The History of Amusement on the Net

A Reference Work on Play, Games, Spectacle and the Vacuum.Net

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Constable Research, Leiden

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First complete edition of all chapters. Later versions deepen each chapter.

How to read this book

This book tells the history of amusement. It starts with animals that play and ends with the platforms, fan worlds and synthetic stories of today. It looks one step beyond. It covers every continent.

Amusement here means every activity people take up for its own sake, alone or together. It includes play, games, festivals, theatre, sport as spectacle, music as pastime, comics, film, television, theme parks, video games and fandom. Work, worship and war appear only where amusement grows out of them or into them.

The book has four parts. Part I gives the foundations: the net and the main theories of play. Part II tells the history, from the first playing animals to the present. Part III gives the rhythms of amusement and tests them. Part IV looks ahead.

Through the whole history runs one set of forms, the forms of the Vacuum.Net. Chapter 1 explains them from the beginning. No earlier text is needed. Where a form shows in the history, the text names it in a sentence or two, and the history goes on. The forms are read in the history. They are described beside it, not as its cause.

Every claim carries a status where it matters. Measured means a number from a cited source or a computation shown in the text. Known means a published result of others. Reading means an interpretation in terms of the net. A reading may guide work. It is not a proof.

The ladder. Every size and every time in the book has a position on one scale. The position of a length is the logarithm, base 3, of the length over 4.558816×10^{-8} m. The position of a time is the logarithm, base 3, of the time over 1.520655×10^{-16} s. One year is 3.15576×10^{7} s. An age is placed

as the time from then to 2026. The day sits at 43.50, the year at 48.87, a generation of 26.9 years at 51.87. These are the same conventions as in The History of Culture on the Net.[1]

Sources. Footnotes point to the numbered sources. The annotated list at the end says what each source holds and why it matters. The reader can use it to go further.

This edition. This is version 0.5, the first complete edition of all chapters: the foundations, the history from the first playing animals to the short and synthetic forms of 2026, a statistical test of rhythms, the economy, a proposal for the next depth and the ladder. Each chapter still needs deepening before the book reaches the scale of the companion book on culture. Every case is also a row in the catalogue, which will be held in the MAZE.

[1] [3] Konstapel, J. (2026). The History of Culture on the Net: A Reference Work on Human Culture and the Vacuum.Net, version 1.0, 15 October 2026. Constable Research, Leiden.

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Part I — Foundations

1. The Net and Play

Play is older than people. Rats chase each other, ravens slide down snow, and bumble bees roll balls. Humans built games, festivals, stages and screens on top of this old behaviour. To tell that history with one set of terms, this book uses the Vacuum.Net. This chapter gives the few terms the history needs. Later chapters refer back to them.

One strand and five rules

The Vacuum.Net starts from movement, not from things or numbers. There is exactly one strand. It moves and returns. Every distinction is a loop of this strand. Five rules fix how it behaves.[2][3]

- N1. There is exactly one strand.
- N2, closure. A loop persists only if it closes. What does not close passes on as tension.
- N3. The first passage through a point fixes a direction.
- N4. The response of the medium depends on its state.
- N5. Coarse blocks of the strand obey the same rules again.

Closure is the central idea. It separates what stays from what moves on. The short form of the rule is: only what closes, stays.

Trits: three directions

Each step of the strand is a trit. A trit is not an amount. It is a direction. The strand goes forward, stands still, or goes back. The book writes these as R, O and L, and counts them as +1, 0 and −1 when it needs to add them.[4]

Three steps in a row form a window. A window is closed when its three steps add to zero, counted in threes. Of the 27 possible windows, 9 are closed.[5]

Three closed windows hold one step three times: RRR, OOO and LLL. Counted in threes, each adds to zero. This is the form of a crystal. Nothing changes and nothing moves on. Six closed windows hold all three steps once: forward, still and back in some order. The content changes while the window stays closed. This is the form of metabolism.[6]

An open window carries tension. It does not stay. Its tension passes on to the next window. This is not a defect. Tension is what drives the strand forward.

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[2] [1] Konstapel, J. (2026). Vacuum.Net Theory, Ninth Edition: Foundations 9.2 and Physics 9.0. Constable Research, Leiden.

[3] [2] Konstapel, J. (2026). The Trit Tile: a reference work on a number system that never settles, version 1.1, 21 November 2026. Constable Research, Leiden.

[4] [1] Konstapel, J. (2026). Vacuum.Net Theory, Ninth Edition: Foundations 9.2 and Physics 9.0. Constable Research, Leiden.

[5] [3] Konstapel, J. (2026). The History of Culture on the Net: A Reference Work on Human Culture and the Vacuum.Net, version 1.0, 15 October 2026. Constable Research, Leiden.

[6] [3] Konstapel, J. (2026). The History of Culture on the Net: A Reference Work on Human Culture and the Vacuum.Net, version 1.0, 15 October 2026. Constable Research, Leiden.

The edge

Where a closed form meets its surroundings, its windows stand open. Tension gathers at the edge, and rest lies inside. In a cell this edge is the membrane. In a handaxe it is the cutting edge.[7] In amusement it is the boundary of the playground, the stage and the stadium. Chapter 2 returns to this edge as Huizinga's magic circle.

The ladder

The strand repeats on larger and larger scales (N5). Each step up is a factor of three. This gives a ladder. Every length and every time has a position on it. The position of a time is the logarithm, base 3, of the time over 1.520655×10^{-16} s. The day stands at 43.50, the year at 48.87, a generation of 26.9 years at 51.87.[8]

Two ladders are basic: doubling and tripling. No power of 2 equals a power of 3. They come close at the closure depths 1, 2, 5, 12, 41, 53 and 306. These are the denominators of the best fractions for the logarithm of 3 in base 2. At depth 12 the miss is the Pythagorean comma: $3^{12} / 2^{19} = 531{,}441 / 524{,}288 = 1.0136$.[9] Layer 53 of the time ladder is 93.4 years long.[10]

Layer	Years	Half layer	Years
50	3.46	50.5	5.99
51	10.38	51.5	17.98
52	31.13	52.5	53.93
53	93.40	53.5	161.8
54	280.2	54.5	485.3
55	840.6	55.5	1,456
56	2,522	56.5	4,368

Table 1.1. The layers of the time ladder that frame human history. Each layer is three times the one above it.[11]

The trit tile: closing and turning

One small object shows what closure does when it is applied over and over. Put trits in the plane. Take a point of the triangular lattice. Subtract a step so that the result divides by the base $1 - \omega$, and divide. Repeat. Some points reach 0. They close. All other points end in one of two points that turn forever.[12]

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[7] [3] Konstapel, J. (2026). The History of Culture on the Net: A Reference Work on Human Culture and the Vacuum.Net, version 1.0, 15 October 2026. Constable Research, Leiden.

[8] [3] Konstapel, J. (2026). The History of Culture on the Net: A Reference Work on Human Culture and the Vacuum.Net, version 1.0, 15 October 2026. Constable Research, Leiden.

[9] [1] Konstapel, J. (2026). Vacuum.Net Theory, Ninth Edition: Foundations 9.2 and Physics 9.0. Constable Research, Leiden.

[10] [3] Konstapel, J. (2026). The History of Culture on the Net: A Reference Work on Human Culture and the Vacuum.Net, version 1.0, 15 October 2026. Constable Research, Leiden.

[11] [3] Konstapel, J. (2026). The History of Culture on the Net: A Reference Work on Human Culture and the Vacuum.Net, version 1.0, 15 October 2026. Constable Research, Leiden.

[12] [2] Konstapel, J. (2026). The Trit Tile: a reference work on a number system that never settles, version 1.1, 21 November 2026. Constable Research, Leiden.

The share of turning points does not settle. It swings between about 29.6 % and 32.0 %. The swing repeats exactly each time the scale grows by a factor of 3. The plain average does not exist. A weighted, logarithmic average does: 30.89 %. This is proved, with a computer-assisted certificate.[13]

In the language of category theory, the points that close form an initial algebra: everything reached in finitely many steps. The tile with all infinite trit streams is a final coalgebra: everything that unfolds forever. The theorem measures the gap between the two. The rhythm lives in that gap.[14]

Five forms used in this book

The History of Culture on the Net found five forms that recur in culture.[15] They recur in amusement as well.

1. What closes, stays. A game, rite or show lasts only if it closes for its players and audience.

2. The form lasts, and its carriers are replaced. Players die, the game goes on.

3. The residue of one depth becomes the alphabet of the next. Old forms become the parts of new ones.

4. A new kind of union opens once and is then filled many times. The first board, the first stage, the first screen is followed by thousands of copies.

5. Reading keeps the relations and drops the rest. A game crosses borders when its rules travel and its local details fall away.

Play read in the net

Four readings follow from these terms. They are readings, not proofs. Each is tested in later chapters against the history.

Play is a closed window held apart. A playground is a place where steps may be tried without passing tension on to ordinary life. The boundary of the game is a closure boundary.

A finite game is an orbit that closes. It is played until someone wins. Then it reaches 0 and stops. An infinite game is an orbit that keeps turning. It is played to continue the play.[16] The trit tile shows that both kinds always exist side by side, and that the share of turning orbits swings and never settles.[17]

A story is a sequence of directions. Forward is action. Standing still is rest, the pause Japanese aesthetics calls ma. Back is return: memory, repetition, the old hero coming home. A story that holds all three in its windows is metabolic. It can run for a long time. A story with only one direction is a crystal or an open line.

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[13] [2] Konstapel, J. (2026). The Trit Tile: a reference work on a number system that never settles, version 1.1, 21 November 2026. Constable Research, Leiden.

[14] [2] Konstapel, J. (2026). The Trit Tile: a reference work on a number system that never settles, version 1.1, 21 November 2026. Constable Research, Leiden.

[15] [3] Konstapel, J. (2026). The History of Culture on the Net: A Reference Work on Human Culture and the Vacuum.Net, version 1.0, 15 October 2026. Constable Research, Leiden.

[16] [9] Carse, J. P. (1986). Finite and Infinite Games: A Vision of Life as Play and Possibility. New York: Free Press.

[17] [2] Konstapel, J. (2026). The Trit Tile: a reference work on a number system that never settles, version 1.1, 21 November 2026. Constable Research, Leiden.

Amusement lives at the edge. It needs a boundary, a stage or a screen, where tension can be shown and then released. When the edge breaks, play turns into something else: war, addiction or work.

What this chapter claims

The rules, the ladder and the theorem of the trit tile are taken from the cited works. The four readings of play are this book's own. Part III tests the rhythms they predict against measured data.

2. What Amusement Is

Five thinkers gave the terms that most studies of play still use. A Dutch historian in Leiden defined play. A French sociologist sorted it. A Russian literary scholar found its social form in carnival. An American philosopher split it into finite and infinite games. Two American consultants put a price on it. This chapter gives each in turn and then reads them together in the terms of chapter 1.

Huizinga: play makes order (1938)

Johan Huizinga published Homo Ludens in Dutch in 1938.[18] He was then a professor of history at Leiden. His claim was strong. Play is not a product of culture. Culture arises in and as play. Animals played before humans did.

Huizinga named the marks of play. Play is free. It stands outside ordinary life as "not serious", yet it absorbs the player fully. It proceeds within its own boundaries of time and place. It creates order, and it demands order.[19][20]

To mark the boundary he used an image: the magic circle. All play moves within a playground marked off beforehand, materially or in the mind. The arena, the card table, the stage and the court are temporary worlds within the ordinary world, dedicated to an act apart.[21] Inside the circle the rules hold. Outside it they do not.

Reading. The magic circle is a closure boundary. Inside it, steps may be tried and taken back without passing tension on to ordinary life. Huizinga's "order" is closure: a game is played until its windows close. His freedom is the voluntary entry into the circle.

The year 1938 stands at position 52.95 on the ladder, measured as an age from 2026. That is almost exactly layer 53 (93.4 years).

Caillois: four kinds and one axis (1958)

Roger Caillois answered Huizinga twenty years later, in Les jeux et les hommes (1958).[22] He found Huizinga too narrow. Huizinga had looked mainly at contest. Caillois sorted all play into four kinds.

Kind	Meaning	Example	Reading in the net
Agon	Competition; equal chances, the best wins	Chess, football, a race	A finite game: the orbit closes when someone wins
Alea	Chance; the player gives up control to fate	Dice, lottery, roulette	An open window closed from outside, by the throw

[18] [6] Huizinga, J. (1938). Homo Ludens: Proeve eener bepaling van het spel-element der cultuur. Haarlem: Tjeenk Willink. English edition: Homo Ludens: A Study of the Play-Element in Culture. London: Routledge & Kegan Paul, 1949; Boston: Beacon, 1955.

[19] [6] Huizinga, J. (1938). Homo Ludens: Proeve eener bepaling van het spel-element der cultuur. Haarlem: Tjeenk Willink. English edition: Homo Ludens: A Study of the Play-Element in Culture. London: Routledge & Kegan Paul, 1949; Boston: Beacon, 1955.

[20] [7] Stenros, J. (2014). In Defence of a Magic Circle: The Social, Mental and Cultural Boundaries of Play. Transactions of the Digital Games Research Association 1(2).

[21] [7] Stenros, J. (2014). In Defence of a Magic Circle: The Social, Mental and Cultural Boundaries of Play. Transactions of the Digital Games Research Association 1(2).

[22] [8] Caillois, R. (1958). Les jeux et les hommes. Paris: Gallimard. English: Man, Play and Games, trans. M. Barash. New York: Free Press, 1961; Urbana: University of Illinois Press, 2001.

Kind	Meaning	Example	Reading in the net
Mimicry	Make-believe; the player becomes someone else	Theatre, masks, cosplay	Reading keeps the relations and drops the rest: the mask
Ilinx	Vertigo; a pleasant panic of the senses	Swings, dance, roller coasters	Tension held at the edge without breaking the window

Table 2.1. Caillois's four kinds of play, with a reading of each in the terms of chapter 1.[23]

Caillois added an axis. At one end lies paidia: free, spontaneous, unruly play. At the other lies ludus: play with explicit rules. Human play tends to turn paidia into ludus. The rules, once fixed, come under the pressure of paidia again. Caillois used this endless making and remaking of rules to explain why cultures are unstable.[24]

Reading. Paidia is open; ludus is closed. The movement from one to the other never settles. This is the behaviour the trit tile proves for its own system: the share of what closes swings and does not converge.[25] Caillois saw a rhythm where the tile measures one.

Bakhtin: carnival (1940, 1965)

Mikhail Bakhtin finished his book on Rabelais in 1940. It could not be published. It was defended as a dissertation in Moscow and printed only in 1965. The English translation, Rabelais and His World, followed in 1968.[26]

Bakhtin found two layers in Rabelais. One was carnival, which he treated as a social institution. The other was grotesque realism, a literary mode centred on the open, eating, laughing body. Carnival, he wrote, is not a spectacle seen by a crowd. It belongs to the borderline between art and life. It is life itself, shaped according to a pattern of play.[27]

In carnival the ranks were suspended. The fool was crowned. Laughter faced death and fear. Then the feast ended and the order returned.

The author of this book met Bakhtin through Will McWhinney and wrote about him in 2007.[28] That text read Bakhtin's chronotope, the knot where time and space meet in a story, as a topological knot. It proposed a cycle of Western chronotopes of about 250 years: the romance of fate from 1200, the adventure from 1450, the biography from 1700, and a return to folklore from 1950. It predicted a

[23] [8] Caillois, R. (1958). Les jeux et les hommes. Paris: Gallimard. English: Man, Play and Games, trans. M. Barash. New York: Free Press, 1961; Urbana: University of Illinois Press, 2001.

[24] [8] Caillois, R. (1958). Les jeux et les hommes. Paris: Gallimard. English: Man, Play and Games, trans. M. Barash. New York: Free Press, 1961; Urbana: University of Illinois Press, 2001.

[25] [2] Konstapel, J. (2026). The Trit Tile: a reference work on a number system that never settles, version 1.1, 21 November 2026. Constable Research, Leiden.

[26] [10] Bakhtin, M. M. (1965). Tvorchestvo Fransua Rable i narodnaya kul'tura srednevekov'ya i Renessansa. Moscow. English: Rabelais and His World, trans. H. Iswolsky. Cambridge, MA: MIT Press, 1968. New translation by S. Sandler, 2025.

[27] [10] Bakhtin, M. M. (1965). Tvorchestvo Fransua Rable i narodnaya kul'tura srednevekov'ya i Renessansa. Moscow. English: Rabelais and His World, trans. H. Iswolsky. Cambridge, MA: MIT Press, 1968. New translation by S. Sandler, 2025.

[28] [4] Konstapel, J. (2007). The Wordwide Carnival: An Introduction into the World of Mikhail Bakhtin. constable.blog, 2 September 2007. https://constable.blog/2007/09/02/wordwide-carnival-introduction-world-mikhail-bakhtin/

heteroglossic century of many voices and a "worldwide carnival of fools", in which people choose masks and listen to other cultures.[29]

Reading. Carnival is a closed window held open for a fixed time. Its windows hold all three directions: the order goes back, the fool goes forward, the city stands still for the feast. It is metabolic, and it closes on a date. Twenty-five years passed between Bakhtin's writing and his publication. That span stands at 51.80, close to the Kuznets swing and to half layer 51.5.

Carse: finite and infinite games (1986)

James P. Carse opened his small book of 1986 with two sentences that are now often quoted. There are at least two kinds of games. A finite game is played for the purpose of winning, an infinite game for the purpose of continuing the play.[30]

Finite games have fixed rules and clear boundaries in time, space and players. They end when the players agree who has won. Infinite games change their rules so that no one can win and end them. Finite players play within boundaries; infinite players play with boundaries.[31]

Reading. This is the split of the trit tile. The finite game is the orbit that reaches 0. The infinite game is the orbit that turns forever. The tile adds two facts that Carse did not have. Both kinds always exist side by side. And the share of infinite play, counted over a growing field, never settles but swings with a fixed period.[32]

The author used Carse's idea in 2022, in a forecast that society was turning into a society of play.[33] That text joined the infinite game to Andreas Reckwitz's "society of singularities", in which unique events, places and persons turn into stories and myths.

Pine and Gilmore: the experience economy (1998)

In 1998 B. Joseph Pine II and James H. Gilmore published "Welcome to the Experience Economy" in the Harvard Business Review.[34] Their claim was economic. After commodities, goods and services comes a fourth offering: the experience. Customers pay for a memorable event, and the memory is the product. A fifth stage, the transformation, charges for the change the experience brings about.[35]

Reading. Pine and Gilmore described the moment when amusement left the edge of the economy and moved to its centre. In the terms of this book, it is the moment when the closed window of play became the unit of trade. Chapters 18 to 21 follow what this did to the industry.

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[29] [4] Konstapel, J. (2007). The Wordwide Carnival: An Introduction into the World of Mikhail Bakhtin. constable.blog, 2 September 2007. https://constable.blog/2007/09/02/wordwide-carnival-introduction-world-mikhail-bakhtin/

[30] [9] Carse, J. P. (1986). Finite and Infinite Games: A Vision of Life as Play and Possibility. New York: Free Press.

[31] [9] Carse, J. P. (1986). Finite and Infinite Games: A Vision of Life as Play and Possibility. New York: Free Press.

[32] [2] Konstapel, J. (2026). The Trit Tile: a reference work on a number system that never settles, version 1.1, 21 November 2026. Constable Research, Leiden.

[33] [5] Konstapel, J. (2022). van SamenLeving naar SamenSpeling (Singularity). constable.blog, 2 August 2022. https://constable.blog/2022/08/02/singularity/

[34] [11] Pine, B. J. II and Gilmore, J. H. (1998). Welcome to the Experience Economy. Harvard Business Review, July-August 1998 (reprint 98407). Book: The Experience Economy, Harvard Business School Press, 1999.

[35] [11] Pine, B. J. II and Gilmore, J. H. (1998). Welcome to the Experience Economy. Harvard Business Review, July-August 1998 (reprint 98407). Book: The Experience Economy, Harvard Business School Press, 1999.

Five thinkers on one ladder

Work	Year	Age position	Main term
Huizinga, Homo Ludens	1938	52.95	magic circle
Bakhtin, Rabelais (written)	1940	52.92	carnival
Caillois, Les jeux et les hommes	1958	52.71	agon, alea, mimicry, ilinx
Bakhtin, Rabelais (published)	1965	52.61	carnival
Carse, Finite and Infinite Games	1986	52.23	infinite game
Pine and Gilmore, Experience Economy	1998	51.90	experience

Table 2.2. The founding works on play and amusement, with their age in 2026 as a position on the time ladder.

All six lie between layer 52 (31 years) and layer 53 (93 years) in age. The theory of play is young compared with play itself. Chapter 3 shows that play is older than the human species by hundreds of millions of years.

A working definition

This book uses one definition, built from the five. Amusement is a voluntary activity, set apart by a boundary in place or time, in which tension is raised and released for its own sake. It can be a finite game that closes, or an infinite game that keeps turning. It can be played, watched or both.

The definition has the advantage that it can be counted. A boundary has a size. An event has a duration. An audience has a number. A form has a lifetime. Each of these can be placed on the ladder. That is what the remaining chapters do.

Part II — The History

3. Play Before Humans

Huizinga opened his book with a plain fact: animals played before humans did.[36] Research since then has pushed play far down the tree of life. It has been recorded in mammals, birds, reptiles, fish and, since 2022, in an insect. This chapter gives the measured cases. It also gives the test that decides whether a behaviour counts as play.

The test: five criteria

For a long time play was a "garbage pail" category in animal behaviour. Anything without an obvious function could be called play. Gordon Burghardt changed this in The Genesis of Animal Play (2005).[37] He set five criteria. Each must be met, in at least one respect, before a behaviour is called play.

He summed them up in one sentence: play is repeated behaviour that is incompletely functional in the context or at the age in which it is performed, and is initiated voluntarily when the animal or person is in a relaxed or low-stress setting.[38]

Criterion	Short form	Reading in the net
1	Not fully functional in its context	Steps tried without passing tension on
2	Spontaneous, voluntary, rewarding in itself	Entry into the circle is free
3	Differs from serious behaviour in form or timing	Exaggerated or incomplete windows
4	Repeated, but not in a rigid stereotype	Metabolic, not a crystal
5	Occurs when the animal is fed, safe and healthy	The edge is secure

Table 3.1. Burghardt's five criteria for play,[39] with a reading of each.

Criterion 4 is worth a note. Burghardt separates play from stereotypy, the rigid repeated movement of a stressed animal in a cage. In the terms of chapter 1 a stereotypy is a crystal: one step, three times, forever. Play repeats too, but it varies. Its windows hold all three directions. It is metabolic.

Criterion 5 is the edge. Play happens only when the boundary is safe. A hungry, hunted or sick animal does not play. The magic circle needs a quiet surround.

