R. MÄRZ

Mark Dion's wall of curiosities bears witness to Berlin's place in science history.

HISTORY

The light and shade of German science

From physiology to physics, a stirring exhibition reflects 300 years of science in Berlin, discovers **Alison Abbott**.

The first image to confront visitors to the *Weltwissen* exhibition in Berlin's Martin Gropius Bau is formed of shadows. Silhouettes of 250 historical objects in 96 giant shelving cubes are projected using bright lighting onto a vast canvas that backs the two-sided display, filling the atrium. The items — ranging from statues of Greek philosophers to skeletons and an iron lung — were selected from local museums by New York artist Mark Dion as 'witnesses' of Berlin's scientific past.

The display is a neat metaphor for the light and shadow of Berlin's 300-year scientific history, reflected in this ambitious show. The city was home to some of Europe's most important science before the rise of Nazism in the 1930s, the physical destruction of the city in the Second World War and the 1949 rise of the Berlin Wall. *Weltwissen* opened on 24 September, 10 days before the 20th anniversary of the reunification of Germany.

The exhibition celebrates scientific rather than political anniversaries — 300 years since the founding of the Berlin Academy of Sciences and the Charité, now Berlin's university hospital; and 200 years since the Humboldt University was established. The Kaiser Wilhelm Society, now the Max Planck Society, runs 80 research institutes throughout Germany and was founded in 1911; running until early next year, the show also covers that centenary.

Weltwissen (World Knowledge): 300 Years of Science in Berlin
Martin Gropius Bau, Berlin. Until 9 January 2011.

The exhibition's powerful fascination lies largely in the placing of Berlin science in the political and social contexts of its times, good and evil. It also lies in the curators' reliance on real objects, rather than multimedia, to tell the stories. To stand close to the 1880 full-body cast of a naked tribesman — made while he was alive for the then-fashionable science of anthropometrics — and to see how he squeezed his eyes shut against the wet plaster, is to experience a raw emotional force that would be hard to create by digital means.

Dion spent two months in the city sifting through tens of millions of historic objects for his installation; the curators spent even longer, and to good effect. The exhibition's rooms are organized into historical eras or are dedicated to eternal themes in scientific culture, such as quarrels over data interpretation or experimental methodology. The first few rooms depict the city's mad rush in the eighteenth century to catch up with established centres of science such as Paris and London, when its first observatory and anatomical theatre were built. Subsequent rooms focus on the next two centuries, when the city grew to be a major force in European research.

Towering scientific figures are introduced: naturalist and explorer Alexander von Humboldt (1769–1859); physiologists Hermann von Helmholtz (1821–94) and Emil du Bois-Reymond (1818–96), who did much to link animal physiology with the laws of chemistry and physics; Werner von Siemens (1816–92), who founded the famous electrical and telecommunications company; microbiologist Robert Koch (1843–1910), who identified the bacterium that causes tuberculosis; and chemist Fritz Haber (1868–1934), who won the 1918 Nobel Prize in Chemistry for his synthesis of ammonia.

Ethics is a running theme, and the dark side of science is prominently displayed. The ambitious Koch, for example, dodged local restrictions on human experimentation by going to East Africa in 1906 to test potential medicines for sleeping sickness. During the First World War, Haber developed poison gases for use in the trenches. The unspeakable Nazi abuses of science and medicine are laid out soberly. Personal letters and diaries of Jewish scientists who fled or were expelled from Nazi Berlin — such as Albert Einstein and Haber — are deeply moving. The exhibition tells us that, after the war, in East Berlin the communist state highlighted these abuses as evidence of the necessity of its regime, while West Berlin closed its collective mind to the issue until the late 1980s.

Notable films include historic footage of the 1933 Nazi book burning, and a new film made for an installation on experimental methods in Alzheimer's disease, a focus of research activity in Berlin. It shows a classic test of rodent memory: a mouse is dropped into a water maze and swims to find the submerged platform. Simple animated graphics show how a memory-impaired mouse must search much longer for the out-of-sight platform. But it is the mouse's perspective of its forced activity that will captivate biologists.

Of note also are the recorded reflections of 16 scientists involved in decisions about which East German institutes and individuals were worth retaining in the science system of reunified Germany. It was a cruel time for many; others, such as chemist Joachim Sauer, husband of Chancellor Angela Merkel, survived the cuts. Now a Humboldt University professor, he remembers the unfair handling of some older colleagues.

Berlin is still struggling with the expense of reunification. But the quality of the exhibition — the €5.5-million (US$7.4-million) cost of which was met by the Berlin lottery — demonstrates the current intellectual wealth of the city. *Weltwissen* is gorgeous to look at, yet visitors will find their preconceptions challenged, and will leave better educated than when they entered, having faced the shadows. ■

Alison Abbott *is* Nature*'s senior European correspondent.*

In *Monkeys as Judges of Art* (1889), Gabriel von Max conveys his interest in animal and human nature.

