



ON THE INTELLIGENCE OF RAVENS - ANTHOLOGY OF JET-BLACK POEMS

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Abstract

This essay discusses the intelligence of ravens, an intelligence which, according to current research, declares ravens to be the most intelligent birds. The differences to human and artificial intelligence are shown. After a digression to the ancient Greeks and Germanic tribes, it becomes clear that ravens were respected as intelligent in various cultures. Both the Greek poet Aesop – e.g. with the fable The Eagle and the Crow – and the Germanic Raven God Wodan with his two ravens Hugin (sense) and Munin (memory) worshipped crows. In our western world, however, ravens were almost wiped out at the beginning of the twentieth century as they were considered pests for agriculture and livestock. This essay uses raven poems to show how the perception and respect of ravens is slowly changing in our latitudes.

Keywords

Anthology, Raven Intelligence, Poetry, Lyrical Ego, Symbolism

1 What is Raven Intelligence?

It is not easy to define the term intelligence. What does it refer to: human intelligence, artificial intelligence or animal intelligence?

Let's stay with humans first and try to characterize human intelligence. Human intelligence is the ability to think abstractly and solve problems based on information and experience. This includes mental and cognitive learning abilities to acquire new knowledge.

What distinguishes human intelligence from artificial intelligence? Artificial intelligence is machine intelligence, i.e., it is based on algorithms from data science and natural language processing in order to be able to answer human questions sensibly from large amounts of data (e.g. the Internet).

Now to the animals: Can they act intelligently? For a long time, it was thought that intelligent action was reserved for humans. It was only through scientific studies and behavioral research that it was recognized that apes and dolphins have intelligent abilities.

Recent research on ravens confirms that these birds of the Corvidae Family (corvids) do have intelligent abilities (Bugnyar 2024, Heinrich 2007, Marzluff/Angell 2012, Reichholf 2023):

- They build tools to get to the food, for example.
- They differentiate between cause and effect.
- They can perceive resentment and communicate it to their conspecifics.
- They recognize antisocial conspecifics and can exclude them.
- They have a certain degree of self-control.

In this essay, we largely exclude artificial intelligence, as this term refers to machines (computers and algorithms). However, dialog systems such as ChatGPT and others certainly offer poets help in searching for topics worth knowing or in generating so-called permutation poems and selecting interesting lines of verse. Generative Poetry (Meier 2024) is based on the use of computers and can support the creativity of computer-savvy poets today and now.

To summarize, in this essay we use the term intelligence to refer to the mental and cognitive abilities of a human or an animal (ape, dolphin, raven) to solve a specific problem or to adapt to environmental changes. Accordingly, raven intelligence refers to the intelligence of the raven family.

Section 2 takes a look into the past to show the appreciation of intelligent corvids among both the Greeks and the Germanic tribes. Section 3 takes a critical look at the efforts to eradicate corvids, which were only abandoned in the course of the twentieth century due to the usefulness of these birds for the environment and nature. At the center of this essay is a small anthology of raven poems in section 4, where five poems are examined and the respective position of the ravens interpreted. Section 5 concludes with a discussion and outlook.

2 Appreciation of the Intelligence of Ravens among Greeks and Germanic Tribes

Aesop was a Greek poet who lived in the 6th century BC. He became famous for his fables about animals (Fontain 2021), which offer advice on living together in the form of a parable.

One of Aesop's fables is entitled *The Eagle and the Crow*. It describes how an eagle would have liked to eat an oyster. Unfortunately, the eagle could not find a way to crack the oyster, neither with his beak nor with skill. The crow then suggested that the eagle take to the air and drop the oyster on some rocks. The eagle followed this advice and the crow lurked near the intended rocks. When the crow's advice was successful, the crow pounced on the cracked oyster and consumed the content. The crow only left the oyster shells to the eagle as a reward for his gullibility. To summarize, Aesop's fable about the eagle and the crow contains the following advice: Stay wise and never follow self-serving advice!

Aesop was not the only poet or philosopher or mathematician who drew his conclusions from observations of nature and gave society a lesson through his writings. In the example of the fable about the eagle and the crow, Aesop's observation that crows use tools to obtain food becomes obvious (cf. e.g. the research work of the evolutionary biologist Josef H. Reichholf in his work *Rabenschwarze Intelligenz*, Reichholf 2023, p. 174 ff.). In Aesop's fable, the crow motivates the eagle to use its own instrument to find food. At the same time, as an Aesopian fable, it gives us advice for life.