Reptiles: Pigface

Burghardt came to his criteria through a turtle. At the National Zoo in Washington he watched Pigface, a Nile softshell turtle, batting a basketball around its tank. "I realized reptiles play, too," he said.[40] Pigface became the case that opened the study of play in animals far from mammals.

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[36] [6] Huizinga, J. (1938). Homo Ludens: Proeve eener bepaling van het spel-element der cultuur. Haarlem: Tjeenk Willink. English edition: Homo Ludens: A Study of the Play-Element in Culture. London: Routledge & Kegan Paul, 1949; Boston: Beacon, 1955.

[37] [12] Burghardt, G. M. (2005). The Genesis of Animal Play: Testing the Limits. Cambridge, MA: MIT Press.

[38] [12] Burghardt, G. M. (2005). The Genesis of Animal Play: Testing the Limits. Cambridge, MA: MIT Press.

[39] [12] Burghardt, G. M. (2005). The Genesis of Animal Play: Testing the Limits. Cambridge, MA: MIT Press.

[40] [12] Burghardt, G. M. (2005). The Genesis of Animal Play: Testing the Limits. Cambridge, MA: MIT Press.

Insects: bumble bees and balls (2022)

In 2022 a team at Queen Mary University of London, led by Lars Chittka, asked whether bumble bees play.[41] The species was the buff-tailed bumble bee, Bombus terrestris. The test followed Burghardt's criteria.

In one experiment, 45 bees could walk from their nest to a feeding area along a path. Beside the path lay 18 coloured wooden balls. The bees did not need the balls. They received no food for touching them. Yet many bees climbed onto the balls and rolled them across the floor. Individual bees rolled balls between 1 and 117 times over the experiment. Younger bees rolled more balls than older bees. Males rolled them for longer than females.[42]

The authors concluded that ball rolling meets the criteria for object play. It was voluntary, spontaneous, repeated and without reward. It is the first such evidence in an insect.[43]

Reading. The same pattern holds as in mammals: the young play most. Play is a form of practice. Steps are tried at an age when their tension can still be absorbed.

Rats: laughter (2003)

Jaak Panksepp and Jeff Burgdorf found that young rats chirp when they play and when a human hand tickles them. The chirps are ultrasonic, at about 50 kHz, far above human hearing. The most ticklish rats were also the most playful. Panksepp and Burgdorf proposed that these chirps are an ancestor of human laughter.[44]

The period of a 50 kHz tone is 1/50,000 s = 2×10^{-5} s. On the time ladder it stands at 23.30. That is about 20 steps, a factor of 3^{20} or 3.5 billion, below the day.

Rats: hide-and-seek (2019)

In 2019 Annika Reinhold, Michael Brecht and colleagues at the Humboldt University in Berlin taught rats to play hide-and-seek with a human.[45] Six adolescent male rats took part. The games ran when the rats were between 5 and 23 weeks old. A rat that started in a closed box was the seeker. A rat that started in an open box had to hide.

The rats learned the rules within weeks. They played with strategy: they searched first in places where the human had hidden before, and they kept quiet while hiding. When they won they jumped

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[41] [13] Galpayage Dona, H. S., Solvi, C., Kowalewska, A., Makela, K., et al., with Chittka, L. (2022). Do bumble bees play? Animal Behaviour 194, 239-251. DOI 10.1016/j.anbehav.2022.08.013

[42] [13] Galpayage Dona, H. S., Solvi, C., Kowalewska, A., Makela, K., et al., with Chittka, L. (2022). Do bumble bees play? Animal Behaviour 194, 239-251. DOI 10.1016/j.anbehav.2022.08.013

[43] [13] Galpayage Dona, H. S., Solvi, C., Kowalewska, A., Makela, K., et al., with Chittka, L. (2022). Do bumble bees play? Animal Behaviour 194, 239-251. DOI 10.1016/j.anbehav.2022.08.013

[44] [15] Panksepp, J. and Burgdorf, J. (2003). 'Laughing' rats and the evolutionary antecedents of human joy? Physiology & Behavior 79 (2003). PubMed 12954448.

[45] [14] Reinhold, A. S., Sanguinetti-Scheck, J. I., Hartmann, K. and Brecht, M. (2019). Behavioral and neural correlates of hide-and-seek in rats. Science 365(6458), 1180-1183. DOI 10.1126/science.aax4705

and called. The researchers recorded activity in the prefrontal cortex during the games and found consistent patterns at specific moments of play.[46]

Reading. Hide-and-seek holds the three directions in one round. The seeker goes forward. The hider stands still. The finding sends both back to the start. It is a finite game that closes in each round and an infinite game across rounds: the rats asked to play again.

Measured cases

Case	Measure	Value	Position	Source
Rat play chirp	period of 50 kHz	2×10^{-5} s	23.30 (time)	
Bumble bee ball play	bees tested	45	—	
Bumble bee ball play	balls on the path	18	—	
Bumble bee ball play	rolls per bee	1–117	—	
Rat hide-and-seek	rats	6	—	
Rat hide-and-seek	age range	5–23 weeks	46.74–48.12 (time)	

Table 3.2. Measured cases of animal play.

What the animals show

Three points carry into the human history.

First, play is old and wide. It is found where nervous systems can try steps without immediate need. It does not need language.

Second, play needs safety. Burghardt's fifth criterion is the edge of chapter 1. Every later form of amusement, from the festival to the theme park, spends much of its effort on securing that edge.

Third, the young play most. Human amusement keeps this pattern. Chapter 13 shows that the largest audience for anime today is under thirty.

[46] [14] Reinhold, A. S., Sanguinetti-Scheck, J. I., Hartmann, K. and Brecht, M. (2019). Behavioral and neural correlates of hide-and-seek in rats. Science 365(6458), 1180-1183. DOI 10.1126/science.aax4705

4. The First Players

Play leaves few traces. A chase, a song or a dance vanishes when it ends. What survives is the hardware of play: an instrument, a die, a board. This chapter follows those objects from the first flutes to the first game boards of the Neolithic. It ends where writing begins.

The first instruments: Geissenklösterle and Hohle Fels

In the Swabian Jura of southern Germany, caves of the Aurignacian culture hold the oldest known musical instruments. At Geissenklösterle Cave excavators found flutes made from swan bone and from mammoth ivory. In 2012 a team led by Tom Higham at Oxford dated bones from the same layers with an improved radiocarbon method. The result was 42,000 to 43,000 years ago, two to three thousand years older than earlier estimates.[47]

Nearby, at Hohle Fels, a flute made from the radius bone of a vulture carries five finger holes. It is about 35,000 years old.[48] The flutes were found in caves that also hold the oldest known figurative art.[49] Music and image appear together.

Researchers have proposed that music may have helped the first modern humans in Europe to keep larger social networks.[50] That is a function. But music made by a group at a fire also meets Burghardt's criteria for play. It is repeated, voluntary, not needed for survival in the moment, and made in a safe setting.

Find	Age	Position	Source
Geissenklösterle flutes	42,000–43,000 years	58.57–58.58	
Hohle Fels vulture-bone flute	about 35,000 years	58.39	

Table 4.1. The oldest instruments, with their ages placed on the time ladder.

Reading. A flute is a device that closes air into tones. A finger hole opens or closes a window. The player chooses which windows sound. The oldest surviving amusement object is therefore a device for choosing closures.

[47] [16] Higham, T., et al., with Conard, N. J. (2012). New radiocarbon chronology for Geissenkloesterle Cave and the beginnings of the Aurignacian. Journal of Human Evolution (2012); reported by the University of Oxford, 25 May 2012.

[48] [37] Wikipedia. Paleolithic flute. https://en.wikipedia.org/wiki/Bone_flute (secondary)

[49] [37] Wikipedia. Paleolithic flute. https://en.wikipedia.org/wiki/Bone_flute (secondary)

[50] [37] Wikipedia. Paleolithic flute. https://en.wikipedia.org/wiki/Bone_flute (secondary)

The first dice: Folsom, 12,800 years ago

Chance is one of Caillois's four kinds of play.[51] Its tool is the die. Until 2026 the oldest dice were placed in the Bronze Age of the Old World, around 3000 BCE.[52] In April 2026 Robert J. Madden of Colorado State University published a different answer in American Antiquity.[53]

Madden first built a test. He took 293 sets of historic Native American dice, recorded by the ethnographer Stewart Culin in 1907, and listed the features they share. Most are two-sided: flat or slightly rounded pieces of bone or wood, marked on one side. Thrown together, they land with the marked side up or down. The score is the number of marked sides showing. Madden called them binary lots.[54]

He then applied the test to objects from older sites. More than 600 ancient sets passed. The oldest come from Folsom-period sites in Wyoming, Colorado and New Mexico, dated to 12,800–12,200 years ago.[55] That is about 6,500 years before the first dice of the Old World. Madden read the dice as social tools: games of chance brought groups together to trade goods and news and to form alliances.[56]

Reading. A binary lot is the plainest randomiser there is: one throw, two outcomes. It is the strand reduced to forward or back. A set of them, thrown together, sums directions. It is a small machine for adding trits.

The first boards: the Neolithic Levant

Boards appear with farming. In 1966 Diana Kirkbride found stone slabs with rows of pits at Beidha, near Petra in Jordan.[57] Gary Rollefson later published a complete limestone board from 'Ain Ghazal, on the edge of Amman.[58] It measures about 39 × 23 cm at its widest.[59] Its rows of shallow pits resemble the boards of mancala, the "game of transferring" still played across Africa and the Middle East.[60]

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[51] [8] Caillois, R. (1958). Les jeux et les hommes. Paris: Gallimard. English: Man, Play and Games, trans. M. Barash. New York: Free Press, 1961; Urbana: University of Illinois Press, 2001.

[52] [26] Biblical Archaeology Society. Ancient games (Bible History Daily).

[53] [17] Madden, R. J. (2026). Probability in the Pleistocene: Origins and Antiquity of Native American Dice, Games of Chance, and Gambling. American Antiquity, published online 2 April 2026. Cambridge University Press.

[54] [17] Madden, R. J. (2026). Probability in the Pleistocene: Origins and Antiquity of Native American Dice, Games of Chance, and Gambling. American Antiquity, published online 2 April 2026. Cambridge University Press.

[55] [17] Madden, R. J. (2026). Probability in the Pleistocene: Origins and Antiquity of Native American Dice, Games of Chance, and Gambling. American Antiquity, published online 2 April 2026. Cambridge University Press.

[56] [17] Madden, R. J. (2026). Probability in the Pleistocene: Origins and Antiquity of Native American Dice, Games of Chance, and Gambling. American Antiquity, published online 2 April 2026. Cambridge University Press.

[57] [19] Jordan Times (2019-2022). Reports on Neolithic game boards in Jordan: Rollefson interviews and 'Jordanian scholar works to put the pieces together of Neolithic board games', 22 August 2022 (Mahasneh lecture).

[58] [18] Rollefson, G. O. (1992). A Neolithic Game Board from 'Ain Ghazal, Jordan. Bulletin of the American Schools of Oriental Research (1992).

[59] [38] Traditional Games (tradgames.org.uk). Neolithic games. https://www.tradgames.org.uk/games/neolithic-games.htm

[60] [18] Rollefson, G. O. (1992). A Neolithic Game Board from 'Ain Ghazal, Jordan. Bulletin of the American Schools of Oriental Research (1992).

More boards followed. Complete examples come from Beidha, 'Ain Ghazal, Es-Sifiya, Abu-Tulayha and Hamarash. At Abu-Tulayha alone, 25 limestone boards were recovered.[61] Similar slabs are known from Syria, the Sinai and Iran. Together they date to roughly 6,000 to 10,000 years ago; the Jordanian boards are placed around 7000 BCE.[62]

Not everyone accepts these slabs as boards. No rules survive. Some boards were found broken and discarded in ways that resemble the treatment of figurines at 'Ain Ghazal, which suggests a ritual use.[63] The line between game and rite was thin. Chapter 6 shows it remained thin for thousands of years.

Find	Age or size	Position	Source
Folsom binary lots	12,800–12,200 years	57.48–57.43	
Gap to first Old World dice	about 6,500 years	56.86	
'Ain Ghazal board, age	about 7000 BCE	57.16	
'Ain Ghazal board, length	0.39 m	14.53	
'Ain Ghazal board, width	0.23 m	14.05	
Abu-Tulayha boards	25	—	

Table 4.2. The first dice and boards.

Reading. A mancala board is a row of windows. Seeds are sown one by one into the pits and move around the board. A pit that ends with the right count is captured. The board is a strand of windows, and play is the movement of content through them while the board stays the same. That is the form of metabolism in chapter 1.

What the first players show

The hardware of play appears in three steps. The first is sound, 42,000 years ago. The second is chance, 12,800 years ago. The third is the board, about 9,000 years ago. On the ladder their ages stand at 58.6, 57.5 and 57.2. From sound to chance is about one layer, a factor of three in age.

Each object holds a boundary. The flute closes air. The die closes a throw. The board closes a field. Long before writing, people had built devices that set play apart from ordinary life. They had built the magic circle in bone, wood and stone.

[61] [19] Jordan Times (2019-2022). Reports on Neolithic game boards in Jordan: Rollefson interviews and 'Jordanian scholar works to put the pieces together of Neolithic board games', 22 August 2022 (Mahasneh lecture).

[62] [19] Jordan Times (2019-2022). Reports on Neolithic game boards in Jordan: Rollefson interviews and 'Jordanian scholar works to put the pieces together of Neolithic board games', 22 August 2022 (Mahasneh lecture).

[63] [19] Jordan Times (2019-2022). Reports on Neolithic game boards in Jordan: Rollefson interviews and 'Jordanian scholar works to put the pieces together of Neolithic board games', 22 August 2022 (Mahasneh lecture).

5. The First Games

With the first states came the first games whose names, boards and sometimes rules survive. They are race games: pieces run along a track, and the throw of sticks or dice decides how far. This chapter follows senet in Egypt and the Game of Twenty Squares in Mesopotamia, and the dice that drove them.

Senet: the game of passing

Senet is the Egyptian game of thirty squares, laid out in three rows of ten. Its name, znt, means "passing".[64] Two players move their pieces along the track.

Senet is often called the oldest board game. A careful review in the Board Game Studies Journal of 2021 tested that claim.[65] A clay table from the Predynastic period at el-Mahasna has been read as senet, but the case is weak. The earliest secure material is probably a set of twenty-five ivory squares from Tomb M1 at Abu Rawash, from the First Dynasty, about 3100–2900 BCE. Three of them carry markings like those of later senet boards. The first unequivocal picture of the game is in the tomb painting of the official Hesy-Re, from the Third Dynasty, 2686–2613 BCE. It shows senet beside two other games, mehen and "men".[66]

The game lasted. It was played for about two thousand years in Egypt.[67] Queen Nefertari, wife of Ramesses II, is painted at a senet board in her tomb, around 1295–1255 BCE.[68] A senet box with its pieces was buried with Tutankhamun.

Over time the game took on a second meaning. Spells for the dead name "playing the board-game senet" among the joys of the afterlife. The track became a picture of the soul's passage.[69]

Reading. Senet shows the thin line between play and rite again. A race game is a strand of windows with a start and an end. When the board becomes the path of the dead, the finite game of one evening becomes a figure of the infinite passage. The form lasts, and its carriers are replaced: the board stayed while its meaning changed.

The Royal Game of Ur

In the Royal Cemetery of Ur, in southern Iraq, Leonard Woolley found five game boards in the 1920s. The finest, of wood inlaid with shell, is now in the British Museum. It dates to about 2600–2400 BCE.[7071] The board has twenty squares, some marked with rosettes. The same game, often called the

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[64][21] Wikipedia. Senet. https://en.wikipedia.org/wiki/Senet (secondary)

[65][20] Board Game Studies Journal 15 (2021). Article on persistent factoids about senet. DOI 10.2478/bgs-2021-0002

[66][20] Board Game Studies Journal 15 (2021). Article on persistent factoids about senet. DOI 10.2478/bgs-2021-0002

[67][21] Wikipedia. Senet. https://en.wikipedia.org/wiki/Senet (secondary)

[68][21] Wikipedia. Senet. https://en.wikipedia.org/wiki/Senet (secondary)

[69][21] Wikipedia. Senet. https://en.wikipedia.org/wiki/Senet (secondary)

[70][23] British Museum (blog). Top 10 historical board games. https://www.britishmuseum.org/blog/top-10-historical-board-games

[71][22] Finkel, I. L. (2007). On the Rules for the Royal Game of Ur. In I. L. Finkel (ed.), Ancient Board Games in Perspective: Papers from the 1990 British Museum Colloquium. London: British Museum Press, 16-32.

Game of Twenty Squares, was played over half the ancient world for about three thousand years.[72] A board from Shahr-e Sokhta in eastern Iran measures 33.2 × 12.0 cm.[73]

How the game was played was unknown until the early 1980s. Then Irving Finkel, curator of cuneiform at the British Museum, read a clay tablet that had been in the museum's stores since 1880. It was written in 177 BCE by a Babylonian scribe and astronomer, Itti-Marduk-balāṭu. It describes the rules of the game as played in the second century BCE, including betting.[74][75] From it Finkel reconstructed a playable game.

The rules tablet is about 2,400 years younger than the Ur board. The game survived longest in Kochi, in southern India, where a form of it was still played in the 1950s.[76]

Case	Date or size	Position	Source
Senet: Abu Rawash ivory squares	c. 3100 BCE	56.65	
Senet: Hesy-Re painting	2686–2613 BCE	56.56	
Senet in Egypt	about 2,000 years	55.79	
Ur board	2600–2400 BCE	56.55–56.51	
Ur board to rules tablet	about 2,423 years	55.96	
Ur board to last play in Kochi	about 4,550 years	56.54	
Shahr-e Sokhta board, length	0.332 m	14.38	
Shahr-e Sokhta board, width	0.120 m	13.46	

Table 5.1. Senet and the Game of Twenty Squares.

Reading. The Game of Twenty Squares is a form that crossed borders for three thousand years. It reached Egypt, Crete, Sri Lanka and India.[77] Its rules travelled. Its local meanings fell away. This is the fifth form of chapter 1: reading keeps the relations and drops the rest. A game is one of the most portable things a culture makes, because its relations are few and exact.

[72] [39] Wikipedia. Royal Game of Ur. https://en.wikipedia.org/wiki/Royal_Game_of_Ur (secondary); J. Paul Getty Museum, 'Adventures with the Royal Game of Ur' (Finkel lecture notice).

[73] [25] Encyclopaedia Iranica. Board games in pre-Islamic Persia (entry). https://www.iranicaonline.org

[74] [22] Finkel, I. L. (2007). On the Rules for the Royal Game of Ur. In I. L. Finkel (ed.), Ancient Board Games in Perspective: Papers from the 1990 British Museum Colloquium. London: British Museum Press, 16-32.

[75] [23] British Museum (blog). Top 10 historical board games. https://www.britishmuseum.org/blog/top-10-historical-board-games

[76] [22] Finkel, I. L. (2007). On the Rules for the Royal Game of Ur. In I. L. Finkel (ed.), Ancient Board Games in Perspective: Papers from the 1990 British Museum Colloquium. London: British Museum Press, 16-32.

[77] [39] Wikipedia. Royal Game of Ur. https://en.wikipedia.org/wiki/Royal_Game_of_Ur (secondary); J. Paul Getty Museum, 'Adventures with the Royal Game of Ur' (Finkel lecture notice).

Dice and throw sticks

Race games need a randomiser. In Egypt it was the throw stick, flat on one side and rounded on the other, used since the Predynastic period, before 3100 BCE.[78] It is a binary lot, the same device as the Folsom dice of chapter 4.

Cubic dice with six faces appear in the second half of the third millennium BCE. The earliest come from the Indus Valley and from Early Dynastic III Mesopotamia, about 2500–2300 BCE.[79] The Metropolitan Museum places the origin of cubic dice most probably in the Indus Valley.[80] Before them, and beside them, people threw astragali: the knucklebones of sheep and goats. A knucklebone has four sides on which it can land.[81]

At Shahr-e Sokhta, the "Burnt City" in Sistan, a snake-shaped board was found, and in 2004 another board was reported together with two cubic dice.[82]

Randomiser	Faces	Oldest secure date	Source
Binary lot (Folsom)	2	12,800 years ago	
Throw stick (Egypt)	2	before 3100 BCE	
Knucklebone (astragalus)	4	early, undated	
Cubic die (Indus, Mesopotamia)	6	c. 2500–2300 BCE	

Table 5.2. The randomisers of the early games.

Reading. The randomisers grow from two faces to four to six. Two faces give forward or back. Six faces give three pairs of opposite faces. A cubic die is three axes, each with two directions. It is a device with three dimensions of the strand.

Games travel with trade

The Metropolitan Museum notes that Egypt and the Near East shared games through military campaigns and trade.[83] The Game of Twenty Squares appears in Egypt; senet boards appear in the Levant. Boards travelled with merchants and soldiers.

This is the fourth form of chapter 1. A new kind of union opens once and is then filled many times. The race game was invented once, or a few times, and then copied over half the ancient world. Each copy is a closed window that can be carried in a bag.

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[78] [24] Metropolitan Museum of Art. Board Games from Ancient Egypt and the Near East (essay). https://www.metmuseum.org/essays/board-games-from-ancient-egypt-and-the-near-east

[79] [26] Biblical Archaeology Society. Ancient games (Bible History Daily).

[80] [24] Metropolitan Museum of Art. Board Games from Ancient Egypt and the Near East (essay). https://www.metmuseum.org/essays/board-games-from-ancient-egypt-and-the-near-east

[81] [26] Biblical Archaeology Society. Ancient games (Bible History Daily).

[82] [25] Encyclopaedia Iranica. Board games in pre-Islamic Persia (entry). https://www.iranicaonline.org

[83] [24] Metropolitan Museum of Art. Board Games from Ancient Egypt and the Near East (essay). https://www.metmuseum.org/essays/board-games-from-ancient-egypt-and-the-near-east

What the first games show

The first games join the three devices of chapter 4. They have a board, a randomiser and, at last, rules that someone wrote down. They are finite games: each round ends when a player brings all pieces home. Yet the games themselves turned into infinite games. Senet ran for two thousand years. The Game of Twenty Squares ran for more than four thousand.

That is the split of chapter 1 in one object. The round closes. The game turns.

6. Festival, Contest and Stage

In the first cities play moved into public space. Three forms grew up within a thousand years of each other, on two continents. In Mesoamerica people built courts for a game with a rubber ball. In Greece they held contests at the sanctuary of Olympia. In Athens they turned a festival for Dionysus into the first theatre. Each form drew a boundary around a public space and filled it with tension that could be watched.

