CULTURE

Artists in the lab

Martin Kemp explores the nature of science–art collaborations after 15 years of major initiatives around the world.

Caged canaries were placed in coal mines to warn of poisonous gases in the twentieth century. Programmes to insert artists into laboratories proliferated in the 1990s, just as the canaries had been phased out. Do these 'artists-in-residence' act as metaphorical canaries, detecting practices that are potentially noxious? Or are they cuddly creators, obedient poodles who translate scientists' work into publicly accessible forms?

Two of the largest science–art schemes raise most of the big questions and provide some answers about the nature of these collaborations. The first, the Sciart grant scheme of the Wellcome Trust, Britain's leading biomedical charity, was introduced in 1996 and has lent its name to the whole area of activity. The second is a laboratory, equipped with experimental apparatus and organic materials but staffed by artists. The SymbioticA research centre at the University of Western Australia, Perth, was inaugurated by artists Oron Catts and Ionat Zurr as the Tissue Culture & Art Project (TC&A) in 1996, and was formally incorporated into the university as SymbioticA in 2000. It marked its tenth anniversary with a provocative exhibition at the Science Gallery of Trinity College Dublin (see *Nature* **470,** 334; 2011).

BRIDGING THE GAP

The intellectual breeze that fanned the flame of initiatives such as these arose from a concern among many artists and scientists that the divorce between their disciplines was unhealthy. Without subscribing to the more bilious aspects of C. P. Snow's 1959 diagnosis of the 'Two Cultures', it was easy to agree that mid-twentieth-century art and science had become dangerously isolated from each other and from society at large (see *Nature* **459,** 32; 2009). Stories in the press reinforced the perceived weirdness of artists and scientists in the public mind. Notorious images such as the mouse bearing a cartilaginous human-like ear on its back, created by the scientist Charles Vacanti, and the green fluorescent rabbit engineered by the artist Eduardo Kac, fed Frankenstein fantasies in the public imagination.

The Wellcome scheme proved that there was a substantial demand for bridge-building. After a decade, it had received nearly 1,500 applications and made 124 awards totalling almost £3 million (US$4.8 million). Some projects were initiated by scientists, others by artists. In 2006, the scheme was replaced by an extended programme with an investment of £1.2 million a year.

Funding in the sciences and arts is usually formalized around predetermined programmes, standard research protocols and predictable outcomes. Risk has been leached out. The Wellcome Trust rightly recognized that unproven collaborations between imaginative scientists and creative artists needed a different approach at every stage. Risk had to be embraced. The trick was to identify a special creative chemistry between high-level participants.

Although Ken Arnold, the administrator of the scheme, admitted after two years that it wasn't obvious what the ingredients were for success, he and subsequent evaluators now agree that most of the funded projects have had positive outcomes. Many have resulted in exhibited art of high quality or have generated scientific, social, cultural, economic and personal gains for participants and the public (see the Wellcome Trust's report at go.nature.com/xz6gnb).

Defining the gains for scientists has proved more elusive than evaluating how artists have benefited. In a gratifying number of instances, host scientists reported that they had acquired broader perspectives on their work or its communication. The artistic presentation of their research in galleries and public spaces has proved salutary for them. Once an image is in the public domain, strict management of its reception is no longer possible, and that can be discomforting and educational. Good artists are expert in this slippery domain and have much to teach the scientists.

ASYMMETRIES

Asymmetries abound in these collaborations. The projects matter in professional terms far more to the artists than the scientists. Little, if any, kudos is to be gained by the scientist in having a Sciart project on his or her CV. It would be good if scientists received more recognition for their participation. For the artist, the collaboration can be an important career move, opening up new venues and audiences. Participating scientists tend to be well enough established not to have to worry about 'wasting time' on an art project. They are often older, male and of high status. Large numbers of the artists are female, young and aspiring.

Some projects are marred by a scientist's belief that he or she can enjoy becoming an artist. It is usually taken as read that the artists will not become professional research scientists during this brief spell. It is a commentary on a general view of artists that the reverse is not seen to hold true. Art, like science, requires highly specialized skills honed over long periods of education and experience.

The grants involved — mostly in the region of £30,000, with a few greatly exceeding this — are substantial for the arts but relatively minor for a successful lab. Much of the money in the early days of the Sciart scheme went towards costs, with artists receiving little or no payment for a great deal of hard work. By contrast, the scientists are likely to be in receipt of a regular salary. Recently, the Wellcome Trust has endeavoured to

THE TISSUE CULTURE & ART PROJECT, *SEMI-LIVING WORRY DOLL A* (2000)/ARS ELECTRONICA

Semi-Living Worry Doll A **covered by living cells (left) grown on a 2-cm-high scaffold (right).**

ensure that the artists receive adequate remuneration.

The SymbioticA model is different. As residents in their own lab, the artists there have the same academic status as experimental scientists on campus. The lab competes for funding within the university and outside. The experimental apparatus and materials are used in a scientific manner, but the resulting research is not published in the way that a scientist would recognize. SymbioticA's greatest achievements have been to establish a different institutional model and attitude towards the end products.

