

The Elberfeld Horses

They were the most important of Clever Hans's heirs. Their story is an archetypal example of the intertwinement that often exists between pseudoscience and the paranormal.

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The story of Clever Hans, the reasoning horse, is very well known. What is less known is that several other clever animals followed Hans soon after. The most prominent among them were the “Elberfeld horses.”

Clever Hans is still remembered because he was the object of a study that represented one of the highest achievements in experimental psychology up to that time and which Oskar Pfungst (1907) detailed in a classic book. Pfungst's discovery of the “Clever Hans effect” has changed the way in which many experiments are conducted in fields where there is an interaction between the experimenter and an animal or human subject.



Figure 1. The horse Zarif, one of the Elberfeld horses, attends a lesson by Krall [source Krall 1912].

On the other hand, the Elberfeld horses did not enhance our knowledge of science or psychology, and no classic book was dedicated to them. As a consequence, they have almost been forgotten. They deserve to be remembered, however, because the events in which they were involved are an archetypal instance of pseudoscience. As several authors pointed out at the time, the story of these animals is also an exemplary illustration of the intertwinement that often exists between pseudoscience and the paranormal.

Clever Hans, the Progenitor

In 1900, Wilhelm von Osten of Berlin set out to educate his horse, Hans, to prove his revolutionary theory: If horses were educated like children, the fundamental intellectual resemblance between them and people would surface. He educated Hans applying the same pedagogical principles then used in elementary schools and taught him by means of a blackboard and verbal explanations.

Allegedly, Hans learned to do arithmetic and understand spoken and written German. For instance, if he was asked “What is three times four?,” he tapped the ground twelve times with his hoof. Moreover, Hans was able to “talk,” as he had learned to represent each letter by tapping a certain number of times.

Von Osten started exhibiting Hans in public in 1904, and very soon the

horse, known by the nickname of “Kluge [Clever] Hans,” became famous throughout the world. A heated controversy opened up between skeptics and believers, and it soon became clear that it could only be settled by conducting experiments on Hans. A multidisciplinary scientific commission delegated the psychologist Oskar Pfungst to undertake the experiments.

Most of Pfungst’s experiments consisted of two conditions: a condition “with knowledge” and another “without knowledge.” In the first case, the examiner knew the answer to the question he asked Hans; in the second, he did not. Pfungst proved that Hans answered correctly only in the “with knowledge” trials. It was as if Hans did not work the answer out by himself but rather read it in the examiner’s mind. In fact, whether or not Hans could hear the question seemed irrelevant.

Moreover, Hans managed to answer correctly only when he could see the examiner. This suggested that he was exploiting some visual cues coming from the examiner. Indeed, Pfungst ascertained that the examiner *unconsciously* stooped very slightly immediately after having asked a question. When Hans saw this movement, he started tapping. When the horse reached the correct number of strokes, the examiner straightened up. Hans perceived this movement and stopped tapping.

On December 9, 1904, the scientific commission proclaimed that Hans could not reason and that rather than being educated he had been trained, albeit unintentionally. Public discussion about Hans then came to an end.

According to most accounts, the story ended here. As a matter of fact, however, it continued when in 1905 von Osten made contact with one of the very few people who had not accepted Pfungst’s explanation: Karl Krall, a wealthy jeweler from Elberfeld (now Wuppertal).

Sensation at Elberfeld

Krall inherited Clever Hans upon the death of his owner in 1909. However, Hans had become almost unmanageable

and Krall resolved to “educate” two other stallions, Muhamed and Zarif. He began delivering daily lessons to them applying von Osten’s methods.

Krall (1912) explains that the work was worth his while as the horses, after they had learned to communicate by tapping, like Hans, manifested capabilities superior to those of any child. After thirteen days, Muhamed could already add and subtract, and after twenty he could multiply and divide. Soon, the horses also learned to work out roots in a few seconds, something beyond Hans’s capability, and to solve complex equations such as $\sqrt{4536} - \sqrt{1849} \cdot \sqrt{196} - \sqrt{144}$. They also learned to understand spoken and written German and French, and to “speak” German. As with Hans, each

letter was represented by a number.¹

In time, two other horses joined Muhamed and Zarif: Hänschen and Berto. These equines were to go down in history as the Elberfeld horses.