Fig. 1 Wodan with the two ravens Hugin and Munin; illustration by Olafur Brynjulfsson, an Icelandic clergyman¹.

Wodan or Odin is the Raven God in Germanic mythology. He is also regarded as the God of poetry and runes, death, transformation, magic and ecstasy. Both names – Wodan and Odin – have Indo-European roots, namely *wat* (to kindle, inspire) and *uat* or *uot* (to be spiritually stimulated).

Wodan is wise because he owes his knowledge to the two ravens Hugin and Munin (see Fig. 1).

The two ravens sit on Wodan's shoulders and whisper to him everything that happens in the world. Wodan also draws his knowledge from a well, where he lost an eye and is considered to be one-eyed. Thanks to his cunning and wisdom, he is known as the king of poets and goes by the nickname of *Liodasmieder* or songwriter.

Every day, Wodan rides across the sky on his eight-legged horse with his faithful ravens Hugin (thought) and Munin (memory) and explores the world. In other words, Wodan values his faithful raven companions because he relies on their intelligence and wisdom.

3 Degradation and Near Extinction of Ravens in the West

In Western countries, ravens have repeatedly been criticized. Whether in cities or in the countryside, they always appear in flocks, make noise and search for food everywhere.

Some idioms go back to the corvids as omnivores and scavengers. The German children's song *Hoppe, hoppe Reiter* refers to the danger of a fall with: 'If he falls into the ditch, the ravens will eat him' (in German: 'Fällt er in den Graben, fressen ihn die Raben').

As young ravens scream extremely loudly when feeding or appear clumsy after leaving the nest, their parents were degraded to raven parents. At that time, many people did not know that ravens are extremely loyal² and feed and care for their young in an exemplary manner until they fledge.

Other word formations such as gallows bird, unlucky raven, bird of death, raven carrion or raven bird are still considered swear words today.

Farmers and animal rights activists repeatedly point out the damage that flocks of ravens can cause. Ravens are omnivores, whereby animal parts predominate. They like to eat vertebrates of all kinds, insects, earthworms, bird eggs, young birds, fruit, food waste or agricultural products such as maize. The ravens are extremely clever with their wide range of food and also use their ability to learn. If the ravens find snails, nuts or

shells, they drop them from a great height onto hard surfaces so that they break (see the fable *The Eagle and the Crow* by Aesop in section 2).

For a long time, corvids were intensively persecuted and shot as pests of game and agriculture due to their foraging and behavior. In Central Europe, ravens were considered almost extinct in the first half of the twentieth century. Other raven species were also severely decimated (Fischer 2022).

Since the European Union's bird protection directives came into force, songbirds – including corvids – are no longer subject to hunting law but to nature conservation law. The shooting or trapping of songbirds is only permitted with the approval of nature conservation authorities. The habitats of songbirds are under special protection; hunting bird species is prohibited during the breeding season.

According to the German Nature and Biodiversity Conservation Union, there are currently around 20,000 common ravens living in Germany³. Compared to 200,000 to 300,000 pigeons or over 9 million blackbirds, this is a small number. In addition, the population of ravens cannot explode, as the number of breeding territories is limited. According to the German Nature and Biodiversity Conservation Union, the population of ravens in Germany is self-regulating. In addition, the value of ravens and other corvids for biodiversity is great, as they consume waste and carrion and thus protect our habitat.

4 Anthological Development of Western Raven Poems

An anthology is a collection of selected literary texts or text excerpts that relate to a specific theme. In our case, five raven poems from the period 1845 to 2024 are presented and commented on. The focus is on the question of how the perception and appreciation of corvids shaped and changed the literary self over the course of time.

4.1 *The Raven* by Edgar Allen Poe (1845)

Edgar Allen Poe (1809 to 1849) was an American writer who shaped poetry, short stories, crime and horror literature. During his time in New York, Poe made a name for himself as a lyricist with his poem *The Raven* (Poe 2024). This poem was reprinted many times and recited by Poe again and again.



Fig. 2 Desperate man with repeated raven visits, illustrated by John Tenniel⁴.

set his heart racing; he opens the door and finds no one there. Was the knock from his lover Leonore? Now there is a knock at the window and when he opens it, a raven flies into his room and sits on the bust of the Greek goddess Athena, goddess of wisdom, battle and the arts.

