

# The fox who came in from the cold

How biologist Günter Tembrock used film for his behavioural research

*By Sophia Gräfe*

Abb. 1. Das Fuchszimmer

Is the behaviour of wild animals best observed in their natural habitat? Günter Tembrock (1918–2011), ethologist from East Berlin, showed how valid results can also be obtained in an artificial environment – with the help of film.

We are still living among our foxes here (...),” wrote biologist Günter Tembrock in a letter he sent from Invalidenstrasse, Berlin, to Basel in the summer of 1951. The addressee was Heini Hediger, a Swiss zoo director, who had made a name for himself as an author and animal connoisseur. His book “Wild Animals in Captivity” (“Wildtiere in Gefangenschaft”, 1942) is regarded as the seminal work of modern zoo biology. In it, he expounds the territorial features that must be taken into account if individual species are to be kept successfully in artificial habitats. But what led Günter Tembrock to write to a zoo?

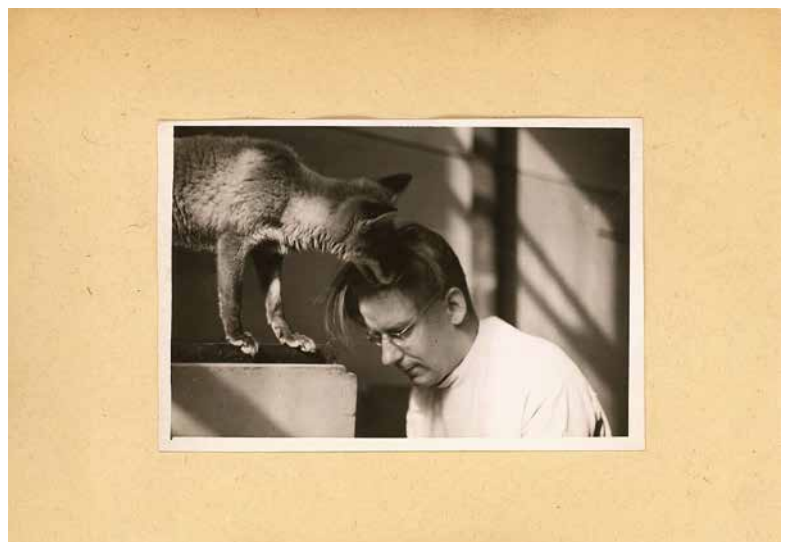
### Ethology in the metropolis

In 1948, Tembrock started building a kind of scientific “mini zoo” for himself (see photo right and p. 50). Primarily entrusted after the Second World War with restoring the Zoological Institute and reorganising teaching at Humboldt-Universität, Tembrock had envisioned his own research institute from early on, the Forschungsstätte für Tierpsychologie (Research Centre for Animal Psychology), where he wanted to study not only anatomy or physiology but also animal behaviour. How does an animal behave in relation to others? For what reasons in evolutionary biology do animals move in a way typical for certain species? Is this firmly anchored in the behavioural repertoire of each animal, or does it even disappear if inactivated or in an unnatural environment? Here, Tembrock followed a branch of research that had been gaining strength since the 1930s, which assumed that it must be possible to distinguish congenital forms of behaviour from acquired ones by closely observing living animals under conditions that were as natural as possible. Modern, comparative behavioural research (ethology) thus bode farewell, at least

ostensibly, to the practice of earlier animal psychology, which was based on experiments and animal training.

Konrad Lorenz (1903–1989), Austrian zoologist and later Nobel Prize laureate, was to produce the most popular images for this line of research. How, then, could Tembrock’s research on wild animals in the middle of the big city, taking place at the same time, succeed? Archives help to solve this anachronistic riddle.