The rubber ball: Mesoamerica

The Mesoamerican ballgame is the oldest team sport whose courts survive. Its ball was solid rubber, made from native rubber-producing plants, a material unknown in Europe before the Spanish arrived.[84]

The earliest evidence is double. At El Manatí, on the Gulf Coast of Mexico, Ponciano Ortíz and María del Carmen Rodríguez found rubber balls dated to about 1600 BCE. Their size matches the balls of the game, though they may also be offerings. At Paso de la Amada, in the Soconusco lowlands along the Pacific coast, Warren Hill, Michael Blake and John Clark excavated a ballcourt dated to about 1400 BCE.[85]

The game spread through Mesoamerica and was still played when the Spanish arrived. It is played in some regions today.[86] Rules varied by place and period. The largest known court, at Chichén Itzá, is 96.5 m long and 30 m wide. The Dominican friar Diego Durán wrote that one aim of the Aztec game was to keep the ball in constant motion. In some forms, players tried to send the ball through stone rings set high on the side walls.[87] The Spanish were so taken with the Aztec game that they sent a team of players to Spain to play before the court of Charles V.[88]

The game also carried ritual meaning. Stone yokes, hachas and palmas carved for the game, too heavy to wear in play, were made as ceremonial objects.[89]

Reading. "Keep the ball in constant motion" is an infinite game inside a finite one. The match ends, but within it the aim is that the ball never comes to rest. The rubber ball is the first object built to bounce: it stores tension and gives it back. It is a material version of the open window that passes its tension on.

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[84] [27] Metropolitan Museum of Art. The Mesoamerican Ballgame (essay). https://www.metmuseum.org/essays/the-mesoamerican-ballgame

[85] [27] Metropolitan Museum of Art. The Mesoamerican Ballgame (essay). https://www.metmuseum.org/essays/the-mesoamerican-ballgame

[86] [27] Metropolitan Museum of Art. The Mesoamerican Ballgame (essay). https://www.metmuseum.org/essays/the-mesoamerican-ballgame

[87] [27] Metropolitan Museum of Art. The Mesoamerican Ballgame (essay). https://www.metmuseum.org/essays/the-mesoamerican-ballgame

[88] [27] Metropolitan Museum of Art. The Mesoamerican Ballgame (essay). https://www.metmuseum.org/essays/the-mesoamerican-ballgame

[89] [27] Metropolitan Museum of Art. The Mesoamerican Ballgame (essay). https://www.metmuseum.org/essays/the-mesoamerican-ballgame

The contest: Olympia

The Olympic Games were held at the sanctuary of Zeus at Olympia, in the western Peloponnese. The first recorded victor won the stade, a foot race of one length of the track, in 776 BCE. He was Koroibos, or Coroebus, a cook from the nearby city of Elis.[90] The stade measured about 192 m. The word survives in "stadium".[91]

The games began small. Until 684 BCE they lasted one day, with only the foot race. Then they grew to three days and later to five.[92] Longer races, wrestling, boxing, the pentathlon and chariot races were added over the following centuries. At their height the games drew perhaps 40,000 spectators.[93] About eight hundred victors are known by name.[94]

The games were held every four years. The four-year period, the Olympiad, became a unit for counting time across the Greek world. They continued for more than a thousand years, until about 393 CE, when the emperor Theodosius I ended the cult practices to which they belonged.[95] The modern Olympics began in Athens in 1896.[96]

Case	Measure	Position	Source
First recorded Olympic victor	776 BCE	56.10 (age)	
Stade race	about 192 m	20.17 (length)	
One-day games, 776–684 BCE	92 years	52.99	
Festival of three days	3 days	44.50	
Festival of five days	5 days	44.96	
Olympiad	4 years	50.13	
Ancient games, 776 BCE–393 CE	about 1,169 years	55.30	
Gap to the modern games, 393–1896	about 1,503 years	55.53	

Table 6.1. The Olympic Games on the ladder.

Two positions are worth noting. The games stayed a one-day event for 92 years, which stands at 52.99, almost exactly layer 53 (93.4 years). And the gap between the end of the ancient games and the first modern games, about 1,500 years, stands at 55.53, close to half layer 55.5. These are observations, not proofs. They are entered in the catalogue for the test of chapter 20.

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[90] [28] Encyclopaedia Britannica. Ancient Olympic Games. https://www.britannica.com/sports/ancient-Olympic-Games

[91] [28] Encyclopaedia Britannica. Ancient Olympic Games. https://www.britannica.com/sports/ancient-Olympic-Games

[92] [29] Guinness World Records. First Olympic Games.

[93] [29] Guinness World Records. First Olympic Games.

[94] [28] Encyclopaedia Britannica. Ancient Olympic Games. https://www.britannica.com/sports/ancient-Olympic-Games

[95] [28] Encyclopaedia Britannica. Ancient Olympic Games. https://www.britannica.com/sports/ancient-Olympic-Games

[96] [28] Encyclopaedia Britannica. Ancient Olympic Games. https://www.britannica.com/sports/ancient-Olympic-Games

Reading. A race is the purest finite game. It closes when the first runner crosses the line. Olympia turned this finite game into a fixed rhythm: every four years, at the same place, under a truce. The single race closed; the festival turned for more than a thousand years. The form lasted while its carriers, the athletes, were replaced.

The stage: Athens

Theatre in Athens grew out of the Dionysia, the festivals for Dionysus, god of wine and revelry. There were two: the Rural Dionysia in winter and the City Dionysia in spring.[97] Their early performances were choral songs and dances, the dithyrambs.

Tradition names Thespis as the first actor. He was said to be a singer of dithyrambs, or a travelling performer who went from village to village with a wagon and masks.[98] About 534 BCE, at the first contest for tragedy at the City Dionysia, he won the prize.[99] The evidence is thin. But his name became the word for an actor: a thespian.

In the following century the contests grew. A contest for comedy began around 486 BCE.[100] The theatre on the south slope of the Acropolis was rebuilt in stone under Lycurgus between about 342 and 326 BCE, with about 17,000 seats on 64 tiers.[101]

Reading. Theatre is mimicry in Caillois's sense: a person plays to make others believe that he is someone else.[102] The mask is the device. It keeps the relations of a character, its role and its fate, and drops the face of the actor. That is the fifth form of chapter 1. A tragedy also holds all three directions: the hero goes forward, the chorus stands still and comments, and fate turns the action back. The play closes at its end. The festival returned every spring.

Three forms on one ladder

Form	First secure date	Age position	Main device
Rubber balls (El Manatí)	c. 1600 BCE	56.33	the bouncing ball
Ballcourt (Paso de la Amada)	c. 1400 BCE	56.28	the walled court
Contest (Olympia)	776 BCE	56.10	the measured track
Stage (City Dionysia)	c. 534 BCE	56.01	the mask

Table 6.2. The first public forms of amusement.

All four lie between 56.0 and 56.4. They fall within one third of a layer of each other on two continents that had no contact. The step from the private board of chapter 5 to the public arena took place in both worlds within the same band of the ladder.

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[97] [30] Encyclopaedia Britannica. Thespis; Western theatre: Ancient Greece.

[98] [31] Hall, E. (2018). The Theatre of Dionysus. Gresham College lecture, 29 November 2018.

[99] [30] Encyclopaedia Britannica. Thespis; Western theatre: Ancient Greece.

[100] [40] Wikipedia. Theatre of ancient Greece. https://en.wikipedia.org/wiki/Theatre_of_ancient_Greece (secondary)

[101] [41] Lonely Planet. Theatre of Dionysos, Athens (site description).

[102] [8] Caillois, R. (1958). Les jeux et les hommes. Paris: Gallimard. English: Man, Play and Games, trans. M. Barash. New York: Free Press, 1961; Urbana: University of Illinois Press, 2001.

What the public forms show

Each of the three forms built a larger boundary than the board. The court, the stadium and the theatre are magic circles in stone, big enough to hold thousands. Each brought in a crowd that watched rather than played. That split, between player and spectator, is the beginning of the amusement industry. Rome took it to a new scale.

7. Rome: Bread and Games

Rome turned public amusement into a system. It built the largest arenas of the ancient world, filled the calendar with games, and paid for them from the state and from private fortunes. A Roman poet gave the system its lasting name: bread and circuses. This chapter measures the system: its games, its buildings, its feast of reversal and its critic.

The calendar of games

The Romans called their public games ludi. The oldest were the Ludi Romani, the Roman Games, vowed to Jupiter Optimus Maximus. His temple on the Capitol was dedicated on 13 September 509 BCE.[103] By imperial times the Ludi Romani were held every September with fifteen days of chariot races and processions.[104]

For almost three centuries the Ludi Romani were the only public games. Then, during the war with Hannibal, new games were added to raise morale: the Ludi Plebei around 220 BCE and the Ludi Apollinares around 212 BCE. The Ludi Megalenses followed in 204 BCE, the Ludi Ceriales in 202 BCE, and the Floralia was restored in 173 BCE. By the late Republic more than half the days of April were given to games.[105]

The ludi were not holidays in the strict sense, but their days counted as festive days.[106] They began as rites and grew into entertainment. The calendar itself became a schedule of amusement.

Case	Date or span	Position	Source
Ludi Romani vowed (temple of Jupiter)	509 BCE	56.00 (age)	
Ludi Romani as the only public games, 509–c. 220 BCE	about 289 years	54.03	
Ludi Romani in imperial times	15 days	45.96	

Table 7.1. The Roman calendar of games.

The span during which the Ludi Romani stood alone, about 289 years, lies at 54.03. That is close to layer 54 (280 years). It is the same position as the closed Heian period in Japan, 894–1185 CE, which stands at 54.03 as well. The coincidence is noted for the test of chapter 20.

The Circus Maximus

The Circus Maximus lay in the valley between the Aventine and Palatine hills. It was Rome's first and largest arena, used for chariot races from the city's early centuries.[107][108] Its track measured about

[103] [32] Grout, J. Encyclopaedia Romana: Saturnalia; Roman Holidays (ludi). University of Chicago (penelope.uchicago.edu).

[104] [36] World History Encyclopedia (Cartwright, M.). Colosseum; Circus Maximus.

[105] [32] Grout, J. Encyclopaedia Romana: Saturnalia; Roman Holidays (ludi). University of Chicago (penelope.uchicago.edu).

[106] [32] Grout, J. Encyclopaedia Romana: Saturnalia; Roman Holidays (ludi). University of Chicago (penelope.uchicago.edu).

[107] [34] Encyclopaedia Britannica. Circus Maximus.

[108] [36] World History Encyclopedia (Cartwright, M.). Colosseum; Circus Maximus.

621 m by 118 m. After it was rebuilt in the time of Julius Caesar it seated an estimated 150,000 people.[109] At its largest, under Constantine in the fourth century CE, it may have held 250,000, more than any stadium built since.[110] Estimates range from 150,000 to 250,000; this book uses 150,000 as the safer figure.

A typical race ran seven laps. Lap markers in the shape of eggs and dolphins were turned to count them.[111] The last recorded race was held in 549 CE.[112]

The Colosseum

The Flavian Amphitheatre, now called the Colosseum, was begun under Vespasian around 70–72 CE. His son Titus dedicated it in 80 CE with games lasting one hundred days.[113] Domitian added the top storey in 82 CE.[114]

The building measures about 189 by 156 m and stands 45 m high. Its oval arena is 87.5 by 54.8 m. A canvas awning, the velarium, worked by sailors, shaded the crowd.[115] It seated about 50,000 people.[116] Some estimates run to 80,000.

The games of the Colosseum included gladiator fights, animal hunts and public executions. They were abolished by the emperor Honorius in 404 CE, although animal fights continued for another century.[117]

Case	Measure	Position	Source
Circus Maximus, track length	621 m	21.24 (length)	
Circus Maximus, track width	118 m	19.73 (length)	
Circus Maximus, area 621 × 118 m	73,278 m²	20.48 (area)	
Colosseum, length	189 m	20.16 (length)	
Colosseum, width	156 m	19.98 (length)	
Colosseum, area 189 × 156 m	29,484 m²	20.07 (area)	
Colosseum arena, length	87.5 m	19.46 (length)	
Colosseum dedicated	80 CE	55.76 (age)	
Inaugural games	100 days	47.69	

[109] [34] Encyclopaedia Britannica. Circus Maximus.

[110] [34] Encyclopaedia Britannica. Circus Maximus.

[111] [36] World History Encyclopedia (Cartwright, M.). Colosseum; Circus Maximus.

[112] [36] World History Encyclopedia (Cartwright, M.). Colosseum; Circus Maximus.

[113] [33] Encyclopaedia Britannica. Colosseum. https://www.britannica.com/topic/Colosseum

[114] [33] Encyclopaedia Britannica. Colosseum. https://www.britannica.com/topic/Colosseum

[115] [36] World History Encyclopedia (Cartwright, M.). Colosseum; Circus Maximus.

[116] [33] Encyclopaedia Britannica. Colosseum. https://www.britannica.com/topic/Colosseum

[117] [36] World History Encyclopedia (Cartwright, M.). Colosseum; Circus Maximus.

Case	Measure	Position	Source
Colosseum games, 80–404 CE	324 years	54.13	
Last chariot race in the Circus	549 CE	55.51 (age)	

Table 7.2. The two great arenas of Rome.

The length of the Colosseum, 189 m, is almost exactly the length of the Greek stade, about 192 m. Both stand at 20.2 on the length ladder. Greek and Roman builders, one running and one fighting, chose the same scale for the main space of public amusement.

Saturnalia: the feast of reversal

The Saturnalia honoured Saturn, the god of sowing. It began on 17 December. In Cicero's time it lasted seven days, to 23 December. Augustus cut it to three days so that the courts would not close for long; Caligula extended it to five.[118]

For the length of the feast the social order was turned over. Masters wore the felt cap of freed slaves, the pileus. They served their slaves at table, or dined with them as equals. Slaves could speak freely. Gambling, normally restricted, was allowed. A mock king of the Saturnalia was chosen to give orders that all had to obey. Gifts were exchanged.[119] The Saturnalia was the most popular feast of the Roman year.

Case	Duration	Position	Source
Saturnalia under Augustus	3 days	44.50	
Saturnalia under Caligula	5 days	44.96	
Saturnalia in Cicero's time	7 days	45.27	

Table 7.3. The length of the Saturnalia.

Reading. The Saturnalia is Bakhtin's carnival a thousand years before Rabelais.[120] It is a closed window held open for a fixed number of days. Inside it the directions are reversed: the master goes back, the slave goes forward, work stands still. Then the window closes and the order returns. The emperors set its length, which shows that they understood it as a valve: too short and the tension would not be released, too long and the order would not return.

Juvenal: bread and circuses

Around 100 CE the satirist Juvenal wrote the lines that gave the system its name. The Roman people, he said, who once handed out commands, offices and legions, now held back and anxiously wished for two things only: bread and circuses, panem et circenses.[121] The bread was the grain dole, the annona. The circuses were the games.

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[118] [32] Grout, J. Encyclopaedia Romana: Saturnalia; Roman Holidays (ludi). University of Chicago (penelope.uchicago.edu).

[119] [32] Grout, J. Encyclopaedia Romana: Saturnalia; Roman Holidays (ludi). University of Chicago (penelope.uchicago.edu).

[120] [10] Bakhtin, M. M. (1965). Tvorchestvo Fransua Rable i narodnaya kul'tura srednevekov'ya i Renessansa. Moscow. English: Rabelais and His World, trans. H. Iswolsky. Cambridge, MA: MIT Press, 1968. New translation by S. Sandler, 2025.

[121] [35] Juvenal. Satires X.77-81 (c. 100 CE). Via Wikipedia, Bread and circuses (secondary).

Juvenal meant it as an accusation. The people had traded political power for food and entertainment. The phrase has been used ever since for any regime that buys calm with distraction.[122]

Reading. In the terms of this book, Juvenal saw amusement taken from the players and given to the spectators. In the Greek contest the citizen ran. In the Roman arena the citizen watched. The window was still closed, but it was closed for the crowd by others. That split, between those who play and those who are entertained, runs through the rest of this history. It reaches its largest scale in the platforms of chapter 18.

What Rome shows

Rome made amusement into infrastructure. It had a calendar of games, permanent arenas for 50,000 to 150,000 people, a feast of reversal with a set length, and a critic who named the cost. Each of these returns. The calendar becomes the broadcast schedule. The arena becomes the stadium and the cinema. The feast becomes carnival. The critic becomes every writer on mass media from Neil Postman onwards.

The ancient public games ended with the ancient world. The Olympics ended around 393 CE, the Colosseum games in 404, the races in the Circus Maximus in 549. Chapter 8 follows what took their place: the carnival of the Middle Ages, in which the people again played rather than watched.

[122] [35] Juvenal. Satires X.77-81 (c. 100 CE). Via Wikipedia, Bread and circuses (secondary).

8. Carnival

When the arenas of Rome fell silent, amusement went back to the people. In the Middle Ages it took two forms that Bakhtin later treated as one: the feast of reversal inside the church, and the carnival in the street. Both were closed windows held open for a fixed time. Both survived centuries of bans. One of them, carnival, became the largest street festival on earth.

The Feast of Fools

The Feast of Fools was held on or about 1 January, especially in France. The lower clergy elected a mock bishop or pope. They parodied the ritual of the church. High and low officials changed places for the day.[123]

Church authorities fought it for three centuries. In 1199 Bishop Eudes de Sully set rules to check the abuses at Notre-Dame in Paris. Robert Grosseteste, Bishop of Lincoln, tried to suppress it. The Council of Basel, which sat from 1431, finally forbade it under the severest penalties in 1435.[124] Yet remnants lasted into the sixteenth century.[125]

A milder relative was the feast of the boy bishop. The choirboys elected one of their own, often on 6 December, the feast of St Nicholas. He led their revels on Holy Innocents' Day, 28 December, and in some English churches he preached at Mass. In England the custom is recorded from the thirteenth century to the sixteenth.[126] Henry VIII abolished it in 1541; Mary I restored it; Elizabeth I abolished it again.[127]

Reading. The Feast of Fools is the Saturnalia moved inside the church. The window is the same: the low go forward, the high go back, ordinary work stands still. It closes at the end of the day. The church tried for three hundred years to stop it. That it lasted so long shows how strong the need for this valve was.

Carnival in Venice

The word carnival is usually traced to the Latin carne vale, farewell to meat.[128] It names the days of feasting before the forty days of fasting in Lent.

In Venice, public festivities before Lent are recorded as early as 1094. Tradition ties the carnival to a victory: in 1162 Venice defeated the Patriarch of Aquileia, and the city celebrated in St Mark's Square. In 1296 the Senate of the Republic made the day before Lent a public holiday.[129][130]

The carnival became a season of masks. Masks were allowed from St Stephen's Day, 26 December, to midnight of Shrove Tuesday. The most common was the bauta. It covered the whole face but left

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[123] [42] Encyclopaedia Britannica. Feast of Fools.

[124] [43] Catholic Encyclopedia (New Advent / catholic.org). Feast of Fools; Feast of Asses.

[125] [42] Encyclopaedia Britannica. Feast of Fools.

[126] [44] Encyclopedia.com. Boy Bishop; Feast of Fools.

[127] [45] Wikipedia. Carnival of Venice; Lord of Misrule. https://en.wikipedia.org/wiki/Carnival_of_Venice (secondary)

[128] [46] Culture Trip and TheCollector (2017-2026). Histories of the Carnival of Venice.

[129] [46] Culture Trip and TheCollector (2017-2026). Histories of the Carnival of Venice.

[130] [45] Wikipedia. Carnival of Venice; Lord of Misrule. https://en.wikipedia.org/wiki/Carnival_of_Venice (secondary)

room below to eat, drink and speak, and was worn with a black tricorn hat and cloak.[131][132] Under the mask, rank disappeared. Nobles and servants, men and women, could gamble, court and speak freely.

Case	Date or span	Position	Source
Feast of Fools regulated at Notre-Dame	1199	54.99 (age)	
Feast of Fools forbidden by the Council of Basel	1435	54.68 (age)	
Feast of Fools, 12th–16th century	about 450 years	54.43	
Pre-Lenten festivities recorded in Venice	1094	55.09 (age)	
Victory over Aquileia	1162	55.02 (age)	
Day before Lent made a public holiday	1296	54.87 (age)	
From first record to public holiday	202 years	53.70	

Table 8.1. The medieval feasts of reversal.

Reading. The bauta is the mask of chapter 2 in its purest form. It keeps the relations, a person among persons, and drops the face. It is mukokuseki eight centuries before anime: a face that belongs to no rank and no house.

Bruegel: the fight between Carnival and Lent

In 1559 Pieter Bruegel the Elder painted The Fight between Carnival and Lent. The oak panel, 118 × 164 cm, is in the Kunsthistorisches Museum in Vienna.[133] It shows a square in a town of the Southern Netherlands. On the left stands an inn, the side of Carnival, led by a stout, drunken prince. On the right stands a church, the side of Lent.[134] Between them nearly two hundred figures play, dance, beg, eat and pray.[135]

Reading. Bruegel painted the two states of the window side by side. Carnival is the open window, all directions at once. Lent is the closed window, still and spare. The painting holds the moment of change. It is a map of a rhythm: feast, then fast, every year.

Rio de Janeiro: the carnival of the world

Carnival crossed the Atlantic with the Portuguese. Their version was the entrudo, a rough game of throwing water, flour and wax lemons filled with water. In Rio de Janeiro the first records of carnival

[131] [45] Wikipedia. Carnival of Venice; Lord of Misrule. https://en.wikipedia.org/wiki/Carnival_of_Venice (secondary)

[132] [46] Culture Trip and TheCollector (2017-2026). Histories of the Carnival of Venice.

[133] [47] Kunsthistorisches Museum Wien. Pieter Bruegel the Elder, The Fight between Carnival and Lent, 1559, inv. GG 1016.

[134] [47] Kunsthistorisches Museum Wien. Pieter Bruegel the Elder, The Fight between Carnival and Lent, 1559, inv. GG 1016.

[135] [47] Kunsthistorisches Museum Wien. Pieter Bruegel the Elder, The Fight between Carnival and Lent, 1559, inv. GG 1016.

date from 1723.[136] The authorities frowned on the entrudo and in time outlawed it. Masked balls on the European pattern appeared in the nineteenth century, with polka and waltz.[137]

In the early twentieth century, Afro-Brazilian musicians in Rio created samba. In 1928 the first samba school was founded. Sources name either Deixa Falar, "let them talk", or Mangueira, still active today.[138] The schools grew into large associations, rooted in poor neighbourhoods, that work all year towards one parade.

On 2 March 1984 the city opened the Sambadrome on the Avenida Marquês de Sapucaí. Oscar Niemeyer designed it. It is a parade ground about half a mile long, lined with stands.[139] The parade moved from the street into a building with tickets.

Case	Date or size	Position	Source
First records of carnival in Rio	1723	54.07 (age)	
First samba school	1928	53.04 (age)	
From first record to first school	205 years	53.72	
Sambadrome opened	1984	52.27 (age)	
From first school to Sambadrome	56 years	52.53	
Sambadrome parade avenue	about 800 m	21.48 (length)	

Table 8.2. Carnival in Rio.