The narrator asks the raven for its name and receives the answer: Nevermore. The lyrical ego wonders what the raven wants to express with Nevermore. Should he forget his beloved Leonore? The raven answers: Nevermore. The lyrical ego does not give up and asks whether a meeting with Leonore in heaven is planned? The raven's

Poe took his success with the poem *The Raven* as an opportunity to reflect more deeply on the composition of poetry and to publish his findings in an essay entitled *The Philosophy of Composition* (1846). This essay influenced modern poetry and so-called symbolism, a literary concept that emerged in France and, in contrast to realism and naturalism, is characterized by idealistic traits.

The Raven is a narrative poem and was published in the New York newspaper *Evening Mirror* on January 29, 1845. In 18 stanzas with 108 verses, the poem describes the midnight visit of a raven to a desperate man (see Fig. 2) whose lover has died.

One night, the lyrical narrator hears a gentle knock on his door. Scarred by the death of his beloved Leonore, he repeatedly seeks solace in occult works. The glow of his fireplace and the rustling of his curtains

Much I marvelled this ungainly fowl to hear discourse so plainly,
Though its answer little meaning—little relevancy bore;
For we cannot help agreeing that no living human being
Ever yet was blessed with seeing bird above his chamber door—
Bird or beast upon the sculptured bust above his chamber door,
With such a name as "Nevermore."

But the Raven, sitting lonely on that placid bust, spoke only
That one word, as if his soul in that one word he did outpour.
Nothing further then he uttered; not a feather then he fluttered—
Till I scarcely more than muttered, "Other friends have flown before—
On the morrow he will leave me, as my Hopes have flown before."
Then the bird said, "Nevermore."

Fig. 3 Excerpt from the poem *The Raven* by Edgar Allen Poe⁵.

answer: Nevermore (cf. text excerpt in Fig. 3).

The poem *The Raven* describes the madness of a man who longs for his deceased lover Leonore and becomes more and more desperate due to the visit of a black raven. It is characterized above all by its musicality, exaggerated language and supernatural atmosphere.

In the poem *The Raven* by Edgar Allen Poe, the lyrical ego expresses a sad and gloomy mood. The raven itself, with its repetitions Nevermore, symbolizes separation, loneliness, despair, grief and death.

4.2 *The Raven Ralf and The Twelve-Eleven by Christian Morgenstern (1905)*

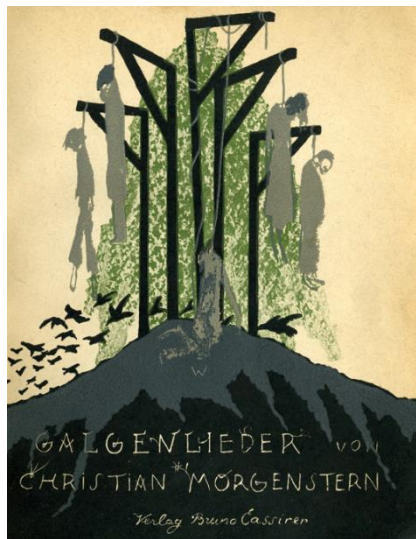


Fig. 4 Cover of the book of poems *GALGENLIEDER* by Christian Morgenstern from 1905⁶.

GALGENLIEDER is a volume of poetry first published in March 1905 (Bruno Cassirer Publisher, Berlin) by Christian Morgenstern (Fig. 4), who had been working on it for around 10 years before its publication.

Christian Otto Josef Wolfgang Morgenstern (from 1871 to 1914) from Tyrol was a translator, writer and poet.

Morgenstern became known as *Homo Ludens* through the publication of his *GALGENLIEDER* (Morgenstern 2011), a collection of linguistically playful and grotesque poems. His nonsense poems or humoresques were not just gimmicks but, in Morgenstern's opinion, 'playful and serious stuff'.

Christian Morgenstern first recited his poems to his friends – the League of Gallows Brothers – before publishing them. Fig. 5 shows two excerpts from the two poems *Der Rabe Ralf* (engl. *The Raven Ralf*) and *Der Zwölf-Elf* (engl. *The Twelve-Eleven*).

Der Rabe Ralf (Morgenstern 2011, p. 33) characterizes a loner who searches for his way, experiences pain and loneliness and quietly finds his peace in the end. At first glance, the poem – three stanzas of eight verses each – appears playful and childlike due to the repetition of sounds and words such as 'will will hu hu' or 'still still du du'.

The lyrical ego tells of the life of Ralf the raven, whom no one helped. Both the title of the poem and its content are reminiscent of the fact that ravens are seen as harbingers of doom and death. The poem can be seen as an allegory of life.