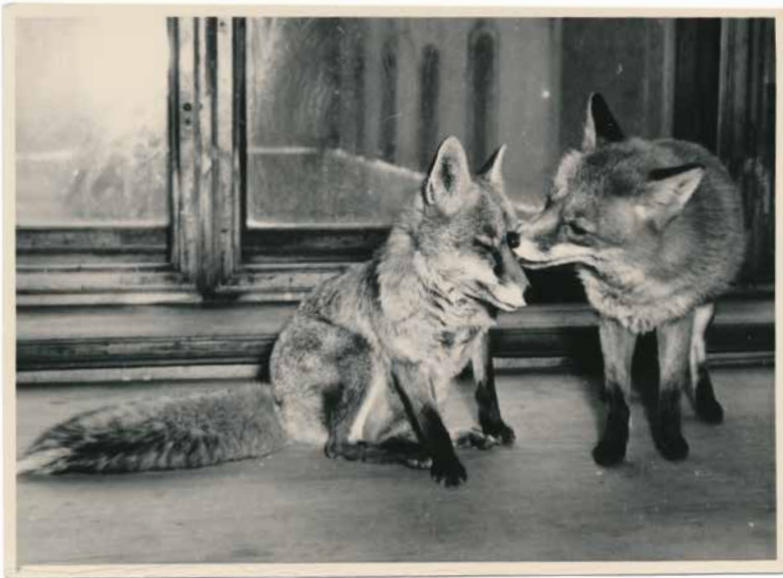
Behavioural biologist Günter Tembrock with “Fiffi”, a red vixen (below). In his “fox room” (floor plan on the left) at the Forschungsstätte für Tierpsychologie (Research Centre for Animal Psychology), he meticulously recorded his foxes’ movements. Index card boxes in which he collected photographs of his lab animals’ behaviour were an important tool in his research work (top left).



### Researchers’ estates as important sources for history of science

Günter Tembrock’s estate clearly shows that he used para-academic sources for his studies of red foxes in addition to specialist literature: he corresponded with numerous directors of zoological gardens to gather suggestions on the care and taming of wild animals on the basis of their knowledge and experience. Tembrock and his

two assistants kept domesticated red foxes in rooms in the west wing of what is today the “Museum für Naturkunde” (Berlin’s Museum of Natural History). There are said to have been about 60 foxes in total over the course of 20 years. From 1955 onwards, Tembrock was able to keep his animals in an outdoor enclosure in the institute’s garden. His estate thus not only sheds light on the theories concerning the study



The red foxes “Fiffi” and “Jupp” on a windowsill in the west wing of what is today the Museum für Naturkunde (Berlin’s Museum of Natural History) (top). A keeper takes care of “Nedda”, a young fox from a “Kaspar Hauser” experiment (bottom).

## IN A NUTSHELL

- In the middle of the 20<sup>th</sup> century, comparative behavioural research was a flourishing field of biology.
- Especially German-speaking ethology set itself the task of distinguishing congenital from acquired forms of behaviour by observing animal movements as accurately as possible.
- While many colleagues elsewhere pursued the new ideal of field research, Günter Tembrock, an East German biologist, set up a research centre right in the middle of Berlin in 1948.
- The success of Tembrock’s behavioural studies in such a confined space can be explained above all by his extensive use of research media, such as logbooks, photographs, drawings and films.
- The archive reveals, however, that the films produced in large numbers in the laboratory were only a temporary phenomenon.
- At the latest in the 1960s, charts and statistics substituted films. Observing actual movement was replaced by what was, from then on, data-based behavioural research, which we now encounter every day.

of animal behaviour that were debated in behavioural biology in the post-war period, it also delivers insights into the history of science, which is currently interested in the scattered arenas and personal networks of earlier biological knowledge. In Tembrock’s archive, academic and para-academic voices combine.