The education of the horses continued for a couple of years substantially as a private matter. However, little by little, the news spread and many people asked to see the horses at work. There were scientists among these people and a few of them were so impressed that they persuaded Krall to write a book (MacKenzie 1912). The book appeared in 1912 with the title *Denkende Tiere* (*Thinking Animals*) and was more than 500 pages long.

Krall was a strong science enthusiast. Nevertheless, his book was unorthodox

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Clever Hans performs for a crowd.

from a scientific perspective, a point several critics did not fail to notice. On the other hand, it also received enthusiastic comments. Wilhelm Ostwald, the Nobel laureate for Chemistry in 1909, expected that it would mark “as clearly the beginning of a new chapter in the doctrine of man’s place in nature as Darwin’s chief work did in its day” (*Nature* 1914–1915). The eminent psychologist Édouard Claparède (1912) wrote that the publication of Krall’s book “is certainly the most sensational event that has ever happened in animal psychology and possibly in psychology at large.”

On the whole, Krall’s book had a wide-reaching effect, and the Elberfeld horses soon became even more famous than Hans had been in his time.

A Controversy Ensues

Krall and his followers founded the *Gesellschaft für Tierpsychologie* (Society of Animal Psychology) in 1912 and the journal *Tierseele* (*Animal Mind*) in 1913, two entities entirely dedicated to reasoning animals. Robert Yerkes, the well-known American psychologist and primatologist, was a member of the *Gesellschaft*.

Like von Osten, Krall and his advocates believed that the horses “have received a real education, and have learned to think like us” (Mackenzie 1912). As with Hans, however, explanations based on telepathy were also put forward: perhaps something was being transferred directly from the brains of those present to the brains of the horses (Claparède 1913).

Many personalities journeyed to Elberfeld. After the influential neurologist Ludwig Edinger had seen the horses, he began supporting Krall’s theories passionately. A number of zoologists, too, embraced the cause of the horses, for example, H. Kraemer, P. Sarasin, H. E. Ziegler, and K. Gruber, a scholar of the occult (Gruber 1930). The prestigious biologist Ernst Haeckel wrote to Krall: “Your careful, critical experiments convincingly prove the existence of reason in animals, something I have never doubted” (Claparède 1912).

However, there were also many scientists and intellectuals who thought that the attention the Elberfeld horses were getting in the intellectual and scientific community was unwarranted. Most important, at the IX International Congress of Zoology held in Munich in 1913, twenty-four scientists signed a statement of *protest* regarding the diffusion of Krall’s theory (Claparède 1913). Skeptics believed that the Elberfeld horses had simply been trained, like Hans, and that their performances could be explained by Pfungst’s theory. It is significant that there were experts in horse training among the skeptics (e.g., von Máday 1914) but not among the believers.

I am particularly familiar with the Italian writings, which are very representative of the European literature in general. The Genoese biologist William Mackenzie was the most active Italian advocate of Krall’s theory and was often cited in the international debate. Some of his many articles on the subject appeared in journals dedicated to the paranormal. In the 1950s, Mackenzie was chairman of the Italian Society of Metapsychics.

Roberto Assagioli also became an enthusiastic admirer of Krall after having journeyed to Elberfeld with Mackenzie in September 1912. He was a theosophist and became famous later on as the founder of psychosynthesis, a school of psychotherapy. One concept of psychosynthesis is the transpersonal unconscious, from where paranormal powers emanate.

The psychiatrist Giulio Cesare Ferrari was cautiously interested in the Elberfeld horses, mainly because he was an educator. He wrote that they proved “the boundless possibilities of education” and was sure that both intentional and unintentional signs had to be absolutely ruled out. However, he ascribed the achievements of the horses to their memory rather than to their intelligence (Ferrari 1914).

The physician and psychologist Father Agostino Gemelli was very critical,

although he conceded that the problem did not admit of a simple solution (Gemelli 1913). Above all, he lamented the absence of a serious inquiry aimed at verifying whether Pfungst’s explanation of Hans’s feats also applied to the Elberfeld horses.

