

Corporate Power

Edward Ihnatowicz was an artist whose interest in finding ways to emulate animal movement led him to become a British pioneer in robotic art. Dissatisfied with what he saw as the limitations of traditional art, he developed his enthusiasm for machinery to the point where, in the late 1960s, he was able to build the first computer-controlled sculptures that responded actively to sound and movement. For him, it was a logical extension of the age-old quest by artists to produce sculptures imbued with a sense of vitality.

His 1970 machine *Senster* marked the pinnacle of his achievements. However, its dependence upon collaboration with, and investment from, a major engineering corporation, and its location in a science theme park, also highlighted some of the compromises that Ihnatowicz later identified as having effectively killed off this once promising sphere of artistic engagement. In 1986, long after *Senster* had been disassembled, he wrote: ‘Artists have largely abandoned the field leaving it to the toy-robot manufacturers, Disneyland animators and Science-Fiction-Films special-effects departments. The early promise has not been fulfilled and the currency has been debased.’ Although he and others had believed in the 1960s that technology and computing had become legitimate fields for artistic expression, twenty years later he felt that nothing much had in fact emerged from this moment of interchange. *Senster*, however, is remembered as one of the most important works in the history of robotic and computer art, though it functioned for only four years.

Born in Poland in 1926, Ihnatowicz came to England as a refugee in 1943. After the war he studied at the Ruskin School of Art in Oxford, where he began to experiment with electronics; but he felt obliged to abandon this interest in order to focus on traditional drawing and painting. He worked in a furniture design company for over ten years before deciding to give up this career, and return to making art. He rented a garage in Hackney, London, which became his studio. At first he worked in a traditional manner, making figurines and portrait busts in clay and plaster, and through his life he retained a passionate belief in the value of good draughtsmanship and modeling skills. However, he struggled to find his way: ‘inwardly I had no faith in the type of art I was trying to produce nor, for that matter, of any other being produced around me.’ He turned increasingly to working with metal, learning in his back garden how to weld and smelt metal, sometimes using car parts. However, his approach remained that of an artist and not an engineer: many of the machine parts used in his robotic sculptures, including *Senster*, were first made in clay or wood and then cast in metal and laboriously finished by hand to imbue the parts with an organic, rather than industrial, quality.

In the late 1960s he began to think of endowing his metal sculptures with imaginary functions and, above all, with movement – not repetitive mechanical movement (such as found, he said, in the machines made by the Swiss artist Tinguely) but animal movement. He knew from his tinkering with cars that a hydraulic system could be made to move quite heavy objects: in order to learn how to control this movement, he had to become familiar with control engineering which he then set out to master. In 1968 Ihnatowicz made his first cybernetic work. He called it *SAM*, short for Sound Activated Mobile, and later saw it as his first genuine piece of sculpture. The anthropomorphic robot consisted of a fiberglass, flower-like head with built-in microphones, a long spine-like neck that could bend and twist in a smooth, natural motion, and a plinth for a body containing a circuit board. Sound registered by the microphones activated the flow of oil to the hydraulically operated pistons in the neck, so that the head turned to face or follow the loudest sound.

SAM was included in a pioneering show held at the Institute of Contemporary Arts in London, called *Cybernetic Serendipity*, in 1968. It was the first exhibition to examine the role of cybernetics in contemporary culture, and included computer-generated images, music, poetry and choreography alongside robots and painting machines. Among other artworks were Bruce Lacey's robot *ROSA* and Nam June Paik's *Robot K-456*. Distinctively, Ihnatowicz's *SAM* required the active participation of the audience in order to function. The exhibition toured to Canada and the USA, during which *SAM* suffered some damage when oil leaked into its electrical parts. It survived – and was displayed at the Kinetica Art Fair, London, in February 2011 – but is no longer operational.

SAM was a great hit at the ICA exhibition. Visitors, especially children, spent a long time in front of the sculpture trying to make the right level of noise (*SAM* was sensitive to low-level, sustained sounds rather than shouts) to gain a reaction. Influential critic and author of *Theory and Design in the First Machine Age* (1960), Reyner Banham wrote in a review:

what is so startling about Sam is that it can snap round to attend to a noise as suddenly as a human being, can peer up or down as quickly as a cat hearing a mouse or a bird ... It's about the most beautiful fragment of sculpture I have seen in a decade – and the most disturbing. Beautiful because of the forms of the yokes [the hand-worked metal components in the machine's 'neck'], their finish, their articulation, their congruence in motion. Disturbing because the old atavism still shies at the sight of any patently man-made creation moving and responding in a manner that millennial tradition insists is the prerogative of the creations of the Almighty.

Ihnatowicz, in fact, had been aiming at recreating the effect of an animal responding to its environment. Interested in photography and filmmaking, he once recorded a lioness in its cage in a zoo. The big cat briefly turned to look at the camera and then looked away, which led him to think about creating a sculpture that could do something similar

in an art gallery, with the same feeling of a moment of contact with another seemingly sentient being.