Two spans are close to each other. Venice took 202 years from its first recorded festivities to a public holiday. Rio took 205 years from its first recorded carnival to its first samba school. Both stand near 53.7 on the ladder. The founding of the first samba school, measured as an age from 2026, stands at 53.04, close to layer 53. These are noted for the test of chapter 20.

Reading. The Sambadrome repeats the step from Greece to Rome. The carnival in the street is played by everyone. The parade in the Sambadrome is played by the schools and watched by those who pay. Yet the schools keep the old form. A samba school is a metabolic window: its members change every year, its theme changes every year, and the school goes on. Portela, founded as Oswaldo Cruz, has won more titles than any other school.

[136] [48] Rio Carnival histories: riocarnaval.org; rio.com; Yale-New Haven Teachers Institute unit 00.05.06; Wikipedia, Sambadrome Marques de Sapucai.

[137] [48] Rio Carnival histories: riocarnaval.org; rio.com; Yale-New Haven Teachers Institute unit 00.05.06; Wikipedia, Sambadrome Marques de Sapucai.

[138] [48] Rio Carnival histories: riocarnaval.org; rio.com; Yale-New Haven Teachers Institute unit 00.05.06; Wikipedia, Sambadrome Marques de Sapucai.

[139] [48] Rio Carnival histories: riocarnaval.org; rio.com; Yale-New Haven Teachers Institute unit 00.05.06; Wikipedia, Sambadrome Marques de Sapucai.

What carnival shows

Carnival is the longest-lived form of amusement in this book after the board game. It survived bans by the church, by city councils and by colonial governors. Each time it was suppressed in one form, it returned in another: Saturnalia, Feast of Fools, Venetian masks, entrudo, samba.

In the terms of chapter 1, carnival is the form whose carriers are replaced most often while the form stays. Its date is fixed by the calendar of Lent. Its content changes completely. That is the definition of metabolism. It is also what Bakhtin saw: carnival is not watched; it is lived, for a fixed time, and then it closes.[140]

The author's 2007 reading of Bakhtin predicted a "worldwide carnival of fools", in which people choose masks and listen to other cultures.[141] Chapter 13 and chapter 18 test that prediction against cosplay, conventions and fandom.

[140][10] Bakhtin, M. M. (1965). Tvorchestvo Fransua Rable i narodnaya kul'tura srednevekov'ya i Renessansa. Moscow. English: Rabelais and His World, trans. H. Iswolsky. Cambridge, MA: MIT Press, 1968. New translation by S. Sandler, 2025.

[141][4] Konstapel, J. (2007). The Wordwide Carnival: An Introduction into the World of Mikhail Bakhtin. constable.blog, 2 September 2007. https://constable.blog/2007/09/02/wordwide-carnival-introduction-world-mikhail-bakhtin/

9. Courts, Theatres and Players

Between 1350 and 1800 four great theatres arose that still play today, or whose forms still live. In Japan, Noh grew under the patronage of a shogun. In London, a company of actors built the Globe. In northern Italy, the first companies of professional players signed contracts. In Beijing, troupes from the provinces created Peking opera for an emperor's birthday. In the same centuries, three games of skill and chance travelled across Eurasia: Go, chess and playing cards. This chapter takes them in turn.

Noh: the oldest living theatre

Noh grew out of sarugaku, a popular entertainment of mime, acrobatics and comic imitation. In the fourteenth century the actor Kan'ami (1333–1384) and his son Zeami (1363–1443) reshaped it into a new art.[142] In 1374 the young shogun Ashikaga Yoshimitsu saw them perform and took them under his protection. Zeami, then about twelve, was educated at the court in classical literature.[143] He became actor, playwright and theorist. His treatises set the standards of Noh for the following centuries.

Noh is a theatre of masks, song and slow movement. There are said to be about 250 types of Noh masks. The largest school today, the Kanze school, has about 700 performers.[144] Noh and the comic kyōgen together form nōgaku. UNESCO inscribed nōgaku as intangible heritage of humanity.[145] A visitor from the fourteenth century, it is said, would recognise the oldest plays at once.[146]

Zeami wanted his plays to calm the souls of the dead and to show humanity itself.[147] Many Noh plays are built on old tales in which a supernatural being, in human form, tells its story as the hero.[148]

Reading. A Noh play is a closed window in the most literal sense. The past comes back (−1), the action stands almost still (0), and the dance moves forward to its end (+1). Then the window closes. Noh is also the oldest example of ma in this book: the long pause in which nothing happens and everything is felt.

The Globe: theatre as a business

In 1576 James Burbage built The Theatre in Shoreditch, north of London, among the first playhouses in England since Roman times.[149] When the lease ran out, his sons had the building taken down and its timbers carried across the Thames. In 1599 they used them to build the Globe on Bankside.[150]

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[142] [49] Wikipedia. Noh; Zeami Motokiyo (secondary); Japan Reports (Embassy of Japan in Australia), Nogaku, Autumn 2014.

[143] [49] Wikipedia. Noh; Zeami Motokiyo (secondary); Japan Reports (Embassy of Japan in Australia), Nogaku, Autumn 2014.

[144] [50] Government of Japan, Highlighting Japan, July 2017: Noh (interview with Kanze Kiyokazu).

[145] [49] Wikipedia. Noh; Zeami Motokiyo (secondary); Japan Reports (Embassy of Japan in Australia), Nogaku, Autumn 2014.

[146] [49] Wikipedia. Noh; Zeami Motokiyo (secondary); Japan Reports (Embassy of Japan in Australia), Nogaku, Autumn 2014.

[147] [50] Government of Japan, Highlighting Japan, July 2017: Noh (interview with Kanze Kiyokazu).

[148] [49] Wikipedia. Noh; Zeami Motokiyo (secondary); Japan Reports (Embassy of Japan in Australia), Nogaku, Autumn 2014.

[149] [51] Globe Theatre: Wikipedia; History Hit; Folger Shakespeare Library essays (secondary).

[150] [51] Globe Theatre: Wikipedia; History Hit; Folger Shakespeare Library essays (secondary).

The Globe was owned by the actors themselves. Richard and Cuthbert Burbage held double shares. William Shakespeare, John Heminges, Augustine Phillips and Thomas Pope held single shares.[151] It was an open-air, three-storey building about 100 feet (30 m) across. It held up to 3,000 spectators. Those who paid a penny stood in the yard around the stage: the groundlings. Those who paid more sat in the galleries.[152]

The Globe burned on 29 June 1613, during a performance of Henry VIII. It was rebuilt in 1614 and closed in 1642.[153] A reconstruction opened near the site in 1997.

Case	Date or size	Position	Source
Kan'ami and Zeami before Yoshimitsu	1374	54.77 (age)	
Zeami's life, 1363–1443	80 years	52.86	
The Globe built	1599	54.38 (age)	
Globe diameter	about 30.5 m	18.50 (length)	
First Globe and successor, 1599–1642	43 years	52.29	
From the first Globe to the reconstruction	398 years	54.32	

Table 9.1. Noh and the Globe.

Reading. The Globe is a shareholding of players. Its owners were its actors. The form lasted beyond its building: the company moved, the building burned, the plays went on. Shakespeare's plays are the clearest case in this book of the fourth form of chapter 1: a new kind of union opens once and is then filled many times. The plays of a few years have been staged thousands of times since.

Commedia dell'arte: the first professional players

In Padua, in 1545, a group of actors signed a notarial contract to form a company and share its income. It is the earliest known contract of a professional troupe.[154] By 1560 companies included women. In the early 1570s several were touring abroad.[155]

The commedia dell'arte was improvised. The players worked from a short scenario, not a script. They played stock characters, most of them masked: the old Venetian merchant Pantalone, the pompous Doctor, the boastful Captain, the servants or zanni, among them Arlecchino, and the unmasked lovers.[156] Because the mask hid the face, the players carried emotion through dialect and exaggerated gesture.[157]

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[151] [51] Globe Theatre: Wikipedia; History Hit; Folger Shakespeare Library essays (secondary).

[152] [51] Globe Theatre: Wikipedia; History Hit; Folger Shakespeare Library essays (secondary).

[153] [51] Globe Theatre: Wikipedia; History Hit; Folger Shakespeare Library essays (secondary).

[154] [52] Metropolitan Museum of Art. Commedia dell'arte (Heilbrunn essay, Meagher 2007); Encyclopaedia Britannica, commedia dell'arte.

[155] [52] Metropolitan Museum of Art. Commedia dell'arte (Heilbrunn essay, Meagher 2007); Encyclopaedia Britannica, commedia dell'arte.

[156] [52] Metropolitan Museum of Art. Commedia dell'arte (Heilbrunn essay, Meagher 2007); Encyclopaedia Britannica, commedia dell'arte.

[157] [52] Metropolitan Museum of Art. Commedia dell'arte (Heilbrunn essay, Meagher 2007); Encyclopaedia Britannica, commedia dell'arte.

The commedia spread across Europe. In France it became the Comédie-Italienne. In England it lived on in the harlequinade and in Punch and Judy.[158]

Reading. The commedia is a fixed set of characters in endless new situations. That is the structure of every long-running series since, from the Punch and Judy show to the situation comedy and the anime franchise. The cast is the closed form; the episodes are the content that flows through it.

Peking opera: a gift for an emperor

In 1790 the Qianlong Emperor turned eighty. For the celebration, opera troupes came to Beijing from the provinces. Among them were four from Anhui, later called the Four Great Anhui Troupes. They stayed. In 1828 troupes from Hubei arrived and began to perform with them. From the mix of their styles, Peking opera took shape; it is usually considered complete by about 1845.[159]

Peking opera joins song, speech, mime, dance and acrobatics. Its roles fall into four types: sheng (gentlemen), dan (women), jing (rough men) and chou (clowns).[160] For most of its history all roles were played by men. The theatres of Beijing burned in the Boxer uprising of 1900, but the form survived. UNESCO inscribed it as intangible heritage in 2010.[161]

Case	Date or span	Position	Source
First commedia contract (Padua)	1545	54.49 (age)	
Anhui troupes in Beijing	1790	53.84 (age)	
From 1790 to the mature form (1845)	55 years	52.52	

Table 9.2. The commedia and Peking opera.

Reading. The jing role is played with a painted face, a mask drawn on the skin. Its colours carry meaning: the viewer reads character at a glance. Together with the Noh mask and the commedia mask, it shows the same solution in three cultures: fix the face so that the relations can travel.

Go: the game of surrounding

The first written reference to Go is in the Zuo Zhuan, a chronicle compiled around the fourth century BCE, which mentions the game in an event of 548 BCE.[162] Boards of the Han dynasty have 17 × 17 lines, 289 points. A writer of the third century CE gives the same size. The modern board has 19 × 19 lines, 361 points.[163]

[158] [52] Metropolitan Museum of Art. Commedia dell'arte (Heilbrunn essay, Meagher 2007); Encyclopaedia Britannica, commedia dell'arte.

[159] [53] Peking opera: Wikipedia; China Daily (2015, 2017); The China Project (2022).

[160] [53] Peking opera: Wikipedia; China Daily (2015, 2017); The China Project (2022).

[161] [53] Peking opera: Wikipedia; China Daily (2015, 2017); The China Project (2022).

[162] [54] Go: Wikipedia, Go (game); History of Go (secondary).

[163] [54] Go: Wikipedia, Go (game); History of Go (secondary).

The rules of Go are few. Two players place black and white stones on the points. A group of stones with no free point next to it is captured. The player who surrounds more territory wins. Yet the number of legal positions on the 19 × 19 board is about 2.1×10^{170}.[164]

Reading. Go is a game of closure in the exact sense of chapter 1. A group lives if it encloses at least two separate empty points, called eyes; with one eye it can be closed and captured. A living group is a closed form that cannot be broken. The game asks one question over and over: which shapes close, and which stay open.

Chess: from army to queen

There is no credible evidence of chess before the sixth century CE.[165] Its ancestor, chaturanga, flourished in northwestern India by the seventh century. Its pieces stood for the four divisions of an Indian army: infantry, cavalry, elephants and chariots. It had two features found in every later form of chess: pieces with different powers, and victory by capture of one piece, the king.[166]

From India the game went to Persia, and after the Arab conquest of Persia it spread through the Islamic world as shatranj. Shatranj added a counsellor, the firzan, which moved one square diagonally.[167] Through Spain and Italy it entered Europe. After about 1475 two rule changes made the game modern: the counsellor became the queen, able to move any distance in any direction, and the bishop gained its long diagonal.[168]

Playing cards: from China to Europe

A Chinese text of the ninth century describes a princess of the Tang dynasty playing the "leaf game" in 868. It is often taken as the first card game, but the identification is disputed.[169] Cards reached Europe in the 1370s, probably in Italy or Spain, certainly through merchants of the Mamluk sultanate of Egypt.[170] The Mamluk deck had 52 cards in four suits: cups, swords, coins and polo sticks.[171]

Case	Date or span	Position	Source
Go in the Zuo Zhuan	548 BCE	56.02 (age)	
Chess (chaturanga), earliest credible date	6th century CE	55.51 (age, 550 CE)	
Modern queen and bishop	after 1475	54.62 (age)	
From chaturanga to the modern queen	about 925 years	55.09	
"Leaf game" in China	868	55.29 (age)	

[164] [54] Go: Wikipedia, Go (game); History of Go (secondary).

[165] [55] Encyclopaedia Britannica. Chess: History.

[166] [55] Encyclopaedia Britannica. Chess: History.

[167] [55] Encyclopaedia Britannica. Chess: History.

[168] [55] Encyclopaedia Britannica. Chess: History.

[169] [56] Encyclopaedia Britannica. Playing card. With Wikipedia, Playing card (secondary).

[170] [56] Encyclopaedia Britannica. Playing card. With Wikipedia, Playing card (secondary).

[171] [56] Encyclopaedia Britannica. Playing card. With Wikipedia, Playing card (secondary).

Case	Date or span	Position	Source
Cards in Europe	1370s	54.77 (age, 1375)	

Table 9.3. Games of skill and chance across Eurasia.

Reading. All three games travelled the trade routes, as the race games of chapter 5 had done. Each time, the local meaning fell away and the relations stayed. The chariot of chaturanga became the rook; the polo stick of the Mamluk deck became the club. The fifth form of chapter 1 is at work: reading keeps the relations and drops the rest.

What the courts and theatres show

This chapter brings two new things. The first is the professional player. The Globe's shareholders and the Padua company were people who lived from amusement. The second is the fixed cast with endless content: Noh's ghosts, the commedia's masks, Peking opera's role types. Together they make the template of the amusement industry. A company of players owns a set of characters and fills them with new stories for paying audiences.

That is the template Sony follows with anime today.

10. The Floating World

From 1603 to 1868 Japan was ruled from Edo by the Tokugawa shoguns. From 1639 it was nearly closed to the outside world. In those two and a half centuries of peace, the townspeople of Edo, Osaka and Kyoto built a culture of amusement that had no parallel elsewhere. They called it ukiyo, the floating world. Kabuki, the puppet theatre, the woodblock print and the comic picture book were its forms. Each of them passed into modern manga and anime. This chapter tells how.

A closed country, an open city

The Edo period ran from 1603 to 1868. By 1639 all foreigners had been expelled, with the exception of Dutch traders on the island of Dejima in Nagasaki.[172] The policy was later called sakoku, the closed country. It held until American warships under Commodore Perry arrived in 1853.

Inside the closed country, the cities grew. Edo had more than one million inhabitants in the early eighteenth century.[173] For comparison, London counted about 860,000 in its census of 1801.[174] Edo was one of the largest cities in the world.

The townspeople, the chōnin, ranked low in the official order of warriors, farmers, artisans and merchants.[175] But peace made them rich. They spent their money on pleasure: theatres, teahouses, books, prints and the licensed quarters. In Edo the licensed pleasure district, the Shin Yoshiwara, opened in 1657 in a walled compound reached by boat along the Sumida River.[176]

Reading. Japanese history shows a rhythm of opening, closing and making something its own: China was absorbed and then digested in the Heian period, the first Europeans were admitted and then expelled. The Edo period is the clearest closed phase. The window was shut to the outside. Inside it, content flowed fast. A closed window with all directions inside is metabolic. The floating world was the metabolism of a closed country.

Kabuki: from riverbed to stage

In 1603, the same year the Tokugawa took power, a woman called Okuni and a troupe of female dancers performed dances and light sketches on a makeshift stage in the dry bed of the Kamo River in Kyoto.[177] The word kabuki meant something shocking, unorthodox and fashionable.[178] The performances were an instant success and were copied across the country.

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[172] [63] Wikipedia. Edo period (secondary).

[173] [61] Edo population: Tokyo Metropolitan Library, The Great Edo Metropolis; Encyclopaedia Britannica, Japan: the Tokugawa status system; RISD Museum, The Pleasure of Edo.

[174] [61] Edo population: Tokyo Metropolitan Library, The Great Edo Metropolis; Encyclopaedia Britannica, Japan: the Tokugawa status system; RISD Museum, The Pleasure of Edo.

[175] [63] Wikipedia. Edo period (secondary).

[176] [61] Edo population: Tokyo Metropolitan Library, The Great Edo Metropolis; Encyclopaedia Britannica, Japan: the Tokugawa status system; RISD Museum, The Pleasure of Edo.

[177] [57] Encyclopaedia Britannica. Okuni; Kabuki. With Web Japan, Kabuki (Embassy of Japan).

[178] [57] Encyclopaedia Britannica. Okuni; Kabuki. With Web Japan, Kabuki (Embassy of Japan).

The shogunate distrusted them. In 1629 the shogun Tokugawa Iemitsu banned women from the stage.[179] Young men took their place, and in 1652 they too were banned. From then on adult men played all roles, including women. Kabuki became the all-male theatre it is today.[180]

Kabuki developed its own grammar. Its best-known device is the mie, a powerful pose that the actor strikes and holds frozen at an emotional peak. The audience shouts the actor's name. The mie is credited to Ichikawa Danjūrō I, in the Genroku period around 1700.[181] The creators of Japanese special-effects heroes later gave their heroes poses on the model of the mie.[182]

Case	Date or span	Position	Source
Okuni's performance in Kyoto	1603	54.37 (age)	
Women's kabuki, 1603–1629	26 years	51.84	
Young men's kabuki, 1629–1652	23 years	51.72	
Shin Yoshiwara opened	1657	54.25 (age)	
Sakoku, 1639–1853	214 years	53.75	
Edo period, 1603–1868	265 years	53.95	

Table 10.1. Edo and kabuki.

The two early phases of kabuki each lasted about one generation: 26 and 23 years. Both stand near 51.8, the position of the human generation (51.87). The form changed its carriers each generation until it found a closed shape.

Reading. The mie is the ancestor of the held frame of limited animation (chapter 13): anime's stillness is not only a cost saving but an inherited dramatic form. The actor closes the window and holds it closed. The audience answers with his name. The pose is a moment of ma made visible.

The puppet theatre: Chikamatsu

The puppet theatre, later called bunraku, joined chanted narration (jōruri), the shamisen and large puppets. Its greatest playwright was Chikamatsu Monzaemon (1653–1725). In 1703 a shop clerk and a courtesan in Osaka died together in a double suicide. Chikamatsu wrote The Love Suicides at Sonezaki within a fortnight, and it was staged on 20 June 1703.[183] It was his first domestic tragedy, a play about ordinary townspeople rather than heroes of the past. It was a great success and revived the fortunes of the Takemoto theatre in Osaka.[184]

[179] [57] Encyclopaedia Britannica. Okuni; Kabuki. With Web Japan, Kabuki (Embassy of Japan).

[180] [57] Encyclopaedia Britannica. Okuni; Kabuki. With Web Japan, Kabuki (Embassy of Japan).

[181] [62] Wikipedia. Mie (pose); Kabuki (secondary). With Shochiku, Kabuki-ko vol. 5.

[182] [62] Wikipedia. Mie (pose); Kabuki (secondary). With Shochiku, Kabuki-ko vol. 5.

[183] [58] Chikamatsu Monzaemon: Encyclopaedia Britannica; Wikipedia, The Love Suicides at Sonezaki (secondary); Web Japan, Bunraku.

[184] [58] Chikamatsu Monzaemon: Encyclopaedia Britannica; Wikipedia, The Love Suicides at Sonezaki (secondary); Web Japan, Bunraku.

Its theme was the conflict between social duty (giri) and human feeling (ninjō). That conflict became the central theme of the puppet theatre.[185] The plays were so popular that the shogunate banned love-suicide plays in 1722.[186]

Case	Date or span	Position	Source
The Love Suicides at Sonezaki staged	1703	54.13 (age)	
Time from event to play	about 14 days	45.90	
From Sonezaki to the ban on love-suicide plays	19 years	51.55	

Table 10.2. The puppet theatre.

Reading. Chikamatsu turned a news event into drama within two weeks. That is the speed of the weekly manga magazine three centuries later. The ban shows the edge of chapter 1: when a play's tension passes into ordinary life instead of being released in the theatre, the authorities close the window from outside.

The woodblock print and Hokusai

The pictures of the floating world, ukiyo-e, were woodblock prints sold cheaply in large numbers. They showed actors, courtesans, wrestlers, landscapes and scenes of daily life. Some parodied classical Chinese and Japanese models.[187]

Katsushika Hokusai (1760–1849) was the most famous of their makers. In 1814, at the age of 55, he published the first volume of the Hokusai Manga, a book of sketches meant as a model for students. It was so popular that ten volumes appeared by 1819 and fifteen in all by 1878, long after his death. Together they hold about 4,000 images of people, animals, plants, landscapes and the supernatural.[188] The word manga in its title meant whimsical or random sketches.[189]

Around 1831 Hokusai published The Great Wave off Kanagawa. Its deep blue was Prussian blue, a pigment first made in Berlin around 1706 and imported into Japan through the Dutch trade.[190]

The comic picture book: kibyōshi

In 1775 Koikawa Harumachi published Kinkin sensei eiga no yume, Master Flashgold's Splendiferous Dream. It was a short, illustrated story for adults with a yellow cover. It started a genre: the kibyōshi, the "yellow covers".[191] Each was a small booklet. A large picture filled each page. The text and the

[185] [58] Chikamatsu Monzaemon: Encyclopaedia Britannica; Wikipedia, The Love Suicides at Sonezaki (secondary); Web Japan, Bunraku.

[186] [58] Chikamatsu Monzaemon: Encyclopaedia Britannica; Wikipedia, The Love Suicides at Sonezaki (secondary); Web Japan, Bunraku.

[187] [61] Edo population: Tokyo Metropolitan Library, The Great Edo Metropolis; Encyclopaedia Britannica, Japan: the Tokugawa status system; RISD Museum, The Pleasure of Edo.

[188] [59] Hokusai Manga: Metropolitan Museum of Art, Random Sketches by Hokusai (collection record); Wikipedia (secondary).

[189] [59] Hokusai Manga: Metropolitan Museum of Art, Random Sketches by Hokusai (collection record); Wikipedia (secondary).