Luigi Siciliano (1914) and the psychical researcher Cesar de Vesme (1912) believed that the performances of the horses had a mediumistic explanation. Stefano Stefani (1913) claimed that the explanation was to be found in telepathy.

Pfungst’s Theory Refuted?

Skeptics insisted that the only way to establish whether or not Pfungst’s theory applied to the Elberfeld horses was to perform experiments using a “without knowledge” condition. The problem was, however, that Krall prevented skeptics from experimenting (e.g. Gemelli 1913). Pfungst (1912) himself lamented that Krall had rejected all three of his requests to study the horses.

According to the believers, Pfungst’s theory of unconscious signs hardly deserved to be mentioned. It was widely refuted by facts, as so many observers had testified after they had seen the horses with their own eyes. Claparède (1912), for instance, made the following written statement for Krall: “The horses answered correctly under circumstances that absolutely rule out the hypothesis of intentional or unintentional signs. It seems certain to me that the aforesaid horses really count the number of taps. . . .”² In short, “it can now be affirmed that *the reality and authenticity of Krall’s results are certainly and definitely established*” (emphasis in original, Assagioli 1912). In general, however, the evidence against Pfungst’s theory consisted of anecdotes and testimonies, whereas strict experiments were wanting.

Nevertheless, some experiments à la Pfungst were undertaken by believers. Krall himself made a few, but he admitted in his book that they had substantially failed. Several other experiments of this kind were performed by Krall’s advocates. We are told that they succeeded, but usu-

ally in conditions unsuited to a serious, controlled experiment. Actually, the Nobel laureate for Literature in 1911, Maurice Maeterlinck (1914), performed an experiment that could be considered quite satisfactory, if one accepts that his account is reliable. Alone with the horses, Maeterlinck randomly pulled three cards out of a deck without looking at them and put them in front of each animal in turn. The horses “communicated correctly the sum of the cards by tapping.” (More on this presently.) Maeterlinck (1914) dedicated to the Elberfeld horses a long chapter of a book that was wholly consecrated to the occult.

Claparède managed to study the horses in March 1913 without Krall being present. Unfortunately, no conclusion could be reached, as the horses an-

a groom’s mentality and are certainly no mathematics professors” (Mackenzie 1912). Most important, the horses worked well even when Krall and the grooms were not present, and this seemed conclusive evidence.

However, only an expert in deception can reliably ascertain whether a trick exists or not. Indeed, the likely truth was discovered only when an unspecified “psychological party” commissioned an investigation to be made by a professional conjurer, the Danish F. Faustinus (the stage name of Faustinus Edelberg), who was given the opportunity to study the horses closely in 1913. Two years later, Faustinus disclosed his findings in an article signed by Müller (1915)—see also Sebeok (1982) for a thorough account in English.

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swered almost all the questions incorrectly—independently of the knowledge that the experimenter had of the answers. Krall assures us that another man made experiments a few days after Claparède and that he obtained positive results after he had made friends with the horses. Krall maintained that the results obviously depended on whether the visitors “are or are not liked by the horses” (Claparède 1913).

A Magician Enters the Stage

The possibility that any signals given may have been intentional was usually ruled out in very resolute terms. Nobody, not even the skeptics, doubted the absolute good faith of Krall (e.g., Gemelli 1913). As for the grooms, “they really are two worthy and simple boys. They have

We learn from Schumann (1916) that “Mr. Faustinus Edelberg has already helped Prof. A. Lehmann of Copenhagen in the debunking of so-called spiritistic mediums. He is believed to be unusually skillful in ‘mind reading’ and it seems that, to this aim, he capitalizes on minimal unintentional movements.”

Krall (1916a) wrote later that Faustinus had tricked him into believing that he was “an independent researcher” only interested in truth. Hence, Krall had let him perform some experiments with his horses, “as I have always done without any exception when I did not doubt the scientific integrity of the researchers.”

