalysts for a new art movement which fuses art with science and technology. There are naysayers who deny that this new avant-garde exists, but they are already marginal. Artists I interviewed told me, "What's the big deal?" – This fusion is here already; "We're it." These artists work in the 21st century fields of sound art, data visualisation art, media art and robotic art, to name but a few. The result of all this is that aesthetics and beauty are being redefined as art, science and technology. In my new book *Colliding Worlds: How Cutting-Edge Science is Redefining Contemporary Art* I call this new fusion 'artsci', for want of a better name. In times to come, it will surely be referred to simply as art.

Science and technology have always played a part in art, such as in the chemistry of paint, lighting, colour theory and photography. Back in the time of Leonardo da Vinci and Albrecht Dürer there was no distinction between artist and scientist.

The onset of the Age of Enlightenment in the late seventeenth century caused a rupture between art and science. Art was relegated to amusement and decoration while science was considered the quest for truth. But by the end of the 19th century a desire was developing for a rapprochement.

As in so much else of the 20th century, Albert Einstein and Pablo Picasso set the stage. In 1905 Einstein turned to a minimalist aesthetic for help in resolving issues confronting scientists. The result was the Theory of Relativity – the response to his aesthetic discontents. Two years later Picasso created an aesthetic of reducing forms to geometry when he had come to a dead end on a painting in which he had incorporated recent exotic developments in mathematics, science and technology. The result was Cubism. At that nascent moment of creativity, Einstein thought like an artist and Picasso like a scientist.

"Radio-controlled robots roamed the halls, stopping to kiss the curious. A music computer improvised on tunes which visitors whistled into a microphone"

Both dealt with the problem that was at the heart of the avant-garde: to redefine classical intuitive notions of space and time. As X-rays revealed, what you see with your eyes is not all there is. In doing so they provided a glimpse into worlds beyond our common-sense intuitions. This has always been the goal of artists and scientists – to communicate the ineffable.

Guillaume Apollinaire, poet extraordinaire and member of Picasso's inner circle, wrote of a Scientific Cubism that would move in an entirely different direction from the art of the day. It would be the "art of painting new structures out of elements borrowed not from the reality of vision, but from the reality of knowledge" – based on conception rather than perception, as both Einstein and Picasso had concluded.

Painting would never be the same again. Picasso's inspiration taken from science and technology was picked up by the Futurists with their attraction to the violence of speed, the Constructivists who focused on science, technology and materials, and the Surrealists who were fascinated by the fourth dimension of relativity theory and such mind-boggling ambiguities of quantum physics as the wave/particle duality of light and matter.

Neither would science be the same. Einstein introduced symmetry and beauty as guiding principles in research. Where in art beauty is in the eye of the beholder and thus subjective, this need not be the case in science. An equation is beautiful if it maintains its form when certain elements in it are transformed. If it maintains its form when left and right are switched, then that equation is said to display mirror symmetry, meaning that the result of the experiment would be the same if the experiment was performed in a mirror world. Theories based on beautiful equations are more likely to succeed than 'ugly' ones, perhaps because beautiful theories reflect an underlying beauty in nature, often beyond our senses.

But there would be no actual collaboration between major artists and scientists until the 1960s. It is a fascinating story of artists – curious about the latest developments in electronics and computers which they were eager to use but direly in need of instruction in how to deal with these tools – and a scientist who had always dreamt about collaborating with them. They all ended up in the right place at the right time: the vicinity of East 10th Street and Fourth Avenue in Lower Manhattan.

This was a dilapidated area full of rundown tenements, essentially a no go zone – Picasso's Montmartre transported to New York. It was the new bohemia, the locus of a budding avant-garde with happenings, impromptu jazz sessions, poetry readings, performance art, and discussions on just about anything and everything. Its stars were the de Koonings (Willem and Elaine), Mark Rothko, Joan Mitchell, Robert Rauschenberg, John Cage, Jasper Johns and Andy Warhol. The conditions were ideal for the birth of new art movements such as Abstract Expressionism and Pop Art. Everyone was excited by the war-surplus electronics waiting to be used as 'paint'. The improbable catalyst for collaborations was an electrical engineer from the Bell Telephone Laboratories at Murray Hill, New Jersey, called Billy Klüver.

In his mid-thirties, educated in Sweden, Klüver had two passions: science and Swedish avant-garde cinema. He took seriously C.P. Snow's message in his 1959 lecture of the need to bridge the gap between the two cultures – the arts and the sciences – and believed that the art scene in Lower Manhattan offered him the opportunity. Klüver began to collaborate with Warhol, Johns, Rauschenberg, Cage and Jean Tinguely. Initially his role was to install the necessary electronics and mechanics into their projects. This provided him with a feel for working with artists, and world-famous ones at that.

One of Klüver's most memorable projects was to design the

"As we shift from the Age of Electronics to the Age of Information, the 21st century is witnessing the emergence of new fields of artsci in addition to biology- and physics-influenced art"

timers for initiating explosions in Tinguely's Dadaist *Homage to New York*. This was an assemblage of small machines that self-destructed one at a time spewing sparks and smoke and eventually threw themselves into the pond in the sculpture garden of the MoMA. The fire department had to be called in. The crowd loved it.

Klüver entered a more reciprocal collaboration with John Cage. In 1965 they planned *Variations V* with Merce Cunningham, in which the dancer's movements triggered sounds and lights. State-of-the-art electronics were involved and sometimes improved on, an ideal interplay between art and science.