3rd Verse of the Poem: *Der Rabe Ralf*

Doch als ein Jahr
will will hu hu
vergangen war
still still du du
da lag im Rot
der Rabe tot
will will still still
du du

1st, 11th and 12th Stanza of the Poem: *Der Zwölf-Elf*

Der Zwölf-Elf hebt die linke Hand:
Da schlägt es Mitternacht im Land.
...
Der Rabe Ralf ruft schaurig: ‚Kra!
Das End ist da! Das End ist da!‘
Der Zwölf-Elf senkt die linke Hand:
Und wieder schläft das ganze Land.

The second poem *Der Zwölf-Elf* (Morgenstern 2011, p. 30) by Christian Morgenstern is mysterious and full of fantastic images and events. Its content – twelve stanzas of two verses each – describes the magical time of midnight, when animals such as dogs, frogs, snails, mice, moles and moon sheep are woken up and put on stage. Then suddenly the raven Ralf announces the end and with the lowering of the *Twelve-Eleven's* left hand, peace returns to the land.

Fig. 5 Excerpts from the poems *Der Rabe Ralf* and *Der Zwölf-Elf* by Christian Morgenstern (2011, p. 33 and p. 30 respectively).⁶

4.3 *The Ravens by Georg Trakl (1913)*

Georg Trakl (1887 to 1914) was an Austrian poet of Expressionism and Symbolism. Only a few poems and texts were published during his lifetime, as Trakl was unable to find a publisher.

Due to his experiences during the First World War, his work is characterized by dark moods, colour symbolism, transience and death.

In Trakl's poem *Die Raben* (engl. *The Ravens*, see Fig. 6) – three stanzas of four verses each with an abba rhyme scheme – the lyrical ego describes the behavior of a flock of ravens.

Die Raben (original poem)

Über den schwarzen Winkel hasten
Am Mittag die Raben mit hartem Schrei.
Ihr Schatten streift an der Hirschkuh vorbei
Und manchmal sieht man sie mürrisch rasten.
O wie sie die braune Stille stören,
In der ein Acker sich verzückt,
Wie ein Weib, das schwere Ahnung berückt,
Und manchmal kann man sie keifen hören.
Um ein Aas, das sie irgendwo wittern,
Und plötzlich richten nach Nord sie den Flug
Und schwinden wie ein Leichenzug
In Lüften, die von Wollust zittern.

The Ravens (translated by deepl.com)

Over the black corner the ravens hurry
at noon with a harsh cry.
Their shadow brushes past the hind.
And sometimes you see them resting sullenly.
Oh, how they disturb the brown silence,
In which a field is enraptured,
Like a woman who ravishes heavy foreboding.
And sometimes you can hear them nagging.
Around a carrion that they scent somewhere,
And suddenly they turn their flight to the north
And disappear like a funeral procession
In airs that tremble with lust.

Fig. 6 The three stanzas of the poem The Ravens by Georg Trakl in German and English⁷

In the first stanza, the narrator describes how ravens rush over the black corner and scream loudly; the black corner probably corresponds to the suggestion of a gallows and the ravens actually make noise with loud cries. Their shadows graze a hind before they rest 'sullenly'.

In the second verse, the brown stillness stands as a rapturous field, which is then personified as a 'woman'. The ravens then quarrel and scold.

The scent of carrion in the third stanza makes the ravens fly north, like a funeral procession trembling with lust.

The lyrical ego describes the ravens in this poem as gallows birds, bringers of doom and pests, threatening fields and harvests, among other things. In addition, the field is personified as a woman who 'ravishes heavy foreboding'.

4.4 Poem *_raben_schwarz* by Andreas Meier (2024)

Andreas Meier (born 1951) studied music at the Music Academy in Vienna and mathematics at the ETH in Zurich. After completing his doctorate, he worked at the IBM Research Lab in California before applying his knowledge in the major banking and insurance sectors. He then accepted a position at the Université de Fribourg in Switzerland,

where he was responsible for data science and electronic business.

Since his time at high school in Liestal, Meier has used electronic computer systems to generate so-called nonsense poems (Meier 2022). His hobby to this day is generative poetry (Meier 2024) and experimental music.

His love for ravens also goes back to his youth. Back then, the ravens were shot by farmers and hung upside down on poles to keep ravens away from the fields. Only in recent decades have renowned research groups in Europe and the USA devoted themselves to in-depth studies of the intelligence of these birds (Heinrich 2007, Reichholf 2023), their social behavior in groups (Bugnyar 2024) and their usefulness for nature and the environment.