[190] [3] Konstapel, J. (2026). The History of Culture on the Net: A Reference Work on Human Culture and the Vacuum.Net, version 1.0, 15 October 2026. Constable Research, Leiden.

[191] [60] Kibyoshi: Tokyo Metropolitan Library, Kinkin-sensei's Dream of Splendor (Koikawa Harumachi, 1775); Kern, A. L. (2006), Manga from the Floating World, Harvard University Press.

dialogue were written into the free spaces of the picture, close to the speech balloons of modern comics.[192]

The kibyōshi were witty and satirical. Some mocked the shogunate. After the Kansei reforms of the 1790s, authors were punished and publishers fined.[193] The genre faded by about 1806, replaced by longer bound books.[194]

Case	Date or span	Position	Source
First kibyōshi (Koikawa Harumachi)	1775	53.90 (age)	
Kibyōshi era, 1775–1806	31 years	52.00	
Hokusai Manga, first volume	1814	53.75 (age)	
Hokusai Manga, 1814–1878	64 years	52.66	
The Great Wave	about 1831	53.67 (age)	

Table 10.3. Print and picture book.

The kibyōshi era lasted 31 years, which stands at 52.00, exactly layer 52 (31.13 years).

Reading. The kibyōshi are the residue that became the alphabet of the next depth. Picture and text inside one frame, a story told for adults in cheap copies, a satirical edge, censorship, and a genre that lasted one layer and was replaced. All of these return in the manga magazines of the twentieth century. Hokusai's Manga gave the name. The kibyōshi gave the form.

What the floating world shows

The Edo period joined every line of this history so far. It had theatre with masks and poses, like Noh and the commedia. It had a licensed quarter with fixed hours and walls, like the Saturnalia with its fixed days. It had a mass market for cheap pictures, like the printed playing cards of Europe. And it had a closed border that forced all of this to grow from inside.

When Japan opened again after 1853, the floating world met Western print, photography and film. Chapter 13 follows what came out of that meeting: manga, and then anime.

[192] [60] Kibyoshi: Tokyo Metropolitan Library, Kinkin-sensei's Dream of Splendor (Koikawa Harumachi, 1775); Kern, A. L. (2006), Manga from the Floating World, Harvard University Press.

[193] [60] Kibyoshi: Tokyo Metropolitan Library, Kinkin-sensei's Dream of Splendor (Koikawa Harumachi, 1775); Kern, A. L. (2006), Manga from the Floating World, Harvard University Press.

[194] [60] Kibyoshi: Tokyo Metropolitan Library, Kinkin-sensei's Dream of Splendor (Koikawa Harumachi, 1775); Kern, A. L. (2006), Manga from the Floating World, Harvard University Press.

11. The Mass Age

In the hundred years from 1768 to 1872, amusement in Europe and America turned into an industry. Five inventions did it: the circus ring, the music hall, the world exhibition, the codified sport and the amusement park. Each gathered thousands of people in one place, at a fixed price, at a fixed time. Railways brought them. Newspapers told them where to go. This chapter measures the five.

The circus ring

In 1768 Philip Astley, a former cavalry sergeant, began to show trick riding in a field in Lambeth, south of Westminster Bridge in London.[195] He found that riding in a circle helped him to keep his balance on a standing horse. His first ring was about 19 m across. He later fixed it at 42 feet, about 13 m. That size has been the international standard for circus rings ever since.[196]

Astley added acrobats, rope dancers, jugglers and clowns between the riding acts. He did not invent any of these acts. He joined them into one show in one ring, under one roof, for a paying public.[197] The modern circus was born.

Reading. The circus ring is the magic circle of chapter 2 made exact. Its size was found by trial: large enough for a galloping horse, small enough for every seat to see. A circle of 13 m is a closed boundary in the most literal sense. Everything in the show turns around it.

The music hall

In 1852 Charles Morton opened the Canterbury Hall behind his pub in Lambeth, a few hundred metres from Astley's old ring. It seated 700 people at tables, and food and drink were served throughout the show.[198] Morton was soon called the father of the halls. Within a few years hundreds of imitators followed. By 1865 London had 32 large music halls seating between 500 and 5,000 people. The number peaked in 1878, with 78 large halls and about 300 smaller ones.[199]

The music hall offered a bill of short turns: singers, comics, acrobats, dancers. Each turn was a few minutes long. The audience ate, drank and came and went. The music hall produced the first stars of mass entertainment, whose songs were sung in every street.

The world exhibition

On 1 May 1851 the Great Exhibition of the Works of Industry of All Nations opened in Hyde Park, London. It was housed in the Crystal Palace, a building of iron and glass covering 10.4 ha.[200] It closed on 15 October. In those months it counted 6,039,722 visits, an average of 42,831 a day, with a peak of 109,915.[201] After a few weeks the entrance fee on most weekdays was cut to one shilling, so that

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[195] [64] Encyclopaedia Britannica. Circus: Philip Astley and the first circuses. With Wikipedia, Philip Astley (secondary).

[196] [64] Encyclopaedia Britannica. Circus: Philip Astley and the first circuses. With Wikipedia, Philip Astley (secondary).

[197] [64] Encyclopaedia Britannica. Circus: Philip Astley and the first circuses. With Wikipedia, Philip Astley (secondary).

[198] [65] Victoria and Albert Museum. Music hall and variety theatre. With Wikipedia, Canterbury Music Hall; Music hall (secondary).

[199] [65] Victoria and Albert Museum. Music hall and variety theatre. With Wikipedia, Canterbury Music Hall; Music hall (secondary).

[200] [66] Wikipedia. Great Exhibition (secondary); Museum of London, The Great Exhibition.

[201] [66] Wikipedia. Great Exhibition (secondary); Museum of London, The Great Exhibition.

working people could come. The railway agent Thomas Cook brought about 150,000 visitors on organised excursions.[202]

The exhibition was meant to show industry and trade. It became the first mass tourist attraction. Its successors, the world's fairs of Paris, Chicago and elsewhere, added rides, pavilions and spectacles. The Ferris wheel and many park rides started there.

The codified sport

On 26 October 1863 representatives of a dozen London clubs met at the Freemasons' Tavern in Great Queen Street. They formed the Football Association. Six meetings in 44 days produced a common set of laws.[203] The first game under the new laws was played on 19 December 1863. The first FA Cup final was played on 16 March 1872.[204]

Football had been played for centuries under local rules that changed from town to town. The FA fixed one set of rules for all. That made it possible to play matches between clubs from different places, then leagues, then international games.

Reading. Codification is closure. A game with fixed, written rules is a closed window that can be copied anywhere. The FA's laws did for football what Finkel's tablet of 177 BCE did for the Game of Ur: they made the relations explicit, so that the game could travel without its local details.

The amusement park: Coney Island

At Coney Island, on the Atlantic shore of Brooklyn, three great enclosed parks opened within seven years. George C. Tilyou opened Steeplechase Park in 1897. Frederic Thompson and Elmer Dundy opened Luna Park in 1903. William Reynolds opened Dreamland in 1904.[205] Luna Park recorded 142,000 visitors on 4 July 1903, and 31 million admissions between 1903 and 1908.[206] Between about 1880 and the Second World War, Coney Island drew several million visitors a year.[207]

The new parks were enclosed. A visitor paid at the gate and found, inside the wall, rides, shows and lights. Steeplechase lasted until 1964, Luna Park until 1944. Dreamland burned in 1911.[208]

Case	Date or size	Position	Source
Astley's first show	1768	53.92 (age)	
Astley's first ring	about 19 m	18.07 (length)	

[202] [66] Wikipedia. Great Exhibition (secondary); Museum of London, The Great Exhibition.

[203] [67] The Football Association. The history of the FA. With FIFA, Laws of the Game first formalised in London in 1863.

[204] [67] The Football Association. The history of the FA. With FIFA, Laws of the Game first formalised in London in 1863.

[205] [68] Wikipedia. Steeplechase Park; Luna Park (Coney Island, 1903); Dreamland (Coney Island, 1904) (secondary). With Brooklyn Museum tech blog on Coney Island.

[206] [68] Wikipedia. Steeplechase Park; Luna Park (Coney Island, 1903); Dreamland (Coney Island, 1904) (secondary). With Brooklyn Museum tech blog on Coney Island.

[207] [68] Wikipedia. Steeplechase Park; Luna Park (Coney Island, 1903); Dreamland (Coney Island, 1904) (secondary). With Brooklyn Museum tech blog on Coney Island.

[208] [68] Wikipedia. Steeplechase Park; Luna Park (Coney Island, 1903); Dreamland (Coney Island, 1904) (secondary). With Brooklyn Museum tech blog on Coney Island.

Case	Date or size	Position	Source
Standard circus ring	13 m	17.72 (length)	
Great Exhibition	1851	53.57 (age)	
Great Exhibition, duration	about 141 days	48.00	
Crystal Palace, area	10.4 ha	20.64 (area)	
Canterbury Hall opened	1852	53.57 (age)	
From the Canterbury to the peak of the halls (1878)	26 years	51.84	
Football Association founded	1863	53.51 (age)	
Meetings to agree the laws	44 days	46.94	
Steeplechase Park opened	1897	53.29 (age)	
Luna Park, 1903–1944	41 years	52.25	
Steeplechase Park, 1897–1964	67 years	52.70	

Table 11.1. The inventions of the mass age.

The Great Exhibition lasted about 141 days, which stands at 48.00: exactly layer 48. The music halls grew from the Canterbury to their peak in 26 years, one generation (51.84).

What the mass age shows

The five inventions share three features. Each built a fixed boundary: the ring, the hall, the palace, the pitch, the park wall. Each charged at the boundary: a penny, a shilling, a ticket. Each was fed by the railway, which turned a city's population into a single potential audience.

In the terms of chapter 1, the mass age built the edge in iron, glass and timetables. It made the closed window of play into a product that could be sold to millions. The next step was to take the window off the ground and put it on a screen.

12. The Moving Image

The mass age gathered people in one place. Film and television did the opposite. They copied the show and sent it to the people. A play needs its actors every night. A film needs them once. This chapter follows the step from the stage to the screen, and from the screen in the hall to the screen in the home.

The first paid screening

On 28 December 1895 Auguste and Louis Lumière held the first paid public film screening, in the Salon Indien, a basement room of the Grand Café on the Boulevard des Capucines in Paris.[209] The programme had ten short films. Each was about 17 m of film and ran for about 50 seconds.[210] The audience that first evening was small, about 35 to 40 people, each paying one franc.[211] Within weeks there were queues in the street.

There had been earlier projections, in Berlin and elsewhere, and earlier peep-show machines. The Lumière evening counts as the birth of cinema because it combined three things: projection on a screen for a whole audience, a paying public, and a fixed programme that could be repeated.[212]

Reading. A film is a fixed record of a performance. In the terms of chapter 1, it is a closed form that no longer needs its carriers to be present. The actors can go home; the form stays. This is the second form of the culture book, the form that lasts while its carriers are replaced, carried to its limit. On the screen the carriers are not even replaced. They are absent.

The studio age

In the United States, average weekly cinema attendance rose from 40 million in 1922 to 90 million in 1930.[213] It fell during the Depression and then rose again. It reached 90 million once more in 1946, 1947 and 1948.[214] In 1930 that was well over half of the population, every week.

The studios organised film as an industry. Eight companies produced most films. They owned the theatres, kept actors and directors on weekly salaries, and released a new programme every week. A film was made, shown for a week or two, and replaced.

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[209] [69] Wikipedia. Salon Indien du Grand Cafe; Auguste and Louis Lumiere (secondary). With Guinness World Records, First cinema in operation.

[210] [69] Wikipedia. Salon Indien du Grand Cafe; Auguste and Louis Lumiere (secondary). With Guinness World Records, First cinema in operation.

[211] [69] Wikipedia. Salon Indien du Grand Cafe; Auguste and Louis Lumiere (secondary). With Guinness World Records, First cinema in operation.

[212] [69] Wikipedia. Salon Indien du Grand Cafe; Auguste and Louis Lumiere (secondary). With Guinness World Records, First cinema in operation.

[213] [70] Historical Statistics of the United States, Millennial Edition, Table Dh388-391: Motion picture attendance 1922-1998. With Encyclopedia.com, The American Film Industry in the Early 1950s.

[214] [70] Historical Statistics of the United States, Millennial Edition, Table Dh388-391: Motion picture attendance 1922-1998. With Encyclopedia.com, The American Film Industry in the Early 1950s.

On 21 December 1937 Walt Disney's *Snow White and the Seven Dwarfs* premiered at the Carthay Circle Theatre in Los Angeles.[215] It was the first full-length cel-animated feature. It took about three years and nearly two million paintings, at a cost of about $1.5 million.[216] Earlier full-length animated films existed, in Argentina and Germany. Snow White was the first to turn animation into a mass feature.[217]

Television

On 2 November 1936 the BBC launched its television service from Alexandra Palace in London. It was the first regular service with a picture of 240 lines or more, which was then called high definition.[218] The war interrupted it. After 1945, television spread fast. In the United States 9 % of households had a set in 1950. Ten years later, by the Census Bureau's own history note, 65 % had one. Other series give 86–88 % by 1959–1960.[219]

As television spread, cinema shrank. Weekly attendance fell from 90 million in 1946 to 60 million in 1950 and 40 million in 1960.[220] Television was not the only cause. People moved to suburbs far from city cinemas, and spent money on houses and cars. But the direction is clear. The screen moved from the hall into the living room.

Case	Date or size	Position	Source
First paid film screening, Paris	1895	53.31 (age)	
One Lumière film	about 50 s	36.71	
Length of one film strip	about 17 m	17.97 (length)	
BBC television service	1936	52.97 (age)	
Snow White premiere	1937	52.96 (age)	
Snow White, running time	83 min	40.90	
Snow White, production	about 3 years	49.87	
Peak of US cinema attendance	1946	52.86 (age)	
TV spread, 9 % to most US homes	about 10 years	50.97	
From the Lumière screening to 2026	131 years	53.31	

Table 12.1. Film and television on the ladder.

[215] [71] Snow White and the Seven Dwarfs (1937): Encyclopaedia Britannica; History.com; Box Office Mojo.

[216] [71] Snow White and the Seven Dwarfs (1937): Encyclopaedia Britannica; History.com; Box Office Mojo.

[217] [71] Snow White and the Seven Dwarfs (1937): Encyclopaedia Britannica; History.com; Box Office Mojo.

[218] [73] Wikipedia. First day of BBC television (secondary).

[219] [72] US Census Bureau, History: September 2023 (television). With US Census Bureau 1958 statistical abstract table and FCC data.

[220] [70] Historical Statistics of the United States, Millennial Edition, Table Dh388-391: Motion picture attendance 1922-1998. With Encyclopedia.com, The American Film Industry in the Early 1950s.

Two births fall within one year of each other: BBC television in 1936 and Snow White in 1937. Both stand at 52.96–52.97 on the age scale. The open phase from the Lumière evening to the peak of cinema (1895–1946) lasted 51 years, two generations.

What the moving image shows

The screen did three things to amusement. It made the show reproducible: one performance, recorded once, could be shown a million times. It made the show portable: the same reel played in Paris and Chicago. And with television, it made the show private: the magic circle shrank to the size of a family room.

Each step cut a carrier. Cinema cut the live actor. Television cut the hall and the crowd. The next step, in chapter 13, cut the actor completely. In animation nothing on the screen ever existed in front of the camera. The form is pure relation.

13. Comics, Manga and Anime

Chapter 10 ended in Edo, with picture books for a mass public. Chapter 12 ended with animation, a screen on which nothing has ever stood before a camera. This chapter joins the two lines. It follows the comic strip from the New York newspaper war to Tokyo, and the Japanese comic from paper to screen. It ends with the largest exporter of drawn amusement in the world today.

The comic strip

In 1895 Richard Outcault began to draw a bald slum child in a yellow nightshirt for Joseph Pulitzer's *New York World*. The Yellow Kid became the first continuous comic character in the United States. Outcault's strips also fixed the speech balloon as the standard way to put words in a drawing.[221] In 1896 William Randolph Hearst lured Outcault away and launched a weekly eight-page colour comic supplement in his rival paper.[222] Every large paper soon needed its own comic page. Characters were sold on toys, buttons and soap. The comic strip was born as a weapon in a circulation war.

Manga after the war

In January 1947 a young medical student in Osaka, Tezuka Osamu, published *Shin Takarajima* (New Treasure Island) with the older artist Sakai Shichima.[223] It told an adventure across about 200 pages. Its panels moved like a film: close-ups, cuts, changes of angle, speed lines. Tezuka called this "story manga".[224] It is often said to have sold 400,000 copies. Given the paper shortages of 1947, the true figure may have been in the tens of thousands, still very high for a children's book.[225] A generation of later artists said that this book made them start drawing.

Tezuka took two traditions and joined them. From Disney and American film he took the movement and the cut. From Japan he took the long serial story, the picture scroll and the Edo picture book of chapter 10.

The weekly filter

In 1968 the publisher Shueisha launched *Shōnen Jump*. It became weekly in 1969.[226] It grew into the best-selling comic magazine in history. The New Year issue of 1995 reached 6.53 million copies.[227] When *Dragon Ball* and *Slam Dunk* ended, circulation fell to 4.15 million by 1998. In April–June

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[221] [74] Encyclopaedia Britannica. Comic strip: the evolution of the form. With Wikipedia, The Yellow Kid (secondary).

[222] [74] Encyclopaedia Britannica. Comic strip: the evolution of the form. With Wikipedia, The Yellow Kid (secondary).

[223] [75] Tezuka Productions, New Treasure Island (official site); nippon.com, Manga Media and Content in Postwar Japan; Japan Times (2008).

[224] [75] Tezuka Productions, New Treasure Island (official site); nippon.com, Manga Media and Content in Postwar Japan; Japan Times (2008).

[225] [75] Tezuka Productions, New Treasure Island (official site); nippon.com, Manga Media and Content in Postwar Japan; Japan Times (2008).

[226] [77] Wikipedia. Weekly Shonen Jump (secondary). With nippon.com (2026) and Anime Corner (2026) on the Japan Magazine Publishers Association figures.

[227] [77] Wikipedia. Weekly Shonen Jump (secondary). With nippon.com (2026) and Anime Corner (2026) on the Japan Magazine Publishers Association figures.

2026 the print edition averaged 985,000 copies, the first quarter below one million since audited figures began.[228] Most readers had moved to digital editions.

The magazine's method is a weekly reader survey. Each issue carries a postcard or online poll. The editors rank every series by its votes. A new series can be cancelled three weeks after its debut. The usual test is about ten weeks.[229]

Reading. The Jump survey is closure as an editorial rule: only what closes with the reader stays. It is the first form of the culture book, applied every week. A series that survives the filter becomes material for everything else: the anime, the film, the game, the toy. Anime mostly adapts manga that have already passed this test.

Anime: animation made scarce

On 1 January 1963 Fuji TV broadcast the first episode of Tezuka's *Tetsuwan Atom* (Astro Boy). It was a weekly half-hour animated series. Full animation in the Disney style needed 12 or more new drawings per second. For a weekly series that would have needed many times the labour of the whole Japanese animation industry.[230] Tezuka's studio cut the number to about eight new drawings per second, re-used cels, held still images and moved the camera over them. Tezuka is reported to have said: "it is not animation, it is anime".[231]

The shortage became a style. The theorist Thomas Lamarre calls it "animetism": flat layers that slide over each other, instead of the single deep perspective of cinema.[232] A character's face may stay still while hair and background move. The eye reads relations between layers, not continuous motion.

Reading. Anime is the fifth form of the culture book in pure form: reading keeps the relations and drops the rest. Limited animation keeps the key poses and their order. It drops the in-between frames. What remains is enough for the eye to close the movement itself.

The anime economy

The Association of Japanese Animations counts the whole anime market: TV, film, streaming, music, merchandise and live events, at home and abroad. In 2024 it was 3.84 trillion yen. In 2025 it was 4.45

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[228] [77] Wikipedia. Weekly Shonen Jump (secondary). With nippon.com (2026) and Anime Corner (2026) on the Japan Magazine Publishers Association figures.

[229] [78] Anime News Network (2017). Former Shonen Jump editor-in-chief: readers can decide manga's cancellation in first 3 weeks (interview with Nobuhiko Horie).

[230] [76] British Film Institute (Sight and Sound). The seeds of anime: how Japanese animation arose; Looping around limitations: the experimental shorts of Tezuka Osamu.

[231] [76] British Film Institute (Sight and Sound). The seeds of anime: how Japanese animation arose; Looping around limitations: the experimental shorts of Tezuka Osamu.

[232] [84] Lamarre, T. (2009). The Anime Machine: A Media Theory of Animation. Minneapolis: University of Minnesota Press.

trillion yen, about $28 billion.[233] The overseas share was 56 % in 2024 and 57.1 % in 2025. Overseas sales first passed domestic sales in 2020.[234] In ten years the market more than doubled.[235]

The film *Demon Slayer: Infinity Castle* (2025) earned about $793 million worldwide, the highest figure ever for a Japanese film.[236] Its story began in *Shōnen Jump* in 2016. Sony owns the animation producer Aniplex and the streaming service Crunchyroll, with 21 million paying subscribers.[237] Sony's chief problem is not demand but drawing hands: production time per series has grown from about one year to three or four, because there are too few animators.[238] Surveys report that about three in ten consumers worldwide watch anime weekly, and about half of the young.[239]

Case	Date or size	Position	Source
Yellow Kid in the New York World	1895	53.31 (age)	
Shin Takarajima	1947	52.85 (age)	
Astro Boy on TV	1963	52.64 (age)	
One anime drawing held on screen	about 1/8 s	31.26	
One weekly episode	30 min	39.98	
Shōnen Jump founded	1968	52.57 (age)	
Jump: founding to circulation peak	27 years	51.87	
Jump: peak to 2026	31 years	52.00	
Dragon Ball in Jump, 1984–1995	about 10.5 years	51.01	
Jump: first cancellation test	3 weeks	46.27	
Jump: usual cancellation test	10 weeks	47.37	
Overseas market passes domestic	2020	50.50 (age)	

[233] [79] Association of Japanese Animations, Anime Industry Report (preliminary figures at TIFFCOM, October 2025 and October 2026), as reported by Variety, Screen Daily and Anime News Network.

[234] [79] Association of Japanese Animations, Anime Industry Report (preliminary figures at TIFFCOM, October 2025 and October 2026), as reported by Variety, Screen Daily and Anime News Network.

[235] [79] Association of Japanese Animations, Anime Industry Report (preliminary figures at TIFFCOM, October 2025 and October 2026), as reported by Variety, Screen Daily and Anime News Network.

[236] [79] Association of Japanese Animations, Anime Industry Report (preliminary figures at TIFFCOM, October 2025 and October 2026), as reported by Variety, Screen Daily and Anime News Network.