Tembrock also incorporated hunters’ knowledge into the behavioural research he conducted in his study. Through the library of the Zoological Institute, he obtained literature on hunting, such as the journal “Wild und Hund”, which is still published today, and drew on its reports on the behaviour of red foxes to compare his laboratory studies. He distilled information about behaviour observable in natural contexts from wildlife experts’ accounts of adventures and their hunting trophies. His approach to behavioural biology was thus comparative in several ways: first, Tembrock included colleagues’ findings on other species, such as wolves, jackals and dingoes. Second, he aligned his laboratory observations with written evidence from practitioners. One such practitioner, hunter and hunt-

ing expert Detlev Müller-Using, would later applaud, in 1957, Tembrock's doctoral thesis on the behavioural repertoire of red foxes, published in the journal "Der Zoologische Garten". In his tiny "fox room" measuring just 5 x 5 metres (see floor plan, bottom of p. 48), Tembrock had succeeded in making valid statements about the behaviour of wild animals. How did he achieve this?

### Observation through extensive use of media

The answer lies in the records and objects of Tembrock's research practice, which suggest an extensive use of media. This practice is symptomatic of the growing mechanisation and media-isation of behavioural research in the mid-20<sup>th</sup> century, which can be studied in an interdisciplinary way using tools from the history of science and media studies. The ethologists set themselves the task of observing their research animals as comprehensively as possible in order to ultimately be able to reveal patterns and causalities in their behaviour. Contemporaries tell of their patience, perseverance and powers of observation – qualities with which they sought to distance themselves, so to speak, from the partly anecdotal research reports of old-school animal psychology by now frowned upon.

Günter Tembrock entered his detailed observations in a logbook just as tirelessly. In daily records, he put down on paper all elements of the animals' behaviour however inconspicuous they were (see photo, top of p. 52). And other media were also at the service of his extensive logging activities. A special feature is the ethological collection of the Forschungsstätte für Tierpsychologie (Research Centre for Animal Psychology), which comprises four wooden index card boxes (see photo, p. 48), crampacked with photographs of the lab foxes' behaviour. Thanks to written notes and numbering on the back of each small black-and-white photograph, they can be assigned to individual lab animals and observation dates as well as to specific forms of behaviour. This logging system constitutes a kind of register of animal behaviour, which served in practice as a reference work and picture repository.

### Behaviour from an ecological perspective

From the perspective of visual culture studies, it is interesting that the photographic documents mentioned here are always annotated with many different cross-references; they were not intended as individual pictures, but as movable points in a grid. A picture always refers to other pictures, whereby its significance turns out to be relational. Looking at what the photographs show – fox behaviour as studied by Tembrock and his colleagues – produces a similar result: as

the ecological perspective on the biological principles of behaviour gained strength in the 1950s, it was no longer only the physical attributes of an individual animal that were considered insightful. The focus now was on the dynamic relationship between the animal and its physical and social environment. That is, the facial expression of a fox, its posture, sounds, etc. only assume meaning in terms of its relationship to its surroundings. The individual animal, to whose behaviour an invariable meaning was previously attributed, was now replaced by animal communities and frames of reference that were no longer considered static.

The numerous ethological collection projects can be regarded as evidence of this approach. Among the best known is the "Encyclopaedia Cinematographica", a film encyclopaedia published between 1952 and 1993 by the Institute for Scientific Film in Göttingen. The aim of this scientific collection of moving images was to make short reels of 16mm film available as raw data for comparative research questions, much like biological specimens. The first entry in the encyclopaedia shows the locomotor "step" of an Indian elephant in Munich's Hellabrunn Zoo. Other forms of animal locomotion and species followed.

### Film as source material for data acquisition

Günter Tembrock too was to expand his repertoire by using film as an analytical medium. From 1951 onwards, his logbooks contained