Gedicht _raben_schwarz

über den schwarzen winkel
fliegen am abend die raben
mit galgen geschrei
ihr rabenschwarzen kolkragen
ihr werdet verachtet
von uns menschen missachtet
ihr galgenvögel rabeneltern
ihr vorboten des unheils
der pest des todes
wo bleibt eure klugheit?
wo bleibt eure treue?
wo bleibt eure intelligenz?
sei euer ruf ein trennungszeichen
ihr teufel raben ihr müsst weichen
KRAAA KRAAA KRAAA
KLONG KLONG KLONG
KAAAF KAAAF KAAAH
kolkragen: jetzt geht es
euch an den kragen
ihr verliert leben und ehr
ihr seid die nimmermehr!
eine letzte frage bleibt:
was haltet ihr dämonen
des under grounds von uns
homo sapiens des erden bunds?
da rufen die kolkragen:
KAAAF KAAAF KAAAH
EUER END IST DAAAH !!!
EUER END IST DAAAH !!!
über den schwarzen winkel
fliegen am abend die raben

Poem _raven_black

over the black angle
the ravens fly in the evening
with gallows cry
you raven-black ravens
you are despised
disregarded by us humans
you gallows birds raven parents
you harbingers of doom
the plague of death
where is your wisdom?
where is your loyalty?
where is your intelligence?
be your reputation a sign of separation
you devil ravens you must give way
KRAAA KRAAA KRAAA
KLONG KLONG KLONG
KAAAF KAAAF KAAAH
common ravens: now
it's your turn
you lose life and honor
you are the nevermore!
one last question remains:
what do you demons think
of the under grounds of us
homo sapiens of the earth alliance?
the ravens are calling:
KAAAF KAAAF KAAAH
YOUR END IS DAAAH !!!
YOUR END IS DAAAH !!!
over the black angle
the ravens fly in the evening

Fig. 7 Poem *_raben_schwarz* in German and English by © Andreas Meier, 2024.

Literature and poetry reflect the *Zeitgeist* of society. While ravens were prized birds in antiquity and mythology (see section 2), they were almost wiped out in Europe in the first half of the twentieth century (section 3). Due to the position of ravens in society and poetry in recent decades and the latest findings regarding social behavior and intelligence, Meier ventures a raven poem in 2024 under the name *_raven_black* (Fig. 7), which takes this change into account.

The first stanza of the poem refers to the poem *The Ravens* by Georg Trakl (see section 4.3). However, it is clear to the narrator right at the beginning that the 'black angle' characterizes a gallows, as the ravens fly past in the evening 'with gallows cry'.

In the next two stanzas, the contempt for ravens is discussed: Gallows birds, raven parents, harbingers of epidemics and death.

Now, in the fourth stanza, three rhetorical questions are asked about cleverness, loyalty and intelligence, although renowned scientists in behavioral and cognitive biology classify corvids such as ravens as clever, loyal and intelligent (Bugnyar 2024). The behavioral biologist Kurt Kotrschal from Vienna even describes corvids as 'flying monkeys'.

The corvids promptly respond with KRAAA ... KLONG ... and KAAAF KAAAF KAAAH. Question: Aren't the raven-black birds Kafkaesque, i.e., absurd, enigmatic and threatening?

In the seventh verse, it's the ravens' turn. They lose life and honor, for they are the 'nevermore' (cf. *The Raven* by Edgar Allan Poe in section 4.1).

Now comes the key passage in the poem *_raven_schwarz* with a final question: What do the ravens think of Homo Sapiens, the wise man? The ravens call out: KAAAF KAAAF KAAAH YOUR END IS DAAAH!!! YOUR END IS DAAAH !!! (cf. *The Raven Ralf* or *The Twelve-Eleven* by Christian Morgenstern in section 4.2).

In the last verse, the ravens fly over the black corner every evening as usual, probably liberated from Homo Sapiens.

The poem *_raven_schwarz* is raven-black and Kafkaesque and holds up a mirror to humanity. War, environmental pollution, hatred and envy characterize the wise man. The raven birds warn people in vain.

5 Discussion and Outlook

In Western society, corvids have always stood for danger, disaster or even death. The legendary 1963 film *The Birds* by Alfred Hitchcock is still celebrated as the archetype of a horror film. In this film, first seagulls and then corvids attack people in Bodega Bay in California and kill them while screaming horribly. Hitchcock's film suggests the menacing behavior of birds in flocks, which is indeed horrifying, but remains untenable due to many research studies.