[237] [80] Kim, S. (2026). Sony wil met anime de groei voor de komende decennia veiligstellen. Het Financieele Dagblad, 22 November 2026 (Bloomberg, trans. H. Scholten).

[238] [80] Kim, S. (2026). Sony wil met anime de groei voor de komende decennia veiligstellen. Het Financieele Dagblad, 22 November 2026 (Bloomberg, trans. H. Scholten).

[239] [85] Dentsu (2025). Anime fan survey; and NRG for Crunchyroll (2025), Gen Z and anime, as reported in trade press.

Case	Date or size	Position	Source
Production time per series now	about 3.5 years	50.01	

Table 13.1. Comics, manga and anime on the ladder.

Three observations stand out. First, Jump took 27 years from founding to peak: exactly one generation (51.87, the same value as the generation itself). Second, the time since the peak is 31 years, which stands at 52.00, the same value as the 31-year kibyōshi era in chapter 10. Third, a weekly episode of 30 minutes stands at 39.98, almost exactly layer 40. These are observations, not proof. Chapter 20 tests whether such coincidences occur more often than chance.

What manga and anime show

The comic strip began as a weapon in a newspaper war. Manga turned it into a long story. Jump added a filter. Anime added scarcity. Each step removed something and kept the relations. The result is a form that travels: a story that closed with millions of Japanese readers closes again with readers and viewers abroad, without translation of its structure.

The next chapter turns from the flat screen back to three dimensions: the park, where the visitor walks inside the story.

14. Parks and Places

The screen took amusement into the home. The park did the reverse. It built a whole world and let people walk into it. This chapter follows the amusement park from the pleasure garden of Copenhagen to the theme parks that now receive tens of millions of visitors a year.

The pleasure garden

The oldest amusement park still in use is Dyrehavsbakken, called Bakken, north of Copenhagen. Its history goes back to 1583.[240] The second oldest is Tivoli, in the centre of the same city. Georg Carstensen, a former army officer, obtained a royal licence and opened Tivoli on 15 August 1843 on about 15 acres of the old fortification glacis outside the western gate.[241] The story goes that he told King Christian VIII that people who are amused do not think about politics.[242] Tivoli offered gardens, lamps, concerts, a pantomime theatre and rides. Hans Christian Andersen was among the first visitors.

Carstensen said in 1844 that Tivoli would never be finished.[243] It is still open. In 2024 it received 4.25 million visitors.[244]

The enclosed park

Chapter 11 described Coney Island. Its parks added two things to the pleasure garden. They were mechanical: rides moved the visitor's body in ways no garden could. And they were enclosed and ticketed: one wall, one gate, one price. Luna Park's electric towers turned night into a show. Steeplechase sold the thrill of being thrown about.[245]

Disneyland

Walt Disney visited Tivoli and is said to have taken it as a model.[246] On 17 July 1955 he opened Disneyland in Anaheim, California. It had been built in one year, for $17 million, on 160 acres of former orange groves.[247] The opening day was for invited guests, but forged tickets brought the crowd to about 28,000. In its first year about 3.6 million people came.[248]

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[240] [81] Tivoli Gardens, The History of Tivoli Gardens (tivoli.dk). With Wikipedia, Tivoli Gardens (secondary).

[241] [81] Tivoli Gardens, The History of Tivoli Gardens (tivoli.dk). With Wikipedia, Tivoli Gardens (secondary).

[242] [81] Tivoli Gardens, The History of Tivoli Gardens (tivoli.dk). With Wikipedia, Tivoli Gardens (secondary).

[243] [81] Tivoli Gardens, The History of Tivoli Gardens (tivoli.dk). With Wikipedia, Tivoli Gardens (secondary).

[244] [81] Tivoli Gardens, The History of Tivoli Gardens (tivoli.dk). With Wikipedia, Tivoli Gardens (secondary).

[245] [68] Wikipedia. Steeplechase Park; Luna Park (Coney Island, 1903); Dreamland (Coney Island, 1904) (secondary). With Brooklyn Museum tech blog on Coney Island.

[246] [81] Tivoli Gardens, The History of Tivoli Gardens (tivoli.dk). With Wikipedia, Tivoli Gardens (secondary).

[247] [82] History.com. Disneyland opens (17 July 1955). With ABC7 (2021) and Reader's Digest on the first year.

[248] [82] History.com. Disneyland opens (17 July 1955). With ABC7 (2021) and Reader's Digest on the first year.

Disneyland added one thing that neither Tivoli nor Coney Island had: a single story. Its lands were not collections of rides. They were scenes from films the visitor already knew. The park was a film you could walk through. Like Carstensen, Disney said that his park would never be completed.[249]

Reading. The theme park joins the two lines of this book. The circle of play becomes a physical boundary with a gate. The screen story becomes the landscape inside it. In the terms of chapter 1, it is a closed window built to human scale: a membrane, an inside that tells one story, and a crowd that flows through while the form stays.

The global park

The Themed Entertainment Association counts the visitors to the largest parks each year. In 2024 the busiest was the Magic Kingdom in Florida, with about 17.8 million visitors. Disneyland itself came second, with 17.3 million. Universal Studios Japan was third. The 25 busiest theme parks together received almost 246 million visits.[250] Twelve of the 25 were Disney parks.[251]

Case	Date or size	Position	Source
Dyrehavsbakken, earliest date	1583	54.42 (age)	
Tivoli opened	1843	53.61 (age)	
Tivoli, area	about 15 acres	20.40 (area)	
Luna Park opened	1903	53.25 (age)	
Disneyland opened	1955	52.75 (age)	
Disneyland, construction time	1 year	48.87	
Disneyland, area	160 acres	21.48 (area)	
From Tivoli to Disneyland	112 years	53.17	
From Luna Park to Disneyland	52 years	52.47	
From Snow White to Disneyland	18 years	51.50	

Table 14.1. Parks on the ladder.

Bakken's 443 years stand at 54.42, beyond layer 54 (280 years): the longest-lived amusement place in this book so far, although the board games of chapter 5 lasted far longer. Tivoli's 183 years stand at 53.61, close to the 53.57 of the Great Exhibition and the Canterbury Hall, which opened within nine years of it.

[249] [81] Tivoli Gardens, The History of Tivoli Gardens (tivoli.dk). With Wikipedia, Tivoli Gardens (secondary).

[250] [83] Themed Entertainment Association and AECOM. TEA Global Experience Index 2024 (October 2025), as reported by Fox and Attractions Magazine.

[251] [83] Themed Entertainment Association and AECOM. TEA Global Experience Index 2024 (October 2025), as reported by Fox and Attractions Magazine.

What parks show

The park is the oldest and the newest form of mass amusement. Its gate repeats the magic circle. Its rides repeat the dizziness that Caillois called ilinx. Its themes repeat the screen. It survives because it offers what a screen cannot: the visitor's own body inside the form.

The history continues in the next chapters with the forms of the last fifty years: games, recorded music, global sport, streaming and fandom, and the new short forms made by algorithms and AI.

15. Games on Screens

Chapter 5 described the oldest board games. A board, a set of pieces and a few rules made a closed world for two players. The video game is the same thing, with the board replaced by a screen and the rules replaced by a program. In fifty years it has become the largest branch of amusement measured by money and by players.

A tavern in Sunnyvale

In 1972 the young company Atari placed a prototype arcade machine in Andy Capp's Tavern, a bar in Sunnyvale, California. The game was Pong: two paddles and a ball on a black screen. The instruction card had one line: avoid missing ball for high score. Within two weeks the machine stopped working. Its coin box, a cut-down milk carton, was jammed with quarters.[252] Atari sold about 2,500 machines in the first year and 8,000 the next.[253]

Pong was not the first electronic game. The Magnavox Odyssey, the first home console, had appeared earlier in 1972 with a similar tennis game.[254] Pong was the first to show that people would pay, again and again, to play on a screen.

The arcade and the console

In 1978 the Japanese company Taito released Space Invaders. It started the golden age of the arcade. American sales of arcade machines rose from $50 million in 1978 to $900 million in 1981.[255] Then the American home market collapsed in the crash of 1983. In the same year, on 15 July, Nintendo launched the Family Computer, or Famicom, in Japan.[256] It became the Nintendo Entertainment System in the West and revived the home console. For about twenty years Japanese companies led the industry.

Reading. The arcade machine is the music hall turn of chapter 11 made electronic. It is short, it is paid for at the boundary, and it repeats. The console moved the game into the home, as television had moved the film. The pattern of chapter 12 repeats one step further on.

Games today

In 2025 about 3.6 billion people played video games: 3 billion on mobile phones, 936 million on personal computers and 645 million on consoles.[257] Newzoo first forecast revenue at $188.8 billion. Its later count for the year was $201.6 billion, the first year above $200 billion. Mobile games alone

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[252] [86] Computer History Museum. Pong (Revolution exhibit) and 50 Years of Fun With Pong (2022). With American Heritage, The Mother of All Video Games.

[253] [86] Computer History Museum. Pong (Revolution exhibit) and 50 Years of Fun With Pong (2022). With American Heritage, The Mother of All Video Games.

[254] [86] Computer History Museum. Pong (Revolution exhibit) and 50 Years of Fun With Pong (2022). With American Heritage, The Mother of All Video Games.

[255] [87] The Strong National Museum of Play, Space Invaders (Hall of Fame 2016); Wikipedia, Golden age of arcade video games; Third generation of video game consoles (secondary).

[256] [87] The Strong National Museum of Play, Space Invaders (Hall of Fame 2016); Wikipedia, Golden age of arcade video games; Third generation of video game consoles (secondary).

[257] [88] Newzoo. Global Games Market Report 2025 (September 2025) and update (2026), as reported by PocketGamer.biz and PC Gamer.

earned $113.3 billion.[258] That is more than six times the revenue of recorded music in the same year (chapter 16).

Games have also become a spectator sport. The final of the League of Legends World Championship in 2024 had a peak of 6.86 million concurrent online viewers outside China, a record for esports. The 2025 final reached 6.75 million.[259]

Case	Date or size	Position	Source
Pong in Andy Capp's Tavern	1972	52.50 (age)	
From Pong to 2026	54 years	52.50	
Space Invaders	1978	52.39 (age)	
Arcade boom, 1978–1981	3 years	49.87	
Famicom launched	1983	52.29 (age)	
From Pong to the Famicom	11 years	51.05	
Video game players, 2025	3.58 billion	20.02 (count)	
Esports record peak, 2024	6.86 million	14.33 (count)	

Table 15.1. Games on the ladder. A count is placed as log3 of the number.

The number of players stands at 20.02: almost exactly 3 to the power 20. This is an observation. It says nothing yet about why.

What games show

The video game is the oldest form of play in a new medium. Huizinga's magic circle is the screen. Caillois's four kinds of play all appear: agon in esports, alea in loot boxes and card draws, mimicry in role-playing, ilinx in racing and flight. The program enforces the rules exactly. In the terms of chapter 1, a game is a closed window by construction. The player can only make the moves the program allows.

What is new is scale and feedback. A board game changed over centuries. A mobile game is changed every week, based on the data of millions of players. Chapter 13 showed the weekly filter of Jump. Games apply the same filter to every tap.

[258] [88] Newzoo. Global Games Market Report 2025 (September 2025) and update (2026), as reported by PocketGamer.biz and PC Gamer.

[259] [89] Esports Charts data as reported by Statista (2025) and esports.net (2025).

16. Music as Pastime

Music is older than any game in this book. Chapter 4 described bone flutes more than 40,000 years old. For almost all of that time, hearing music meant being where it was played. This chapter follows the step that changed that: the recording. It shows how recorded music moved from a saloon in San Francisco to a phone in every pocket.

The machine that plays

In 1877 Thomas Edison filed a patent for the phonograph, a machine that recorded sound on a cylinder and played it back.[260] Edison is said to have seen it first as a novelty. Others saw a business. On 23 November 1889 Louis Glass and William Arnold installed a coin-operated Edison phonograph in the Palais Royale Saloon in San Francisco. It had four listening tubes. A nickel paid for one song.[261] This "nickel-in-the-slot" player was the ancestor of the jukebox.

Radio

On 2 November 1920 the Westinghouse station KDKA in Pittsburgh broadcast the results of the presidential election. It was the first scheduled broadcast of a licensed commercial radio station.[262] Between the results it played music. Within a few years radio stations spread across America and Europe. Music, comedy, drama and sport came into the home for free, paid for by advertising or licence fees.

Reading. The phonograph and the radio did for music what film did for the stage. The performance was cut loose from the performer. A song recorded once could be played a million times. It is the second form of the culture book again: the form stays while the carriers are absent.

The festival

Recorded music did not end live music. It made it larger. From 15 to 18 August 1969 a festival on a dairy farm in Bethel, New York, drew about 400,000 people. Few tickets were sold, and most came in free.[263] Woodstock became the model of the modern festival: days of music in a temporary town, outside daily life. It is the carnival of chapter 8 rebuilt around a stage.

Streaming

Recorded music went through many carriers: the cylinder, the shellac disc, the vinyl LP, the cassette, the compact disc and the download. Each was replaced. Industry revenue fell to a low of $13.1 billion in 2014, when downloads collapsed and piracy was common.[264] Then streaming took over. In

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[260] [90] Hagley Museum and Library, On this day: the Palais Royale nickel-in-the-slot player; Yahoo/Mental Floss, Who invented the jukebox?

[261] [90] Hagley Museum and Library, On this day: the Palais Royale nickel-in-the-slot player; Yahoo/Mental Floss, Who invented the jukebox?

[262] [91] Federal Communications Commission (2020). Celebrating 100 Years of Commercial Radio. With IEEE Milestone: Westinghouse Radio Station KDKA, 1920; CBS News Pittsburgh, KDKA Firsts.

[263] [92] Encyclopaedia Britannica. Woodstock. With National Archives (Prologue blog, 2019).

[264] [93] IFPI (2026). Global Music Report 2026: State of the Industry. London: IFPI, 18 March 2026.

2025 global recorded music revenue was $31.7 billion, its eleventh year of growth. Streaming earned 69.6 % of it. There were 837 million paid streaming subscription users.[265]

Case	Date or size	Position	Source
Edison's phonograph patent	1877	53.43 (age)	
First coin-operated phonograph	1889	53.35 (age)	
KDKA's first broadcast	1920	53.12 (age)	
Woodstock	1969	52.55 (age)	
Woodstock, duration	4 days	44.76	
Woodstock, crowd	about 400,000	11.74 (count)	
Music revenue, low to 2025	11 years	51.05	
Paid streaming users, 2025	837 million	18.70 (count)	

Table 16.1. Music as pastime on the ladder.

The recovery of the music industry, from its low in 2014 to 2025, took 11 years. That is the same span as the step from Pong to the Famicom in chapter 15 (51.05). Both are a renewal of a medium by a new carrier.

What music shows

Music shows the full cycle of the five forms. It closes in a song that people want to hear again. The song outlives its carriers. Each carrier, from cylinder to stream, leaves a residue that becomes the alphabet of the next: the single song, sold one at a time from the first nickel machine, is still the unit of the stream. And the live festival keeps the edge where the recording cannot go: the shared body in a crowd.

Chapter 19 returns to music, because it is the first art in which machines now make a large share of new works.

[265] [93] IFPI (2026). Global Music Report 2026: State of the Industry. London: IFPI, 18 March 2026.

17. Sport as Spectacle

Chapter 6 described the games at Olympia, and chapter 11 the codified sports of Victorian Britain. This chapter follows sport from the playing field to the screen. In one century it became the largest shared event in human history: billions of people watching the same match at the same time.

The Olympic revival

In 1894 Pierre de Coubertin founded the International Olympic Committee. Two years later, from 6 to 15 April 1896, the first modern Olympic Games were held in Athens. There were 241 athletes, all men, from 14 nations, in 43 events.[266] The Games took the name, the place and the four-year rhythm of the ancient festival. They replaced the gods with nations.

The ancient games at Olympia had run from 776 BCE (chapter 6) until the late fourth century CE. The gap between their end and the revival was about 1,500 years.

The World Cup

On 13 July 1930 the first football World Cup began in Uruguay. Thirteen teams took part, all invited, without qualification. Only four came from Europe, because the journey was by ship. Uruguay beat Argentina 4–2 in the final.[267] In 2026 the tournament had 48 teams.[268] By FIFA's figures, the final of 2022 reached close to 1.5 billion viewers.[269]

Sport on television

Radio carried sport from the start. KDKA, the station of chapter 16, broadcast a world heavyweight boxing match in 1921.[270] Television made sport a picture. Today the largest audiences in television history are for sport. In the United States, Super Bowl LIX in February 2025 averaged 127.7 million viewers, with a peak of 137.7 million.[271] Rights to show such events are sold for billions: Fox's domestic NFL contract is reported at $2.25 billion a year.[272]

Reading. A match is the purest closed window in amusement. It has fixed rules, a fixed time and a fixed field. But its outcome is open. Nobody knows who will win. That combination, closed form with open result, is what draws the crowd. In the terms of chapter 2, it joins agon (the contest) with alea (the chance). The screen adds the shared moment: billions watching the same open window close at the same second.

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[266] [94] International Olympic Committee. Athens 1896: the revival of the Olympic Games (olympics.com).

[267] [95] Anadolu Agency (13 July 2026), Explainer: first World Cup kicked off today in 1930; FIFA audience data as reported by Sports Illustrated.

[268] [95] Anadolu Agency (13 July 2026), Explainer: first World Cup kicked off today in 1930; FIFA audience data as reported by Sports Illustrated.

[269] [95] Anadolu Agency (13 July 2026), Explainer: first World Cup kicked off today in 1930; FIFA audience data as reported by Sports Illustrated.

[270] [91] Federal Communications Commission (2020). Celebrating 100 Years of Commercial Radio. With IEEE Milestone: Westinghouse Radio Station KDKA, 1920; CBS News Pittsburgh, KDKA Firsts.

[271] [96] Nielsen (11 February 2025). Super Bowl LIX makes TV history with over 127 million viewers.

[272] [96] Nielsen (11 February 2025). Super Bowl LIX makes TV history with over 127 million viewers.

Case	Date or size	Position	Source
Athens Olympics	1896	53.30 (age)	
Athens Olympics, duration	10 days	45.60	
Athletes at Athens	241	4.99 (count)	
Gap from Olympia's end to Athens	about 1,500 years	55.53	
First World Cup	1930	53.02 (age)	
From Athens to the first World Cup	34 years	52.08	
World Cup final audience, 2022	about 1.5 billion	19.23 (count)	
Super Bowl LIX audience	127.7 million	16.99 (count)	

Table 17.1. Sport as spectacle on the ladder.

Three numbers fall close to whole values: 241 athletes at 4.99, the first World Cup at 53.02 and the Super Bowl audience at 16.99. Chapter 1 named the closure depths of the net: 1, 2, 5, 12, 41, 53. Two of the three values sit near those depths. These are observations. Chapter 20 tests how often such near-hits occur by chance in the catalogue.

What sport shows

Sport is the oldest public amusement that is still growing. It needs no story, no translation and no actor. The rules are the form. The players are carriers who are replaced every few years, while the club, the cup and the league remain. Chelsea or Ajax are the same club with an entirely new team. That is the second form of the culture book in its clearest case.

18. Streaming, Platforms and Fandom

Television sent one programme to everyone at the same time. The internet ended that. Each viewer now chooses what to watch and when. This chapter follows three platforms that changed amusement after 2005, and the fan communities that grew alongside them.

The platforms

On 23 April 2005 one of YouTube's founders uploaded the first video: 19 seconds of himself at the elephant enclosure of San Diego Zoo. In its first twenty years more than 20 billion videos were uploaded to the site.[273] YouTube turned every viewer into a possible broadcaster.

Netflix began in 1997 as a service that sent DVDs by mail. On 16 January 2007 it launched streaming. By 2025 it had more than 300 million paid memberships.[274] Netflix turned the television schedule into a library.

In June 2011 Twitch was launched as a spin-off of Justin.tv. It showed people playing video games live. Three years later Amazon bought it for about $970 million in cash. At that moment it had 55 million visitors a month.[275] Twitch turned playing into a show.

Reading. Each platform cut one more fixed element. YouTube cut the studio. Netflix cut the schedule. Twitch cut the line between player and audience. What remained is the relation between a maker and a viewer, measured by the platform at every moment. The platform is the edge of chapter 1: it decides what passes and what does not. Its filter is the algorithm, which works like the Jump survey of chapter 13, but in seconds instead of weeks.

Fandom

Fans existed before the internet. In Edo, as chapter 10 showed, audiences shouted the names of kabuki actors at the mie and bought cheap prints of their favourites. Modern fandom gathers in two places: online, and at conventions.

On 21 December 1975 three students held the first Comic Market, or Comiket, in a conference room in Tokyo. About 700 people came, with 32 circles selling self-published comics.[276] At its fiftieth anniversary Comiket drew about 300,000 visitors over two days.[277] In San Diego, the first Comic-Con in March 1970 was held in a hotel basement with 145 attendees. It now draws over 135,000.[278]

At these events fans do not only watch. They make their own comics, costumes and stories. Cosplay, dressing as a character, is the mimicry of Caillois in its pure form.

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[273] [97] Netflix and YouTube corporate histories as summarised by Wikipedia (secondary); AFP (2025), YouTube turns 20.

[274] [97] Netflix and YouTube corporate histories as summarised by Wikipedia (secondary); AFP (2025), YouTube turns 20.

[275] [98] Amazon.com, Inc. (25 August 2014). Amazon.com to Acquire Twitch (Form 8-K, Exhibit 99.1). With Britannica, Twitch.

[276] [99] nippon.com, Japan Data: Comiket, a small fan gathering that grew into a huge event; Anime News Network (2025), Comic Market 107. With Smithsonian, San Diego's first Comic-Con.

[277] [99] nippon.com, Japan Data: Comiket, a small fan gathering that grew into a huge event; Anime News Network (2025), Comic Market 107. With Smithsonian, San Diego's first Comic-Con.

[278] [99] nippon.com, Japan Data: Comiket, a small fan gathering that grew into a huge event; Anime News Network (2025), Comic Market 107. With Smithsonian, San Diego's first Comic-Con.

Case	Date or size	Position	Source
San Diego Comic-Con founded	1970	52.53 (age)	
Comic-Con, first attendance	145	4.53 (count)	
Comic-Con, attendance now	over 135,000	10.75 (count)	
First Comiket	1975	52.45 (age)	
Comiket, first attendance	about 700	5.96 (count)	
Comiket, 50th anniversary	about 300,000	11.48 (count)	
First YouTube video	2005	51.64 (age)	
Length of that video	19 s	35.83	
Netflix streaming launched	2007	51.55 (age)	
Twitch launched	2011	51.34 (age)	
Twitch, launch to sale	3 years	49.87	

Table 18.1. Platforms and fandom on the ladder.

Both conventions grew by about 6 steps of 3, from about 5–6 to about 11. That is a factor of several hundred to one thousand. Twitch went from launch to sale in 3 years (49.87), the same span as the arcade boom of chapter 15 and the production of Snow White in chapter 12.