Faustinus found convincing evidence that Albert, the only groom at that time, had swindled Krall. The conjurer started

becoming suspicious when Albert immediately spotted a mistake that Faustinus had deliberately inserted in a problem that consisted of working out a fourth root.

Next, Faustinus realized that Muhamed worked only if he could perceive Albert. Even when Faustinus had the impression that he was alone with Muhamed, Albert was actually able to communicate with the horse from outside the stable, even from a considerable distance. When Faustinus prevented Muhamed from seeing Albert, the horse stopped answering correctly. This could explain the accounts, including Maeterlinck’s, regarding the horses answering correctly even when their questioner did not know the answers and was seemingly alone with them.

Therefore, it seemed that Albert provided Muhamed with signals, but which signals? Faustinus discovered that there was just one very simple and “almost imperceptible” signal. When asked a problem, Muhamed started tapping but stopped when Albert shook his head slightly but discernibly. In sum, there was “a signaling in Pfungst’s sense, the only difference being that here it is intentional” (Müller 1915). After he had discovered the trick, Faustinus was able to make Muhamed give right or wrong answers as he wished.

But Albert was just a groom, so how could he perform very complex computations so fast? Faustinus pointed out that a fully reliable system existed for working out three kinds of roots (square, cube, fifth) very easily.

Hänschen and Berto also failed when they could not perceive Albert’s presence and so were almost surely controlled by him as well. Yet how, Faustinus was unable to discover. Certainly Albert did not use the same technique with them that he used with Muhamed. As for Zarif, Faustinus could not undertake any experiment on him. As a matter of fact, “Zarif could only be used as a saddle horse already by the summer of 1913,” as his performances had severely deteriorated (Krall 1916b).

Faustinus could not complete his investigation because Krall forbade further inquiries when he was informed of the conjurer's findings. Although incomplete, Faustinus's account appears trustworthy, especially considering that Karl Wigge (1912), also witnessed intentional signs by Albert.

Krall (1916a, 1916b) and Ziegler (1916) tried to challenge Faustinus with various arguments, but above all they tried to discredit him as an untrustworthy investigator. For instance, Ziegler (1916) wrote that it was surprising that more credit was given to the "conjurer and fortune-teller Faustinus" than to all the scientists who had most accurately observed the horses and had testified that there was no signaling involved. The highly regarded psychologist Friedrich Schumann (1916) replied to Ziegler that "It is usually well recognized that [a person like Faustinus] is more suitable than 'learned' men for discovering the intentional or unintentional assistance of a groom." It seems that even in those days there was awareness that a conjurer is much better at debunking a fraud than any scientist.

Then the Great War came. In 1915, Albert was recruited (Marbe 1916) and Krall dispensed with his stable, as "it has become too heavy a weight for a single man" (*Mitt. d. Gesell. f. Tierpsych.* 1914–1915).

Unfortunately, outside Germany Faustinus's investigations did not receive the attention they deserved, and the question of the intellectual capabilities of the Elberfeld horses remained officially open. For instance, the American psychologist Joseph Jastrow (1920) did not mention Faustinus in his highly skeptical article and wrote that "there has been no definitive examination of the Elberfeld horses."

In any case, the controversy trickled to an end after the war. A silence descended over the Elberfeld horses, which from then on was broken occasionally but without anything new being added to the debate. For his part,

Krall (1916b) tried to educate a new horse, the mare Jona, and kept speaking and writing about his horses of old. He insisted that they could reason but added that they were also capable of communicating telepathically in particular conditions. He became more and more involved in parapsychology and spiritism (von den Berg 2008). Karl Krall died in 1929.

A German dog, Rolf, also became very famous in the same years as the Elberfeld horses, and other sapient dogs came after Rolf. They were thought to be even more gifted than the Elberfeld horses but were not supported by leading scientists. In general, the explanations of the believers drifted more and more toward the paranormal. Those who can read Italian can find their stories chronicled in Vezzani (2010). ■

Notes

1. See Sanford (1914) for a more detailed account in English of the performances of the horses.
2. However, Claparède gradually convinced himself that the Elberfeld horses were simply trained animals (Claparède 1913; Heuzé 1928).

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