ARTISTIC CONCERNS

The project *Semi-Living Worry Dolls*, by Catts and Zurr, still working under the name of TC&A, is as much about the process and its recording as it is about fixed artistic products. Traditional worry dolls are given to Guatemalan children so that they can share their concerns with a trusted confidant. The dolls by TC&A are confected from degradable polymers and surgical sutures. The polymers are progressively replaced by living cells within a micro-gravity bioreactor.

First exhibited in Linz, Austria, in 2000, the dolls were the first tissue-engineered sculptures to be presented alive in a gallery. Viewers are invited to speak their worries to the dolls into an adjacent microphone. The anonymous responses have gone further than the anticipated concerns about biological engineering; visitors often spoke about personal issues. SymbioticA's style of artwork is about process and participation, not an enduring material object.

Art–science collaboration is becoming established as a distinct curatorial practice that has a defined public engagement through exhibitions. Educational initiatives are arising, ranging from school programmes to master of arts degrees, such as the two-year postgraduate course at the University of the Arts in London. The notion of artists and scientists collaborating is no longer a surprise, and is a well recognized strategy in the art world.

As the Wellcome and SymbioticA examples show, artists in laboratories come to understand the science in such a way that they act as neither canaries nor poodles in a crudely critical or acquiescent manner. At their best, the artists present works of complexity and subtlety that engage the spectator's imagination in a non-prescriptive way. Ultimately, as with all artworks, the artist lays down the melody while encouraging the visitors to sing their songs in their own way. ■

Martin Kemp *is emeritus professor of art history at the University of Oxford, UK.*

Q&A Paul D. Miller
Climate-change DJ

Paul D. Miller, also known as DJ Spooky, is famed for his digital sampling techniques. His 2007 foray to Antarctica inspired a multimedia symphony, Terra Nova: Sinfonia Antarctica*, and a companion volume,* The Book of Ice*. Ahead of a performance of* Terra Nova *this week at the New York Academy of Sciences, he discusses how he uses weather patterns in his compositions.*

How did you become an audio artist?
It was a hobby gone out of control. As a kid I messed around with early Texas Instruments and Commodore 64 computers. My mother made me take violin and double-bass lessons. After college, where I majored in philosophy and French literature, I started DJ'ing to pay my rent, which freed me up for writing and artwork. I began using digital sampling as a kind of musical collage, like the 'cut-up' text technique of Beat Generation author William S. Burroughs.

Why did you go to Antarctica in 2007?
I challenged myself to travel to one of the most remote parts of the planet and make acoustic portraits there. I wanted to confront the recursive logic of weather patterns — rain, snow, ice and wind. So I chartered a decommissioned Russian military ice-breaker ship and went to the continent.

How did you gather material for *Terra Nova*?
I carried a compact recording studio in a backpack across the ice. I set up microphones to record the sounds of water and ice, took photographs and distilled a composition from them, mixing electronic edits of the sounds with string arrangements. I wanted to turn weather patterns, which are so complex it takes a supercomputer to model them, into audio-visual compositions. My aim was to convey the idea that, with climate change, some natural variables are no longer meshing.

How did *The Book of Ice* come about?
The book started as a graphical score for the musical piece, inspired by the work of British experimental composer Cornelius Cardew. It grew into a larger project: to condense the complex information about Antarctica into a digestible format using graphic design. String theorist Brian Greene, of Columbia University in New York, wrote a foreword about the physics of ice. And the book includes an infographic on the interactions between different causes of climate change.

What intrigues you about Antarctica?
It is the only continent with no government. One could think of it as a creative commons. A 1959 treaty forbids a military presence. The United States and others have put a huge amount of money into science there, and the research scene has a military feel. Fortunately, the scientists share information with colleagues from other countries.

M. FIGGIS

The Art of Climate Science: Antarctica
New York Academy of Sciences, New York. 7 p.m., 19 September.

The Book of Ice
PAUL D. MILLER
Mark Batty: 2011. 128 pp. $29.95

You have also started an artists' centre on Vanuatu. Why?
The Pacific island of Vanuatu keeps getting ranked as one of the happiest places on Earth. My centre there pulls artists out of the city and slows them down. I've also worked on Nauru, a Pacific dystopia. After the Soviet Union collapsed, Nauru was an offshore banking centre, with billions of dollars passing through daily. It was economically devastated when the money vanished. I made recordings there and used them in a string-quartet composition and visual installation called *The Nauru Elegies*.

What's next?
My composition *Arctic Rhythms* is set at the North Pole. I travelled last year to the Svalbard archipelago. There are some 20 million people in the Arctic Circle and about 2,000 in Antarctica. A bigger population makes for a different project: it is about local frameworks, nation states, the international rule of law and the human response to climate change.

What's your view of climate change now?
Economists try to assign a cost to global warming. Yet biologist Richard Dawkins' theory of 'extended phenotype' says that anything an animal makes can be considered an effect of its genes on the environment. So we need to start thinking of climate change as an extension of what it means to be human. ■

INTERVIEW BY JASCHA HOFFMAN