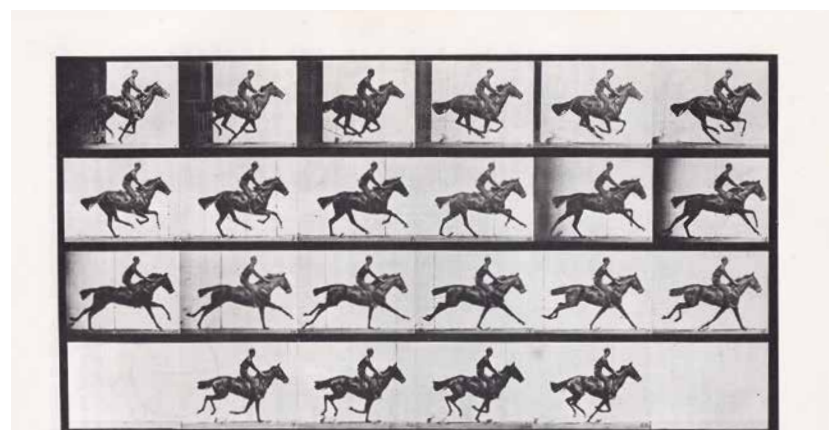
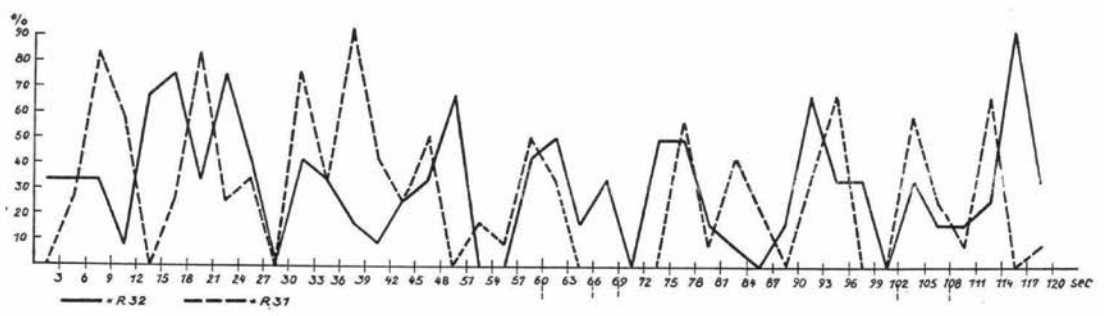