Klüver's collaborations began receiving a lot of press coverage which brought him to the attention of Bell Labs' upper echelon. Bell Labs was conceived in the spirit of Thomas Edison's Menlo Park as a place for inventions and scientific research. Among the many discoveries and inventions at Bell Labs, three won Nobel Prizes: the verification of the wave/particle duality in electrons in 1927; the invention of the transistor in 1947; and in 1978 the discovery of the cosmic background radiation which substantiated the hypothesis of the Big Bang. Of these the transistor was the only one that actually had any application. Klüver was an example of that spirit of inquiry, of teamwork, of surmounting obstacles and reaching out to other fields. All this inspired him to attempt something much grander than just working with a single artist.

In October 1966 Klüver produced *9 Evenings: Theater and Engineering* in the cavernous 69th Regiment Armory in Manhattan, the scene of the original Cubist exhibition in 1913 when Marcel Duchamp's *Nude Descending a Staircase* scandalised America. Klüver hoped that *9 Evenings* would produce a similar effect.

9 Evenings was a collaboration between two groups of people who at first sight were poles apart – artists and technologists. Cage and Rauschenberg were among the artists.

Cage's piece was a collage of sounds collected by a bank of telephones from sources such as the ASPCA, restaurant kitchens, and police and marine radio channels, filling the Armory. Rauschenberg used state-of-the-art electronics to subvert a game of tennis, making cordless connections between electronic components and infra-red sensitive television cameras.

It was experimental in the extreme with unanticipated technical glitches that gave it the spontaneity and inspired anarchy of a happening. *9 Evenings* was an inspired moment in the new combination of art and technology. The mechanical age was over. The electronic age had begun.

To keep such collaborations going, Klüver and Rauschenberg formed Experiments in Art and Technology (E.A.T.), a revolutionary organisation that had, unfortunately, a short lifetime owing primarily to management problems.

Enter Jasia Reichardt, assistant director of the fledgling Institute of Contemporary Arts (ICA) in London. On hearing about *9 Evenings* she hopped on an airplane to see what it was all about. She was immediately caught up in the excitement. "Some of the engineers all of a sudden wanted to be artists, too," she recalled. Reichardt wanted to do something in London that would combine art and science, yet be different from *9 Evenings*. Two years later, in 1968, she curated a show whose theme was the relationship between creativity and technology. She called it *Cybernetic Serendipity*. The aim was to emphasise exploration rather than achievement and demonstrate connections between technology and creativity.

The participants included computer artists and musicians, among them Ken Knowlton and A. Michael Noll of Bell Labs, both pioneers in computer art, the Op Art painter Bridget Riley, who produced paintings resembling Moiré patterns, Cage, Iannia

Xenakis, who used mathematics and architecture for composing, the roboticist Bruce Lacey, the media artist Nam June Paik and Tinguely who created contraptions more benign than the one in New York.

Cybernetic Serendipity took London by storm. It was the interactive pieces such as Edward Ihnatowicz's *Sound Activated Mobile* (SAM) that most interested visitors. Shaped like a spine with a flowerlike head SAM was made of hydraulic valves, analog circuits and servo mechanisms. It leaned towards people as if it were listening. Visitors had the eerie sensation that they were being watched. Radio-controlled robots roamed the halls, stopping to kiss the curious. A music computer improvised on tunes which visitors whistled into a microphone.

Alas, these high times were about to end. One of the causes was the rise of Postmodernism which had a distinct distaste for science, another the protests against the Vietnam War. Science and technology were criticised for their role in the development of lethal weapons such as napalm and Agent Orange. This led to a sharp decrease in the collaborations between artists and scientists. On top of all this there was economic recession which impacted on funding for collaborations.

Dramatic developments in the 1990s in biotechnology, such as in vitro fertilisation, gene therapy, organ transplants and functional magnetic resonance imaging (fMRI) put a break on this decline. Artists realised that they could not afford not to be interested in these developments. Far-sighted people at the Wellcome Foundation, the UK's blockbuster medical establishment, realised the possibilities in biology-influenced art and poured funds into it. This in turn kick started physics-influenced art.

As we shift from the Age of Electronics to the Age of Information, the 21st century is witnessing the emergence of new fields of artsci in addition to biology- and physics-influenced art. Data visualisation artists use algorithms to mine data in order to seek patterns and deep structure. They find that the higher the information content of a data representation, the greater the aesthetic value. This dramatically widens the concept of what is aesthetic.

New instruments are being invented which often interface with computers which themselves have become musical instruments, and this, along with the added dimension of imagery – sound and image – has widened our conception of what music is. Sound artists are sonic explorers.

Today art students are fully conversant with technology and most express little interest in painting which they refer to as "flat art." As Peter Weibel, video artist and CEO of Zentrum für Kunst und Medientechnologie (ZKM) in Karlsruhe, told me, "Today art is an offspring of science and technology." The future of artsci is wide open.

Yet its products are usually rejected by establishment galleries on the basis that they violate standards. They can't become commodities, are not unique, may not last forever and can also sometimes be downright dangerous.

Rejected by the traditional art world artsci surely satisfies the concept of what it means to be avant-garde. In the 19th century the Salon des Refusés and the Salon des Indépendants showed work rejected by the establishment art world – the works of Édouard Manet, James Whistler, Paul Gauguin, Henri de Toulouse-Lautrec and Camille Pissarro, to name but a few. These artists have now become part of the canon. Galleries also refused to exhibit Picasso's early cubist works, declaring them madness.

Akin to the Parisian salons that took in works rejected by establishment galleries, today's 'Salons' include Science Gallery in Dublin, GV Art in London, Le Laboratoire in Paris, ZKM in Karlsruhe and Ars Electronica in Linz. Thanks to them artsci is redefining the world in which we live. ■