A small anthology of five raven poems shows how the image of ravens is gradually changing in Western countries. While corvids were almost wiped out in the first half of the twentieth century, scientific behavioral research has led to the rediscovery of their cleverness, loyalty and intelligence. Some scientists even dare to compare the intelligence of great apes and corvids (Pike et al. 2020).

Artists and musicians have also repeatedly addressed the fascination of corvids in their works. For example, the ballad *The Three Ravens* by Thomas Ravenscroft (1588 to 1635) describes a conversation between three ravens about their next meal. The purpose of this conversation is to show how important love and loyalty are for life. The ballad was published as a song in the 1960s by PETER, PAUL AND MARRY, among others, under the title *The Raven*.

In addition to their dexterity and cleverness, the social behavior of ravens is also striking. Ravens warn their conspecifics in case of danger or if they act selfishly to their own advantage. This spans an arc from the fable *The Eagle and the Crow* of the Greek storyteller Aesop to the poem *_raven_schwarz* of Andreas Meier.

The time seems ripe to describe the animal world – especially corvids – with more respect and dignity, both in prose and poetry. In Germanic mythology, Wodan or Odin, the Raven God, used the wisdom of his two ravens Hugin (thought) and Munin (memory).

What good would it do us earthlings if we appreciated and protected nature and wildlife? Wouldn't that be a chance of survival for us humans?

References

1. <https://commons.wikimedia.org/w/index.php?curid=6029939>; accessed September 1st, 2024.
2. Common ravens are monogamous and remain faithful to their partners for life; see <https://www.nabu.de/>; accessed September 1st, 2024.
3. see <https://www.nabu.de/index.html>; accessed September 1st, 2024.
4. <https://commons.wikimedia.org/w/index.php?curid=2433317>; accessed September 1st, 2024.
5. <https://www.vokabel.org/englisch/texte/gedichte/edgar-allan-poe-the-raven/>; accessed September 1st, 2024.
6. <https://www.literaturportal-bayern.de/themen-startseite?task=lpbtheme.default&id=1083>; accessed September 1st, 2024.
7. German poem *Die Raben* von Trakl: <https://www.abipur.de/gedichte/analyse/1760-die-raben-trakl.html>; accessed September 1st, 2024.

Literature

- Bugnyar, T.: RABEN – Das Geheimnis ihrer erstaunlichen Intelligenz und sozialen Fähigkeiten. Brandstätter, Wien 2024.
- Bugnyar, T.: Why are ravens smart? Exploring the social intelligence hypothesis. *Journal of Ornithology* (2024) 165: 15-26.
- Fischer, K.: Sind Rabenvögel in Deutschland zur Plage geworden? *National Geographic*, August 2022.
- Fontain, J.: Sämtliche Fabeln – Illustriert von Grandville. Anaconda, München 2021.
- Heinrich, B.: *Mind of the Raven: Investigations and Adventures with Wolf-Birds*. Ecco Press, New York 2007.
- Marzluff, J., Angell, T.: *Gift of the Crow: How Perception, Emotion, and Thought Allow Smart Birds to Behave Like Humans*. Simon and Schuster, New York 2012.
- Meier, A.: Generative Lyrik – Gestaltungsoptionen mithilfe des Computers. In: D'Onofrio S. (Hrsg.): *Generative KI – Die Ära der kreativen Maschinen*. HMD Praxis der Wirtschaftsinformatik, Nr. 356, Heidelberg, April 2024.
- Meier, A.: *wah wah – grand slam lyrics*. pako Verlag, Rain 2022.
- Morgenstern, C.: *Alle Galgenlieder – Galgenlieder*, Palmström, Palma Kunkel, Der Ginggan, Vier Legendchen, Zeitgedichte. marixverlag, Wiesbaden 2011.
- Pike, S., Sima M.J., Blum, C.R., Herrmann, E. and Mundry, R.: Ravens parallel great apes in physical and socialcognitive skills. *Scientific Report* 10, 20617, 2020.
- Poe, E. A.: *The Raven*. <https://www.eapoe.org/works/poems/ravent.htm>; accessed September 1st, 2024.
- Reichholf, J. H.: *Reben-schwarze Intelligenz – Was wir von Krähen lernen können*. Langenmüller, München 2023.