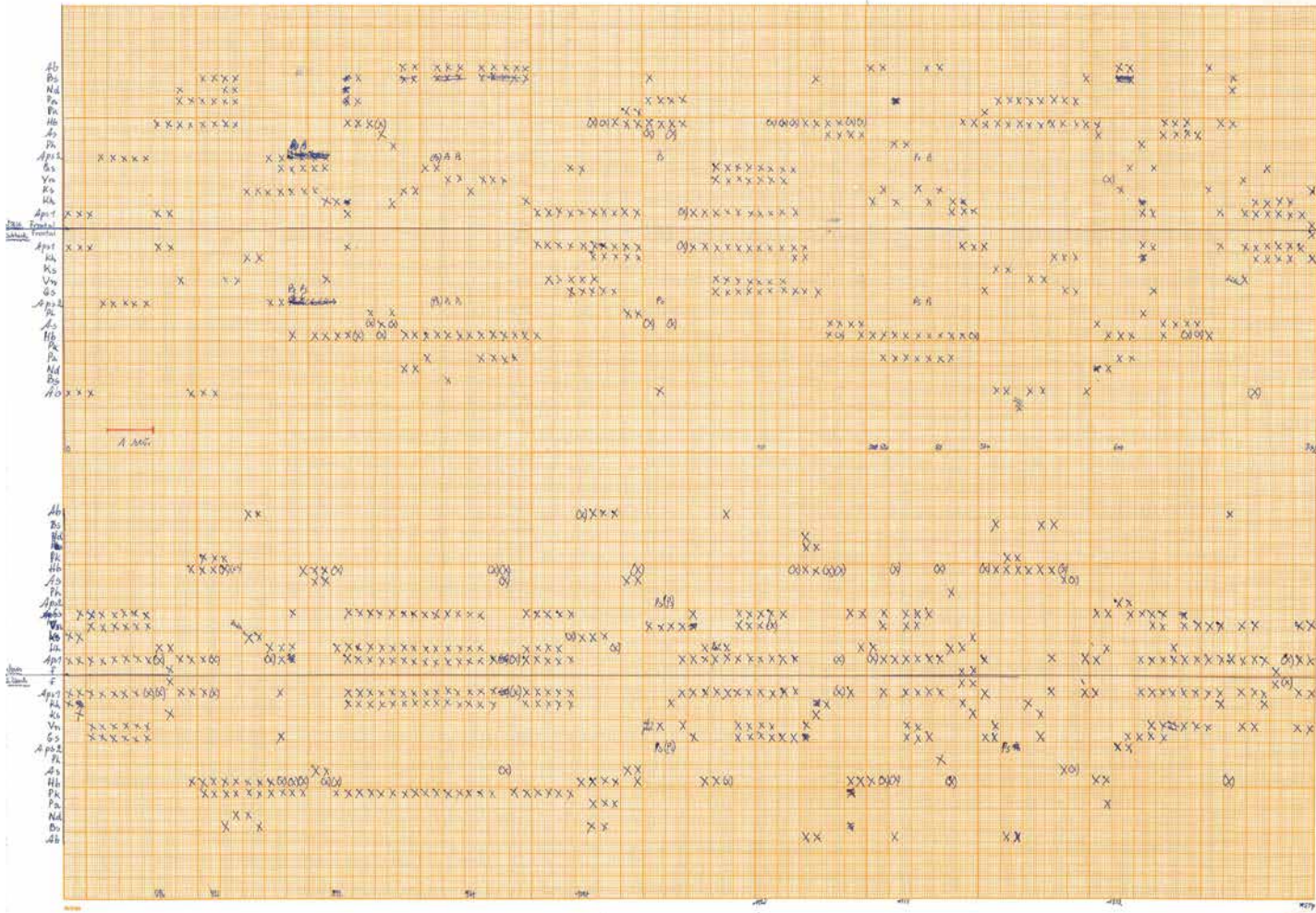
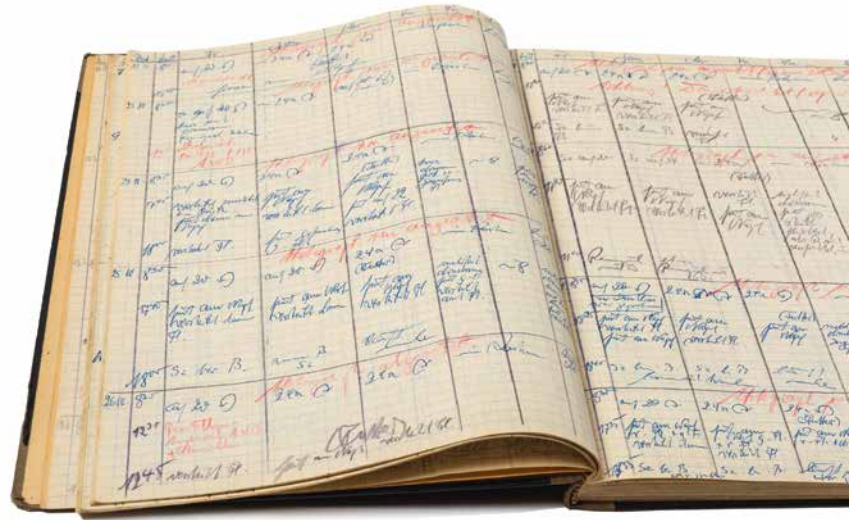