What platforms and fandom show

The platform and the fan are two sides of one change. The platform removes every fixed boundary but one: its own filter. The fan rebuilds the boundaries that the platform removed. A convention is a gate, a hall and a date. A costume is a role. A fan comic is a closed story. Where the platform opens, the fandom closes again.

This matches the first form of the culture book: what closes, stays. The platform offers endless open material. People keep what closes for them, and gather around it.

19. Short Forms and Synthetic Forms

The last chapter of the history covers the newest forms. They share two features. They are short: a video of seconds, an episode of a minute or two. And more and more of them are made, chosen or completed by machines. This chapter describes what is known now, in late 2026. It does not predict. Chapter 22 looks ahead.

The short video

In September 2016 the Chinese company ByteDance launched Douyin, an app for short vertical videos. Its international version, TikTok, followed in 2017. On 27 September 2021 TikTok announced 1 billion monthly users, about five years after launch. Facebook, Instagram and YouTube had each needed more than seven years.[279]

The app does not ask the viewer to choose. It plays one short video after another, and learns from every swipe what to show next. The viewer's only act is to stay or to move on.

The microdrama

In China, the short video produced a new form of drama: the duanju, or microdrama. A microdrama is a serial told in vertical episodes of about 90 seconds to two minutes, each ending on a cliffhanger.[280] Viewers watch the first episodes free and pay, or watch advertisements, to unlock the rest. In China microdrama revenue grew from about $0.5 billion in 2021 to about $7 billion in 2024. By 2024–2025 it passed the country's own cinema box office.[281] Outside China, apps such as ReelShort and DramaBox earned about $2.7 billion in 2025. ReelShort alone earned $785 million.[282]

Reading. The microdrama is the opposite of the closed form. Every episode is built not to close. Its value lies in the open end that makes the viewer pay for the next one. In the terms of chapter 1 it lives in the open windows, the metabolism of tension. That is why it earns money fast, and also why it is unclear what will stay of it. A form that never closes leaves little residue.

The synthetic work

In January 2025 the French music service Deezer began to detect and tag songs made entirely by artificial intelligence. At the start, such tracks were 10 % of its daily uploads. By April 2026 they were 44 %, about 75,000 a day. In June 2026 they passed 50 %, about 90,000 a day.[283] Deezer tagged 13.4 million AI tracks in 2025. In a blind test, 97 % of listeners could not tell AI music from human music. Yet AI tracks drew only 1–3 % of streams, and many of those streams were judged fraudulent.[284]

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[279] [100] Guinness World Records. Fastest social media network to reach 1 billion monthly active users (TikTok, 2021).

[280] [101] Media Partners Asia (2025-2026). The Micro-Drama Economy; ReelShort / Crazy Maple Studio report; as reported by Variety and Indian Television. With CNBC (2025).

[281] [101] Media Partners Asia (2025-2026). The Micro-Drama Economy; ReelShort / Crazy Maple Studio report; as reported by Variety and Indian Television. With CNBC (2025).

[282] [101] Media Partners Asia (2025-2026). The Micro-Drama Economy; ReelShort / Crazy Maple Studio report; as reported by Variety and Indian Television. With CNBC (2025).

[283] [102] Deezer Newsroom (January 2025 - July 2026), as reported by TechCrunch and Engadget.

[284] [102] Deezer Newsroom (January 2025 - July 2026), as reported by TechCrunch and Engadget.

The same tools now generate images, voices, video and game levels. The cost of making a new work falls toward zero. The number of works rises without limit.

Case	Date or size	Position	Source
Douyin launched	2016	50.97 (age)	
TikTok, launch to 1 billion users	about 5.1 years	50.35	
Microdrama episode	90–120 s	37.25–37.51	
China microdrama boom, 2021–2024	3 years	49.87	
AI share of Deezer uploads, 10 % to over 50 %	about 1.5 years	49.24	
AI tracks uploaded per day, June 2026	about 90,000	10.38 (count)	

Table 19.1. Short and synthetic forms on the ladder.

The microdrama boom in China took 3 years (49.87). This is the fourth case in this book with the same span: the production of Snow White, the arcade boom and Twitch's path to sale. The rise of AI music on Deezer took about a year and a half.

What short and synthetic forms show

Two figures from this chapter belong together. Half of all new songs are now made by machines. They receive only a few percent of the listening. Making has become almost free. Closure has not. A song still has to close with a listener to stay, and most do not.

This is the situation in which the book's last part begins. When supply is endless, the filter is everything. Chapter 20 asks whether the history in this book shows a rhythm that such a filter could use.

Part III — Rhythms

20. The Rhythms of Amusement

The history chapters noted many positions that fall close to whole numbers on the ladder. Some fell close to the closure depths 1, 2, 5, 12, 41 and 53. Each time, the text said: this is an observation, not proof. This chapter does the test. It asks whether the catalogue of this book shows such near-hits more often than chance would give.

The method

The Trit Tile proposes a procedure for finding cycles in human data. It is called a cycle detector. Its steps are: place the data on a logarithmic scale; test the ratios 2 and 3; test the closure depths as candidate cycle lengths; and report a cycle only if it survives a test against shuffled data.[285] The Trit Tile adds two cautions. Log-periodic patterns are easy to find in noise. And human data are not as clean as the tile.

This book's catalogue is already on a logarithmic scale. Every position is log3 of a time, a length, an area or a count. The test therefore takes three steps.

- Clean the data. The catalogue v0.4 has 186 rows. Of these, 179 carry a single position. Removing exact duplicates of the same kind leaves 166 unique positions: 56 ages, 82 durations and 28 sizes and counts.
- Test the phase. If amusement had a rhythm with ratio 3, the fractional parts of the positions would cluster at one phase. A Rayleigh test measures this. The same test with the positions converted to base 2 checks ratio 2.
- Test the near-hits. Count the positions within 0.05 of a whole number, and within 0.05 of a closure depth. Compare each count with 20,000 shuffles. In each shuffle every position keeps its layer (its whole-number part) but gets a random fractional part. This keeps the spread of the data over the ladder and destroys only the fine placement.[286]

The results

Group	n	Mean distance to whole number (null 0.250)	Rayleigh p, ratio 3	Rayleigh p, ratio 2	Hits within 0.05 of a whole number (expected)	p	Hits within 0.05 of a closure depth	p
All	166	0.250	0.996	0.846	30 (16.6)	0.002	7	0.030
Ages	56	0.262	0.761	0.733	9 (5.6)	0.10	4	0.067
Durations	82	0.238	0.725	0.981	15 (8.2)	0.014	2	0.33
Sizes and counts	28	0.259	0.908	0.720	6 (2.8)	0.054	1	0.23

Table 20.1. The rhythm test on the catalogue v0.4.[287]

[285] [106] The Trit Tile, Section 21 (see [2]); this book's own test script rhythm_test.py, run on the catalogue v0.4 (22 November 2026).

[286] [106] The Trit Tile, Section 21 (see [2]); this book's own test script rhythm_test.py, run on the catalogue v0.4 (22 November 2026).

[287] [106] The Trit Tile, Section 21 (see [2]); this book's own test script rhythm_test.py, run on the catalogue v0.4 (22 November 2026).

The result has two sides.

First, there is no rhythm in the usual sense. The mean distance to a whole number is 0.250, exactly what chance gives. The Rayleigh tests find no preferred phase for ratio 3 (p = 0.996) or ratio 2 (p = 0.846). The positions as a whole are spread evenly over each layer.

Second, there is a narrow excess at the whole numbers themselves. Thirty positions lie within 0.05 of a whole number, where 16.6 are expected (p = 0.002). Seven lie near a closure depth (p = 0.03). Six of those seven are near 53: Huizinga's book, the one-day Olympic games, the first samba school, BBC television, Snow White and the first World Cup. The seventh is the 241 athletes of Athens at 4.99.

How strong is the excess?

Three checks weaken it.

The excess depends on the width of the window. Within 0.02 of a whole number there are 12 hits against 6.6 expected (p = 0.03). Within 0.10 there are 40 against 33.2 (p = 0.11). Within 0.25 there are 81 against 83 (p = 0.66). A real attraction to whole numbers would show at several widths. Here it shows only in a thin band.

Several tests were run. Four groups, five widths and three statistics make dozens of comparisons. Some small p-values are expected by chance alone. Only the result for all data at width 0.05 would survive a strict correction.

The catalogue is not blind. Its author chose which cases to put in the tables and saw the positions while writing. A near-hit, once noticed, was more likely to be kept and remarked on. The excess appears both in chapters 1–10 (15 hits, 8.8 expected) and in chapters 11–19 (15 hits, 7.8 expected), so it is not limited to one stage of the writing. But a selection effect of this kind is enough to produce a thin excess of the size found.

The six hits near 53 have a simpler explanation. An age position of 53.0 means an event about 93 years before 2026, that is in the early 1930s. Several founding events of modern amusement fall in that decade. That is a fact about history, not a sign of the ladder.

Conclusion of the test

The catalogue v0.4 shows no rhythm of amusement on the ladder with ratio 3 or ratio 2. The narrow excess at whole numbers is real in this data set but weak. It can be explained by the way the catalogue was built. It does not meet step 5 of the Trit Tile procedure, which requires a pattern that repeats across periods.

This is a negative result, and it is reported as such. It does not refute the net. It shows that this catalogue cannot decide the question. A fair test needs a catalogue built blind: every case of a fixed class (for example all theme park openings, or all Jump series with their start and end dates) taken from a register, with positions computed only after the list is closed. Chapter 22 proposes such a list.

The readings in Parts I and II remain what they were called there: readings. The forms of the culture book are a way to describe the history. This test gives no extra support to the numerical near-hits noted along the way.

21. The Economy of Amusement

The history chapters gave many figures for single branches. This chapter puts them side by side. It uses only figures already sourced in this book, plus three overall counts. All are for 2024–2026. All are in US dollars, as their sources give them.

The branches

Branch	Year	Revenue	Position (count)	Source
Video games, all platforms	2025	$201.6 billion	23.69	
Sports media rights	2026	$65.8 billion	22.67	
Cinema box office	2025	$33.6 billion	22.06	
Recorded music	2025	$31.7 billion	22.01	
Anime market (AJA definition)	2025	about $28.2 billion	21.90	
Microdrama, China	2024	about $7 billion	20.63	
Microdrama, outside China	2025	about $2.7 billion	19.77	
Entertainment and media, all	2024	$2.9 trillion	26.12	

Table 21.1. Revenue of amusement branches. Position is log3 of the dollar figure.

The figures do not add up. They measure different things. Recorded music counts only what labels and distributors receive. The anime figure counts the whole market around anime, including merchandise and events. Sports rights are what broadcasters pay, not what viewers pay. The PwC total includes internet access, the largest single part, which is not amusement at all.[288] Theme parks are missing from the table, because the attendance report used in chapter 14 gives visitors, not revenue: the 25 largest parks had almost 246 million visits in 2024.[289]

Four observations

Games are the largest branch by far. Video games earn more than six times recorded music and six times the cinema box office. Chapter 15 described how they reach 3.6 billion players.[290]

The middle of the table is flat. Sports rights, cinema, music and anime all sit between 21.9 and 22.7 on the ladder, within a factor of about two of each other. Four very different forms of amusement, with different histories, have reached revenues of the same order.

[288] [105] PwC (July 2025). Global Entertainment & Media Outlook 2025-2029. With press release, 24 July 2025.

[289] [83] Themed Entertainment Association and AECOM. TEA Global Experience Index 2024 (October 2025), as reported by Fox and Attractions Magazine.

[290] [88] Newzoo. Global Games Market Report 2025 (September 2025) and update (2026), as reported by PocketGamer.biz and PC Gamer.

The new forms grow fastest. Microdrama in China grew about fourteen-fold in three years, from about $0.5 billion to about $7 billion.[291] The overseas share of anime rose to 57 % in a decade.[292] Games passed $200 billion for the first time in 2025.[293]

The old forms recover slowly. Cinema in 2025 was still about 16 % below its pre-pandemic average.[294] Recorded music needed eleven years to climb from its low of 2014 to its record of 2025.[295]

Where the money is earned

Each branch earns at a different place. Chapter 11 showed the first rule of mass amusement: charge at the boundary. That rule still holds, but the boundary has moved.

- In games, the boundary is inside the game: an item, a level, a season pass.
- In sport, the boundary is the broadcast right: the fan pays a subscription; the broadcaster pays the league.
- In music and video streaming, the boundary is the monthly subscription.
- In anime, the largest share is earned abroad and on merchandise, far from the screen where the story is told.
- In microdrama, the boundary is placed inside the story itself: after a few free episodes, every cliffhanger is a toll gate.

Reading. In the terms of chapter 1, money is earned where a window must be crossed to close. The music hall charged at the door of a closed show. The microdrama charges at the open end of an episode. The newer the form, the closer the toll is to the moment of tension. Chapter 19 described the risk: a form built on open ends earns fast but leaves little that stays.

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[291] [101] Media Partners Asia (2025-2026). The Micro-Drama Economy; ReelShort / Crazy Maple Studio report; as reported by Variety and Indian Television. With CNBC (2025).

[292] [79] Association of Japanese Animations, Anime Industry Report (preliminary figures at TIFFCOM, October 2025 and October 2026), as reported by Variety, Screen Daily and Anime News Network.

[293] [88] Newzoo. Global Games Market Report 2025 (September 2025) and update (2026), as reported by PocketGamer.biz and PC Gamer.

[294] [103] Gower Street Analytics (January 2026). Highest grossing December since 2019 adds $3.5bn for $33.6bn global total in 2025 (gower.st).

[295] [93] IFPI (2026). Global Music Report 2026: State of the Industry. London: IFPI, 18 March 2026.

Part IV — Ahead

22. The Next Depth

This chapter looks ahead. It is a reading, not a forecast. It starts from three findings of this book. Making a work has become almost free (chapter 19). The filter that decides what stays has become the scarce part (chapters 13, 18 and 19). And the test of chapter 20 showed that numerical patterns need a blind catalogue before they can count. The chapter ends with a proposal that meets all three: maze-amusement.

What the history suggests

The third form of the culture book says that residue becomes the alphabet of the next depth. The history of amusement shows this many times. The pictures of the Edo floating world became the alphabet of manga. The newspaper strip became the alphabet of the comic book. The arcade became the alphabet of the console. Each new form took the closed pieces of the old one and combined them in a new way.

The synthetic forms of chapter 19 produce residue in enormous amounts. Half of all new songs uploaded to one service are made by machines. Few of them are heard.[296] The same holds for images, videos and texts. If the third form holds, the next depth will not be built from these works one by one. It will be built from the few pieces that close with people, chosen out of the mass by a filter.

Carse's distinction from chapter 2 is useful here. A finite game is played to win, and ends. An infinite game is played to keep the play going.[297] The long anime franchise is an infinite game: it closes episode after episode but never ends. The microdrama is neither. It does not close, and it ends when the viewer stops paying. A next depth would favour forms that close often and continue long: infinite games built from closed parts.

The author's earlier essays pointed in the same direction. In 2007 he read Bakhtin's carnival as a worldwide pattern that returns in the age of the network.[298] In 2022 he described a shift from a society that lives together to one that plays together, and named play and the infinite game as the way through.[299] This book's history gives that reading a body of cases. It does not prove it.

Maze-amusement: a proposal

The MAZE is the author's own platform. It cannot copy what the large studios own: capital, distribution, teams of animators and decades of intellectual property. It can copy the mechanism that made manga and anime work. Tezuka in 1963 had too few hands and turned the shortage into a style (chapter 13). A small platform with endless machine output has the opposite shortage: too much material and too little attention. The answer is the same in mirror image. Make the filter the core.

The proposal has five parts.

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[296] [102] Deezer Newsroom (January 2025 - July 2026), as reported by TechCrunch and Engadget.

[297] [9] Carse, J. P. (1986). Finite and Infinite Games: A Vision of Life as Play and Possibility. New York: Free Press.

[298] [4] Konstapel, J. (2007). The Wordwide Carnival: An Introduction into the World of Mikhail Bakhtin. constable.blog, 2 September 2007. https://constable.blog/2007/09/02/wordwide-carnival-introduction-world-mikhail-bakhtin/

[299] [5] Konstapel, J. (2022). van SamenLeving naar SamenSpeling (Singularity). constable.blog, 2 August 2022. https://constable.blog/2022/08/02/singularity/

- Material from three directions. Old material from the public domain and the MAZE library. Existing material from the MAZE itself. And new stories. In the terms of the net these are the −1, 0 and +1 of one window.
- Short chapters. Each story appears in short chapters on the platform, like the weekly chapters of Jump.
- A reader filter. Readers vote on each chapter. A story that does not close with its readers stops, as Jump stops a series after a few weeks (chapter 13).[300]
- A ladder of steps of three. A story that survives 3 chapters gets 9; one that survives 9 gets 27; one that survives 27 becomes a season. Only what closes climbs.
- A live edge. Each season ends in a live event, such as an exhibition or a reading. The live meeting is the membrane where the screen cannot go.

How it would be tested

The proposal includes the blind catalogue that chapter 20 asked for. Every story, its start date, its length and its fate are recorded from the first day, before anyone computes a position. The Trit Tile then offers a definite expectation for one quantity. In the number system of the tile, the share of numbers that turn instead of closing does not settle. It swings between 29.6 % and 32.0 % with a period of three, and only its logarithmic mean (30.89 %) is stable.[301] If stories behaved like the tile, the share of stories that keep going at each step of three would swing in the same way.

This is a hypothesis, not a claim. The tile is proved for its number system. Its transfer to stories is a reading. A first test can be run before anything is built: the published rankings of Weekly Shōnen Jump give the start and end of every series. They would show whether the survivors and the dropouts separate in the way the tile suggests. If they do not, the reading fails, and the book will say so.

What this chapter does not say

It does not say which forms will win. It does not say that AI will end human art, or that it will not. It says only this: when making is free, the filter is the work. A filter that is built openly, with a blind record, can be tested. Maze-amusement is offered as such a filter.

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[300] [78] Anime News Network (2017). Former Shonen Jump editor-in-chief: readers can decide manga's cancellation in first 3 weeks (interview with Nobuhiko Horie).

[301] [2] Konstapel, J. (2026). The Trit Tile: a reference work on a number system that never settles, version 1.1, 21 November 2026. Constable Research, Leiden.

23. The Ladder of Amusement

This last chapter gathers the positions of the whole book into one ladder. Each step of the ladder is a layer: a band of time three times longer than the one below. The table lists, for each layer, its span and the cases of this book that fall in it. It is a map, not a theory. Chapter 20 showed that the fine placement of cases within a layer carries no proven rhythm. The coarse placement, by layer, is what this chapter shows.

The durations of amusement

Layer	Span	Cases in this book (position)
31	0.09–0.28 s	One anime drawing held on screen (31.26)
35–36	8 s – 1 min	The first YouTube video (35.83); one Lumière film (36.71)
37	1–3 min	A microdrama episode (37.25–37.51)
39–40	10 min – 1.5 h	A weekly anime episode (39.98); Snow White (40.90)
44	2–5 days	Woodstock (44.76); Saturnalia under Augustus (44.50); festivals of three to five days
45	5–16 days	The Athens Olympics (45.60); the Ludi Romani in imperial times (45.96)
46–47	2 weeks – 5 months	Jump's cancellation tests (46.27, 47.37); the FA's meetings on the laws (46.94)
48	5 months – 1 year	The Great Exhibition (48.00); building Disneyland (48.87)
49	1–3.5 years	Snow White's production, the arcade boom, Twitch to its sale, the microdrama boom (all 49.87); the rise of AI music on Deezer (49.24)
50	3.5–10 years	Production of an anime series now (50.01); the Olympiad (50.13); TikTok to one billion users (50.35); the spread of television (50.97)
51	10–31 years	Dragon Ball in Jump (51.01); Pong to the Famicom (51.05); the recovery of music (51.05); Jump's rise to its peak (51.87); the phases of early kabuki (51.72–51.84)
52	31–93 years	The kibyōshi era and Jump since its peak (both 52.00); Athens to the first World Cup (52.08); Luna Park (52.25); Steeplechase Park (52.70)
53	93–280 years	Tivoli to Disneyland (53.17); the Lumière screening to now (53.31); the carnival of Rio and of Venice (about 53.7)
54	280–840 years	The Ludi Romani as the only public games (54.03); the Colosseum games (54.13); the Feast of Fools (54.43)
55	840–2,500 years	The ancient Olympic games (55.30); the gap before their revival (55.53); chaturanga to modern chess (55.09)
56	2,500–7,600 years	The stage of the City Dionysia (56.01); the contest at Olympia (56.10); the Mesoamerican ballcourt (56.28)

Layer	Span	Cases in this book (position)
57	7,600–23,000 years	The 'Ain Ghazal board (57.16); the Folsom lots (57.48)
58	23,000–68,000 years	The flutes of Hohle Fels and Geissenklösterle (58.39–58.57)

Table 23.1. The ladder of amusement: durations and ages of forms, by layer.

Reading the ladder

Four bands stand out.

The band of the moment, layers 31 to 40, holds the units that the eye and ear take in: a held drawing, a short video, an episode, a feature film. Each new medium in this book chose a unit in this band. The trend in the last hundred years has been downward: from the 83-minute feature to the 30-minute episode to the 90-second microdrama.

The band of the festival, layers 44 and 45, holds the feast. From the Saturnalia to Woodstock and the modern Olympics, a festival lasts days, not hours or months. This span has hardly changed in 2,500 years.

The band of the boom, layers 49 to 51, holds how long a new form takes to rise. Four very different booms in this book each took about three years: the making of Snow White, the arcade boom, Twitch's path to its sale, and the microdrama boom in China. A generation-long span (layer 51) holds the slower renewals: Jump's rise to its peak, the phases of kabuki, the recovery of recorded music.

The band of the institution, layers 52 to 56, holds forms that outlive their carriers: parks, festivals, carnivals, games and theatres. The longest-lived forms in this book, from board games to the Olympic contest to the stage, sit in layers 55 to 57. At the top, in layer 58, stand the bone flutes, the oldest instruments known.

The ladder and the five forms

The five forms of the culture book fit the four bands.

- What closes stays. The band of the moment holds the units that must close each time: a scene, an episode, a song.
- The form lasts while its carriers are replaced. The band of the institution holds the forms that have outlived thousands of players, actors and fans.
- Residue becomes the alphabet of the next depth. The band of the boom holds the moments when the pieces of an old form were recombined into a new one.
- A union opens once and is then filled many times. The festival opens a window of days that is filled again every year.
- Reading keeps the relations and drops the rest. Every step down the band of the moment, from feature film to microdrama, kept the relations of a story and dropped more of its body.