PHOTO SCALA, FLORENCE/BPK, BILDAGENTUR FUER KUNST, KULTUR UND GESCHICHTE, BERLIN

PAINTING

Inquisitive and exact

Alison Abbott visits an exhibition charting the artistic and scientific interests of painter and collector Gabriel von Max.

During his lifetime, Gabriel von Max (1840–1915) was one of Munich's most successful artists — a privilege he exploited. In his middle-age, he began to churn out reams of paintings for the art market, for he had a very expensive habit to feed: collecting scientific objects.

His commercial tendency and his adherence to a realistic painting style might explain why he fell into obscurity as art moved on in the twentieth century. An exhibition now on at the Kunstbau gallery in Munich, Germany, claims to rediscover this extraordinary man, who studied and painted nature with the inquisitiveness and exactness of Leonardo da Vinci while embracing the radical new sciences of his age with equal passion.

The show brings together both sides of his psyche: the artistic and the scientific. It displays a broad range of his paintings — from early religious works to later studies of primates and commentaries on the scientific process — alongside objects from his collection. At his death, his acquisitions totalled up to 80,000 objects, including around 400 skulls believed to have been destroyed in the Second World War, but which were rediscovered in Freiburg, Germany, in 2008.

His earlier paintings were concerned with religion or death, and conveyed a heightened emotionality along with a teasing eroticism.

Gabriel von Max: Star Artist, Darwinist, Spiritualist
Kunstbau, Munich. Until 30 January 2011.

His breakthrough came with his 1867 work, *Christian Martyr on the Cross (St Julia)*, a luminous painting of such power that female visitors to its first showing openly wept, according to reports at the time. Even then, his fascination with nature was on display. He painted a fly or butterfly motif into many pictures, settling them casually on a death-white arm or anatomy table. Those insects were far from casually painted, however, as his detailed preparatory sketches show.

Even more fascinating are his sketches and paintings of the monkeys he collected and kept as pets. A capuchin monkey called Paly was his constant companion for 15 years. His interest in — and affection for — the animals paralleled his embrace of Charles Darwin's theory of evolution. He even saw them as superior in some ways to humans, who he thought were corrupted by civilization.

At the turn of the century, von Max completed a series of paintings showing monkeys conducting academic activities such as giving anatomy lessons. The most familiar, *Monkeys as Judges of Art* (1889), which portrays 13 monkeys as art critics (pictured), is widely assumed to be a censure of the profession. Yet the artist's writings, according to the exhibition's catalogue, suggest the opposite. He sought to convey sophisticated, individual human weaknesses — such as vanity — just as writers of fables traditionally used particular animals to embody human characteristics.

Von Max may have loved his pets, but he studied their behaviour and anatomy with detached scientific rigour. Many died in the cold Bavarian climate, and he would skin their bodies, sketching and photographing their muscles to understand how to portray postures correctly.

But living animals should not be harmed merely to satisfy scientific curiosity, cautioned von Max in his 1883 painting *The Vivisector*. The vivisector, a bearded scientist, sits at his dissection table. The allegorical female figure of compassion has taken from him a puppy, with bound muzzle, which he was preparing to dissect. The scales she holds aloft in her other hand show that the heart weighs more than the brain in this situation. That painting was quickly used as propaganda by the growing anti-vivisection movement, which was already putting Germany's physiologists and infection biologists on the defensive.

Von Max's scientific collection, replete with objects representing the new sciences of geology, ethnology, anthropology and palaeontology, reflected his life-long concern with the origins of humans and the Earth, and was taken seriously by the scientific community. Zoologist and artist Ernst Haeckel, who became a friend, engineered for him an honorary doctorate from his University of Jena in Germany.

After von Max's death, the collection was bought by the Mannheim museum. It was broken up in 1935 and distributed among specialist museums in the region — which is how the skulls ended up in the University of Freiburg's anthropology collection. While preparing for a German exhibition celebrating the 150th anniversary of Darwin's theory of evolution, curators found that von Max's skulls had not been destroyed in the Second World War after all, but had got mixed up with a different skull collection. Von Max's entire collection is now reassembled at Mannheim's Reiss-Engelhorn Museum.

As this fine exhibition shows, von Max is well worth bringing back into the light. ■

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CORRECTION

In 'The light and shade of German science' (*Nature* **467,** 660; 2010), the date of the Berlin Wall's rise was incorrectly given as 1949, the date of Germany's separation into two states. Construction of the Berlin Wall began in 1961.