Illustration 14. The Gallop

The history of modern behavioural research is closely linked with the development of modern visual media. Since the end of the 19<sup>th</sup> century, especially film has crystallised as an important research tool alongside drawing and photography. With the help of film, human and animal behaviour should play out and be compared in an almost natural way before the researcher's very eyes. Not only today's film scholars are familiar with the work of Eadweard Muybridge, whose series of photographs, which once laid the groundwork for cinematographic techniques, show the movements of a galloping horse.

Günter Tembrock's open logbook showing his observations of red fox behaviour (top). Tembrock analysed fox behaviour down to the smallest detail by capturing the foxes' fighting movements on film, plotting them on graph paper (centre) and then statistically evaluating a specific detail, the neck bite, and visualising it with the aid of a chart.



countless references to footage he had produced. However, the archive is unusually silent at this point. Many of his films no longer exist – a fate shared by many scientific films. Unlike feature films, they rarely end up in archives. Only one of Tembrock's scientific films, documenting the fighting behaviour of two red foxes, is extant. Two educational films made by Tembrock in cooperation with the DEFA Studio for Popular Science Films have also survived. What remains are the paper witnesses of Tembrock's films: large sheets of graph paper proving that he definitely used film. In the early 1960s, Günter Tembrock plotted the movements of the animals under observation one by one on these sheets with a ballpoint pen (see photo, centre of p. 52). By charting the film material in this way, he was able to make statistical statements about role allocation between the two laboratory foxes during a fight (see graph, bottom of p. 52). What we see here is a turning point in the history of both behavioural research and scientific films: a practice where film is converted into data. Both – the study of animal behaviour and the study of moving images – were abstracted into calculable

units in the course of the cybernetic turnaround of the 1960s. In this context, Günter Tembrock's estate shows that the increasing calculability of behaviour, which is achieved today with the help of digital technology, had its precursors in analogue logging practices – abstraction by means of a ballpoint pen and paper.

### Red fox as object of modern ethology

The behaviour of Berlin's red foxes continues to fascinate researchers today. Wildlife biologist Dr Sophia Kimmig is dealing with red foxes' adaptability to the urban biotope. To do this, however, a fox no longer needs to come in from the cold. Kimmig uses GPS transmitters to record data on the movements of free-living foxes. These transmitters, as well as wildlife cameras, are able to capture specific forms of behaviour. In contrast to Tembrock, and in line with current scientific standards, Kimmig backs up her research with statistical tools. Using tens of thousands of GPS coordinates from the foxes, she creates models of urban wildlife activity and compares the areas they frequent with what the animals have at their disposal in the city. In this way, she identifies the foxes' preferences and detects avoidance behaviour. Genetic studies also deliver insights into fox behaviour. Here, a series of models of wildlife activity in the city simulate dispersal scenarios. These are then compared with kinship data from the wild. The model variant with the greatest similarity to the field data at the end of the experiment represents fox behaviour. For example, it was possible to establish that foxes from Berlin and Brandenburg do not like to mix and that there are big genetic gaps between foxes from East and West Berlin. ●

### Literature

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### Picture credits

p. 48 top: Photo: Carola Radke MfN 2021; bottom: Picture from: Tembrock, Günter: Zur Ethologie des Rotfuchses, p. 294.  
p. 49: Tembrock Forschungssammlung Berlin (TFSB), undated.  
p. 50: Tembrock Forschungssammlung Berlin (TFSB), 1953 and 1957.  
p. 51 box: Illustration 14: "The Gallop", from Muybridge, Eadweard: Animals in motion, p. 50.  
p. 52 top: Photo: Hwa Ja Götz MfN 2020; centre: Tembrock Forschungssammlung Berlin (TFSB), undated; bottom: Tembrock, Günter: Zur Strukturanalyse des Kampfverhaltens bei *Vulpes*, p. 274.



### The author

**Sophia Gräfe**, born in 1988, is a media and cultural studies scholar. She has been researching the history of media and knowledge in the field of behaviour at Philipps-Universität Marburg since 2018. In 2021, as a guest of the History of Science Department at Princeton University, she debated the role of media in the historical reconstruction of past knowledge in the field of biology with historians. Her search for films, photographs, drawings and other media in the context of modern behavioural research has also taken her to the archives of renowned biologists, including Konrad Lorenz, Nikolaas Tinbergen – and East Berlin biologist Günter Tembrock. In December 2021, she presented her latest discoveries from Tembrock's Berlin archive at the international conference "Visible Evidence" at Goethe University.

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