Although *SAM* had proved a success, Ihnatowicz felt its movements were a little too unpredictable and uncontrollable for the more elaborate and bigger structures he wanted to build. He contacted people in the field of powered prosthetics, and taught himself about fluidics and digital computers. Whereas most animal joints are quite complicated in that they can pivot in a number of directions, he learnt that crustaceans have simpler, hinged joints – a much easier model to replicate mechanically. As early drawings show, his plans for the new machine were inspired by a lobster's claw. The finished work was later dubbed *Senster* – part sensor, detecting both sound and motion, and part monster, resembling the long neck and head of a giraffe or dinosaur.

In 1967 the giant electrical corporation Philips commissioned Ihnatowicz to realise his plans for a large-scale sculpture in Evoluon, a new exhibition space dedicated to science and technology in Eindhoven, Holland. Ihnatowicz made a 1:4 model in his garage but to complete the work, moved to a basement laboratory in the Department of Mechanical Engineering at University College London. Insured for no less than £50,000 (at a time when an average house would cost only a few thousand pounds), *Senster* was installed in Evoluon in September 1970. Ihnatowicz and his assistants had designed and hand-built the electrical interface between the sculpture and computer, which was housed in the control cabinets kept to one side and behind the sculpture. The artist's son recalls that the Philips computer was the size of a small refrigerator and had only 8k of memory. The huge hydraulic unit required to operate the machine smoothly was housed in a basement below, which meant that *Senster* was entirely silent.

As with *SAM*, microphones in the head of *Senster* allowed it to track the source of sound, while radar units enabled it to respond to movement. The head could move within a second or two to anywhere within a total space of more than 1,000 cubic feet, with sophisticated electronic programmes that allowed the head to slow down before coming to a stop, avoiding the appearance of jerky movement. Using punched paper, Ihnatowicz had programmed the digital computer to interpret the readings generated by ambient noise and movement according to past experiences and current contingencies. Like the smaller and much less sophisticated *SAM*, *Senster* moved towards low level sounds and slow movements but withdrew from loud shouts and sudden movements as if shying away with fright. If the sound levels became too loud, it raised its head up high as if indignant, ignoring the surrounding crowd until the noise subsided. Different behaviours were programmed for different periods. Initially, the machine was programmed to move, when activated, as if foraging for food.

Visitors to Evoluon would spend hours in front of *Senster*, clapping or tapping the barrier in order to attract its attention and interacting with it as if it was a caged zoo animal. In response, it appeared to express an interest in the human beings around it. In the early morning the machine would be found with its head down, seeming to listen to the faint noise of its own hydraulic pumps. Then if a girl walked by with noisy high heels, the head would follow her, looking at her legs. Ihnatowicz recalled that when he had just got it working, he cleared his throat, and the head came right up to him as if to ask, 'Are you all right?'

Positioned near the entrance to Evoluon, *Senster* was highly popular, and made a dramatic impression on all those who saw it. Creating a behaviour-based robot on this scale was a huge and unprecedented undertaking at the time. Ihnatowicz was recognised as having taken an important step towards creating a machine that responded to its environment through computer-based data-processing, and Philips was congratulated in the press for its farsighted commission.

Ihnatowicz and a Philips engineer further refined the computer's program, but in 1972 Philips asked the artist to desensitise the machine, as its behaviour – and visitors' reactions – were creating too much of a stir. In December 1973 the company dismantled *Senster* (it was the legal owner) and only subsequently informed the artist, saying it was attracting 'unfavourable publicity'. Ihnatowicz replied that it had only begun to create a negative impression because it was not maintained correctly and its programming had been severely degraded in order not to create too much excitement and noise. The company subsequently got rid of records relating to *Senster* bar a few photographs.

An employee of the firm Verburg-Holland B.V. (now Delmeco Fishing Technology BV), which was contracted to dismantle *Senster*, recognised the historic importance of the work and persuaded his company to retain the machine's body. Today it sits in the company's grounds in Colijnsplaat as an open-air sculpture. The electronic parts were given away to enthusiasts. It was a sorry end to what had been an extraordinarily innovative work, one that straddled the boundaries between art and technology and is referred to today as a pioneering piece of robotic and computer-based art.

For Ihnatowicz, the experience of making *Senster*, and of discovering computer programming along the way, convinced him that computing could be a valid and important artistic medium. Artists, he felt, should embrace new discoveries in science and technology to enhance their personal understanding of the world, though he recognised a difference in approach: unlike scientists, artists took themselves as their only point of reference, and aimed to demonstrate the workings of the world, not explain them. However, he himself was not able to sustain an artistic trajectory in this field. Employed subsequently as a researcher in the Department of Mechanical Engineering at University College London, he had access to the necessary equipment and community of experts. As he acknowledged, however, his later works, though sculptural in conception, became pieces of technical equipment; and his personal beliefs about physical movement and its role in perception were not scientifically grounded and were not taken up by colleagues. Ihnatowicz became interested in early computer painting and drawing programmes, combining his traditional skills as an artist with his passion for new technology. But in the 1970s and 1980s the cultural and economic structures governing the development of technology-based art in this period made it difficult for such works of art – even when as pioneering and popular as *Senster* – to flourish and be preserved.