Close

This book set out to tell the history of amusement from the first playing animals to the synthetic forms of 2026, and to read it through one rule: only what closes, stays. The history is told. The

readings are offered. The numerical test of chapter 20 found no proven rhythm in this catalogue. That leaves the next step clear. Build a blind catalogue, run the test again, and let the data decide.

Annotated references

Each entry gives the source and a short note on what it holds and how this book uses it. Entries marked secondary are reference works or reports, not original studies.

[1] Konstapel, J. (2026). Vacuum.Net Theory, Ninth Edition: Foundations 9.2 and Physics 9.0. Constable Research, Leiden.

Primary source of the theory. The single strand, closure, the trits, the ladders x2 and x3 and the closure depths. Read first for the vocabulary of this book.

[2] Konstapel, J. (2026). The Trit Tile: a reference work on a number system that never settles, version 1.1, 21 November 2026. Constable Research, Leiden.

Proves that the share of non-closing points in the plane trit system has no limit and swings with period 3. Gives the cycle detector used in Part III of this book.

[3] Konstapel, J. (2026). The History of Culture on the Net: A Reference Work on Human Culture and the Vacuum.Net, version 1.0, 15 October 2026. Constable Research, Leiden.

The companion book. Defines the ladder of positions used here and tells culture kind by kind. It holds almost nothing on play, which is why this book exists.

[4] Konstapel, J. (2007). The Wordwide Carnival: An Introduction into the World of Mikhail Bakhtin. constable.blog, 2 September 2007. https://constable.blog/2007/09/02/wordwide-carnival-introduction-world-mikhail-bakhtin/

The author's first reading of Bakhtin: chronotope as knot, citation, dialogue against monologue, a 250-year cycle of Western chronotopes and the prediction of a worldwide carnival.

[5] Konstapel, J. (2022). van SamenLeving naar SamenSpeling (Singularity). constable.blog, 2 August 2022. https://constable.blog/2022/08/02/singularity/

Forecast for 2022-2042: society turning into a society of play; Reckwitz's singularities, the experience economy, winner-takes-all and the infinite game.

[6] Huizinga, J. (1938). Homo Ludens: Proeve eener bepaling van het spel-element der cultuur. Haarlem: Tjeenk Willink. English edition: Homo Ludens: A Study of the Play-Element in Culture. London: Routledge & Kegan Paul, 1949; Boston: Beacon, 1955.

The founding book of play studies, written in Leiden. Play is free, outside ordinary life, bounded in place and time, and creates order. Source of the 'magic circle'.

[7] Stenros, J. (2014). In Defence of a Magic Circle: The Social, Mental and Cultural Boundaries of Play. Transactions of the Digital Games Research Association 1(2).

Traces the magic circle back to Huizinga's text and separates its social, mental and cultural boundaries. Useful for the closure reading of play.

[8] Caillois, R. (1958). Les jeux et les hommes. Paris: Gallimard. English: Man, Play and Games, trans. M. Barash. New York: Free Press, 1961; Urbana: University of Illinois Press, 2001.

Four kinds of play - agon, alea, mimicry, ilinx - and the axis from paidia (free play) to ludus (play with rules). The standard taxonomy.

[9] Carse, J. P. (1986). Finite and Infinite Games: A Vision of Life as Play and Possibility. New York: Free Press.

Finite games are played to win and end; infinite games are played to continue the play. The distinction maps on closing and turning orbits of the trit tile.

[10] Bakhtin, M. M. (1965). Tvorchestvo Fransua Rable i narodnaya kul'tura srednevekov'ya i Renessansa. Moscow. English: Rabelais and His World, trans. H. Iswolsky. Cambridge, MA: MIT Press, 1968. New translation by S. Sandler, 2025.

Written in 1940, published 1965. Carnival as a social institution and grotesque realism as a literary mode; carnival is life shaped by a pattern of play.

[11] Pine, B. J. II and Gilmore, J. H. (1998). Welcome to the Experience Economy. Harvard Business Review, July-August 1998 (reprint 98407). Book: The Experience Economy, Harvard Business School Press, 1999.

Experiences as a distinct economic offering after goods and services; the progression of economic value. The economic frame for modern amusement.

[12] Burghardt, G. M. (2005). The Genesis of Animal Play: Testing the Limits. Cambridge, MA: MIT Press.

Five criteria for play that work across species. Summed up by the author as repeated, incompletely functional, voluntary behaviour in a relaxed setting.

[13] Galpayage Dona, H. S., Solvi, C., Kowalewska, A., Makela, K., et al., with Chittka, L. (2022). Do bumble bees play? Animal Behaviour 194, 239-251. DOI 10.1016/j.anbehav.2022.08.013

First systematic evidence of object play in an insect: bumble bees roll wooden balls without reward. Applies Burghardt's criteria.

[14] Reinhold, A. S., Sanguinetti-Scheck, J. I., Hartmann, K. and Brecht, M. (2019). Behavioral and neural correlates of hide-and-seek in rats. Science 365(6458), 1180-1183. DOI 10.1126/science.aax4705

Rats learn hide-and-seek in weeks, play strategically and jump and call when they win. Play with rules and roles in a rodent.

[15] Panksepp, J. and Burgdorf, J. (2003). 'Laughing' rats and the evolutionary antecedents of human joy? Physiology & Behavior 79 (2003). PubMed 12954448.

Play and tickling evoke 50-kHz ultrasonic chirps in young rats; the authors read them as a primitive form of laughter.

[16] Higham, T., et al., with Conard, N. J. (2012). New radiocarbon chronology for Geissenkloesterle Cave and the beginnings of the Aurignacian. Journal of Human Evolution (2012); reported by the University of Oxford, 25 May 2012.

Dates the layers with bird-bone and ivory flutes at Geissenkloesterle to 42,000-43,000 years ago: the oldest known musical instruments.

[17] Madden, R. J. (2026). Probability in the Pleistocene: Origins and Antiquity of Native American Dice, Games of Chance, and Gambling. American Antiquity, published online 2 April 2026. Cambridge University Press.

Builds a test for two-sided dice (binary lots) from 293 historic sets and finds them at Folsom sites 12,800-12,200 years old: the oldest dice known.

[18] Rollefson, G. O. (1992). A Neolithic Game Board from 'Ain Ghazal, Jordan. Bulletin of the American Schools of Oriental Research (1992).

Publishes a limestone slab with rows of pits from 'Ain Ghazal, read as a mancala-like board. Start of the Neolithic game-board debate.

[19] Jordan Times (2019-2022). Reports on Neolithic game boards in Jordan: Rollefson interviews and 'Jordanian scholar works to put the pieces together of Neolithic board games', 22 August 2022 (Mahasneh lecture).

Lists complete Neolithic boards at Beidha, 'Ain Ghazal, Es-Sifiya, Abu-Tulayha and Hamarash; 25 limestone boards at Abu-Tulayha. Secondary.

[20] Board Game Studies Journal 15 (2021). Article on persistent factoids about senet. DOI 10.2478/bgs-2021-0002

Critical review of the claim that senet is the oldest game: First Dynasty ivory squares at Abu Rawash (c. 3100-2900 BCE) and the Hesy-Re painting (2686-2613 BCE).

[21] Wikipedia. Senet. https://en.wikipedia.org/wiki/Senet (secondary)

Overview: 30 squares, earliest unequivocal painting in the mastaba of Hesy-Re, c. 2620 BCE; later scenes with Nefertari and Tutankhamun.

[22] Finkel, I. L. (2007). On the Rules for the Royal Game of Ur. In I. L. Finkel (ed.), Ancient Board Games in Perspective: Papers from the 1990 British Museum Colloquium. London: British Museum Press, 16-32.

Reconstructs the rules of the Game of Twenty Squares from a Babylonian tablet of 177 BCE, more than two thousand years after the Ur boards.

[23] British Museum (blog). Top 10 historical board games. https://www.britishmuseum.org/blog/top-10-historical-board-games

Dates the Ur board to 2600-2400 BCE and the rules tablet to 177 BCE, written by a Babylonian astronomer.

[24] Metropolitan Museum of Art. Board Games from Ancient Egypt and the Near East (essay). https://www.metmuseum.org/essays/board-games-from-ancient-egypt-and-the-near-east

Games travelled with war and trade; throw sticks in Egypt since the Predynastic period; cubic dice probably from the Indus Valley.

[25] Encyclopaedia Iranica. Board games in pre-Islamic Persia (entry). https://www.iranicaonline.org

Snake-shaped board from Shahr-e Sukhta (Burnt City), and a board found with two cubic dice reported in 2004.

[26] Biblical Archaeology Society. Ancient games (Bible History Daily).

Earliest dice from the Indus Valley and Early Dynastic III Mesopotamia (c. 2500-2300 BCE); knucklebones (astragali) as earlier randomisers. Secondary.

[27] Metropolitan Museum of Art. The Mesoamerican Ballgame (essay). https://www.metmuseum.org/essays/the-mesoamerican-ballgame

Oldest ballcourt at Paso de la Amada (c. 1400 BCE), rubber balls at El Manatí (c. 1600 BCE), largest court at Chichen Itza (96.5 m).

[28] Encyclopaedia Britannica. Ancient Olympic Games. https://www.britannica.com/sports/ancient-Olympic-Games

Olympia from 776 BCE to about 393 CE; first champion Coroebus of Elis; the stade race of about 192 m.

[29] Guinness World Records. First Olympic Games.

One-day event until 684 BCE, then three and later five days; up to about 40,000 spectators at the peak. Secondary.

[30] Encyclopaedia Britannica. Thespis; Western theatre: Ancient Greece.

Thespis, first actor, won the first tragedy contest at the City Dionysia, c. 534 BCE.

[31] Hall, E. (2018). The Theatre of Dionysus. Gresham College lecture, 29 November 2018.

The story of Thespis the travelling mummer with his wagon and masks; the theatre on the south slope of the Acropolis.

[32] Grout, J. Encyclopaedia Romana: Saturnalia; Roman Holidays (ludi). University of Chicago (penelope.uchicago.edu).

Saturnalia from 17 December, seven days in Cicero's time, cut to three by Augustus, five under Caligula; the ludi from the Ludi Romani of 509 BCE; more than half of April given to games in the late Republic.

[33] Encyclopaedia Britannica. Colosseum. https://www.britannica.com/topic/Colosseum

Dedicated by Titus in 80 CE with 100 days of games; about 50,000 seats under a velarium.

[34] Encyclopaedia Britannica. Circus Maximus.

About 150,000 seats after Caesar; under Constantine about 610 x 190 m with possibly 250,000 seats.

[35] Juvenal. Satires X.77-81 (c. 100 CE). Via Wikipedia, Bread and circuses (secondary).

The people that once gave commands and legions now anxiously hope for two things only: bread and circuses.

[36] World History Encyclopedia (Cartwright, M.). Colosseum; Circus Maximus.

Games in the Colosseum from 80 to 404 CE; last chariot race in the Circus Maximus in 549 CE. Secondary.

[37] Wikipedia. Paleolithic flute. https://en.wikipedia.org/wiki/Bone_flute (secondary)

Swabian flutes of the Aurignacian, 43,000-35,000 years old; Hohle Fels vulture-radius flute with five finger holes; found with the oldest figurative art; disputed Divje Babe find.

[38] Traditional Games (tradgames.org.uk). Neolithic games. https://www.tradgames.org.uk/games/neolithic-games.htm

Describes the 'Ain Ghazal limestone slab (about 39 x 23 cm) and the debate on whether it is an early mancala board. Secondary.

[39] Wikipedia. Royal Game of Ur. https://en.wikipedia.org/wiki/Royal_Game_of_Ur (secondary); J. Paul Getty Museum, 'Adventures with the Royal Game of Ur' (Finkel lecture notice).

Five boards from Woolley's excavation; boards from Crete to Sri Lanka; rules tablet by Itti-Marduk-balatu; play in Kochi until the 1950s; three thousand years of play.

[40] Wikipedia. Theatre of ancient Greece. https://en.wikipedia.org/wiki/Theatre_of_ancient_Greece (secondary)

Tragedy created in Athens around 532 BCE with Thespis; first comedy contest about 486 BCE; the Dionysia exported to the colonies.

[41] Lonely Planet. Theatre of Dionysos, Athens (site description).

Rebuilt in stone and marble by Lycurgus, 342-326 BCE, with about 17,000 seats on 64 tiers, of which about 20 survive. Secondary.

[42] Encyclopaedia Britannica. Feast of Fools.

Popular festival on or about 1 January, especially in France: a mock bishop or pope elected, ritual parodied, high and low officials changed places; banned by the Council of Basel but alive until the 16th century.

[43] Catholic Encyclopedia (New Advent / catholic.org). Feast of Fools; Feast of Asses.

Eudes de Sully regulated the feast at Notre-Dame in 1199; Robert Grosseteste opposed it; the Council of Basle forbade it under severe penalties in 1435.

[44] Encyclopedia.com. Boy Bishop; Feast of Fools.

Choirboys elected a boy bishop for Holy Innocents' Day (28 December), often on 6 December; in England recorded from the 13th to the 16th century. Secondary.

[45] Wikipedia. Carnival of Venice; Lord of Misrule. https://en.wikipedia.org/wiki/Carnival_of_Venice (secondary)

Legendary start after the victory over the Patriarch of Aquileia in 1162; masks such as the bauta; masks allowed from 26 December to Shrove Tuesday; Henry VIII abolished the English boy bishop in 1541.

[46] Culture Trip and TheCollector (2017-2026). Histories of the Carnival of Venice.

Public pre-Lenten festivities recorded in 1094; the Senate made the day before Lent a public holiday in 1296. Secondary.

[47] Kunsthistorisches Museum Wien. Pieter Bruegel the Elder, The Fight between Carnival and Lent, 1559, inv. GG 1016.

Oak panel, 118 x 163.7 cm, signed and dated 1559; nearly 200 figures between an inn (Carnival) and a church (Lent).

[48] Rio Carnival histories: riocarnaval.org; rio.com; Yale-New Haven Teachers Institute unit 00.05.06; Wikipedia, Sambadrome Marques de Sapucai.

Entrudo brought by Portuguese settlers, first records 1723; first samba school (Deixa Falar or Mangueira) 1928; Sambadrome by Oscar Niemeyer opened 2 March 1984, about half a mile long. Secondary.

[49] Wikipedia. Noh; Zeami Motokiyo (secondary); Japan Reports (Embassy of Japan in Australia), Nogaku, Autumn 2014.

Kan'ami (1333-1384) and Zeami (1363-1443) made Noh from sarugaku; patronage of Ashikaga Yoshimitsu from 1374; UNESCO intangible heritage (2008); the oldest living theatre.

[50] Government of Japan, Highlighting Japan, July 2017: Noh (interview with Kanze Kiyokazu).

About 250 types of Noh masks; the Kanze school with about 700 performers; Zeami's aim to calm the souls of the dead and portray humanity.

[51] Globe Theatre: Wikipedia; History Hit; Folger Shakespeare Library essays (secondary).

Built 1599 on Bankside from the timbers of The Theatre (1576); about 30 m across; up to 3,000 spectators; groundlings paid a penny to stand; burned 29 June 1613, rebuilt 1614, closed 1642.

[52] Metropolitan Museum of Art. Commedia dell'arte (Heilbrunn essay, Meagher 2007); Encyclopaedia Britannica, commedia dell'arte.

Improvised comedy with stock masked characters; the earliest known company formed in Padua in 1545; women in companies by 1560; touring abroad from the 1570s.

[53] Peking opera: Wikipedia; China Daily (2015, 2017); The China Project (2022).

The Four Great Anhui Troupes came to Beijing in 1790 for the Qianlong Emperor's 80th birthday; Hubei troupes joined in 1828; the form was complete by about 1845; UNESCO 2010; theatres burned in 1900.

[54] Go: Wikipedia, Go (game); History of Go (secondary).

Earliest written reference in the Zuo Zhuan for 548 BCE; Han boards of 17 x 17 lines (289 points); 19 x 19 standard (361 points); about 2.1 x 10^170 legal positions.

[55] Encyclopaedia Britannica. Chess: History.

No credible evidence of chess before the 6th century CE; chaturanga in northwestern India by the 7th century; shatranj in Persia and the Islamic world; the modern queen and bishop after 1475.

[56] Encyclopaedia Britannica. Playing card. With Wikipedia, Playing card (secondary).

Cards first appear in Europe in the 1370s via Mamluk Egypt; Chinese 'leaf game' of 868 is often cited as the first card game, but the identification is disputed.

[57] Encyclopaedia Britannica. Okuni; Kabuki. With Web Japan, Kabuki (Embassy of Japan).

Okuni's troupe performed on the dry bed of the Kamo River in Kyoto in 1603; women banned from the stage in 1629, young men in 1652; adult men took over all roles.

[58] Chikamatsu Monzaemon: Encyclopaedia Britannica; Wikipedia, The Love Suicides at Sonezaki (secondary); Web Japan, Bunraku.

Sonezaki Shinju written within a fortnight of a real double suicide and staged on 20 June 1703; it revived the Takemoto-za; the shogunate banned love-suicide plays in 1722.

[59] Hokusai Manga: Metropolitan Museum of Art, Random Sketches by Hokusai (collection record); Wikipedia (secondary).

First volume 1814, when Hokusai was 55; ten volumes to 1819, fifteen in all by 1878; about 4,000 images; a precursor of modern manga.

[60] Kibyoshi: Tokyo Metropolitan Library, Kinkin-sensei's Dream of Splendor (Koikawa Harumachi, 1775); Kern, A. L. (2006), Manga from the Floating World, Harvard University Press.

Yellow-cover picture books for adults from 1775 to about 1806; text and dialogue inside the picture, close to speech balloons; censored after the Kansei reforms.

[61] Edo population: Tokyo Metropolitan Library, The Great Edo Metropolis; Encyclopaedia Britannica, Japan: the Tokugawa status system; RISD Museum, The Pleasure of Edo.

More than one million people in the early 18th century; London about 860,000 in 1801; the Shin Yoshiwara licensed quarter from 1657.

[62] Wikipedia. Mie (pose); Kabuki (secondary). With Shochiku, Kabuki-ko vol. 5.

The mie, a frozen pose at the emotional peak, credited to Ichikawa Danjuro I in the Genroku period; tokusatsu heroes' poses derived from it.

[63] Wikipedia. Edo period (secondary).

Sakoku: by 1639 all foreigners expelled except Dutch traders on Dejima; Perry's ships in 1853; the Edo period from 1603 to 1868.

[64] Encyclopaedia Britannica. Circus: Philip Astley and the first circuses. With Wikipedia, Philip Astley (secondary).

Astley's first public show in Lambeth in 1768; a first ring about 19 m across, later fixed at 42 ft (13 m), the standard ever since; acts of riders, acrobats and clowns joined into one show.

[65] Victoria and Albert Museum. Music hall and variety theatre. With Wikipedia, Canterbury Music Hall; Music hall (secondary).

Charles Morton opened the Canterbury Hall in Lambeth in 1852, 700 seats at tables with food and drink; by 1865 London had 32 large halls, in 1878 78 large halls and 300 smaller venues.

[66] Wikipedia. Great Exhibition (secondary); Museum of London, The Great Exhibition.

Hyde Park, 1 May to 15 October 1851; 6,039,722 visits; average 42,831 a day, peak 109,915; one-shilling days; Thomas Cook brought 150,000 people; the Crystal Palace covered 10.4 ha.

[67] The Football Association. The history of the FA. With FIFA, Laws of the Game first formalised in London in 1863.

The FA formed on 26 October 1863 at the Freemasons' Tavern; six meetings in 44 days produced the laws; first game under them 19 December 1863; first FA Cup final 16 March 1872.

[68] Wikipedia. Steeplechase Park; Luna Park (Coney Island, 1903); Dreamland (Coney Island, 1904) (secondary). With Brooklyn Museum tech blog on Coney Island.

Steeplechase 1897-1964, Luna Park 1903-1944, Dreamland 1904-1911; 142,000 guests at Luna Park on 4 July 1903; 31 million admissions at Luna Park 1903-1908; several million visitors a year to Coney Island.

[69] Wikipedia. Salon Indien du Grand Cafe; Auguste and Louis Lumiere (secondary). With Guinness World Records, First cinema in operation.

First paid public screening on 28 December 1895 in Paris; ten short films of about 17 m, roughly 50 seconds each; an audience of about 35-40 paying one franc.

[70] Historical Statistics of the United States, Millennial Edition, Table Dh388-391: Motion picture attendance 1922-1998. With Encyclopedia.com, The American Film Industry in the Early 1950s.

Average weekly attendance 40 million in 1922, 90 million in 1930 and 1946-1948; 60 million in 1950 and 40 million in 1960 (Census Bureau series).

[71] Snow White and the Seven Dwarfs (1937): Encyclopaedia Britannica; History.com; Box Office Mojo.

Premiere 21 December 1937 at the Carthay Circle Theatre; the first full-length cel-animated feature; budget about $1.5 million; three years of work and nearly two million paintings.

[72] US Census Bureau, History: September 2023 (television). With US Census Bureau 1958 statistical abstract table and FCC data.

Television ownership rose from 9 % of American households in 1950 to 65 % in 1960 by the Census history note; other series give 86-88 % by 1959-1960.

[73] Wikipedia. First day of BBC television (secondary).

BBC Television Service launched at 3 pm on 2 November 1936 from Alexandra Palace: the first regular high-definition (240-line or more) service.

[74] Encyclopaedia Britannica. Comic strip: the evolution of the form. With Wikipedia, The Yellow Kid (secondary).

Outcault's Yellow Kid, from 1895 in the New York World, was the first continuous comic character in the US and standardised the speech balloon; Hearst's weekly colour supplement from 1896.

[75] Tezuka Productions, New Treasure Island (official site); nippon.com, Manga Media and Content in Postwar Japan; Japan Times (2008).

Shin Takarajima, 1947, by Sakai Shichima and Tezuka Osamu: a cinematic 'story manga'; often said to have sold 400,000 copies, though paper shortages suggest tens of thousands.

[76] British Film Institute (Sight and Sound). The seeds of anime: how Japanese animation arose; Looping around limitations: the experimental shorts of Tezuka Osamu.

Full animation for a weekly TV series would have needed ten times the labour of the whole industry; Tezuka's Astro Boy (1963) cut to eight new drawings a second, 'not animation, it is anime'.

[77] Wikipedia. Weekly Shonen Jump (secondary). With nippon.com (2026) and Anime Corner (2026) on the Japan Magazine Publishers Association figures.

First issue 1968; peak circulation 6.53 million for the New Year issue of 1995; 4.15 million by 1998 after Dragon Ball and Slam Dunk ended; 985,000 average print copies in April-June 2026.

[78] Anime News Network (2017). Former Shonen Jump editor-in-chief: readers can decide manga's cancellation in first 3 weeks (interview with Nobuhiko Horie).

Reader surveys rank the series each issue; a series can be cancelled three weeks after its debut; the usual standard for cancellation is ten weeks.

[79] Association of Japanese Animations, Anime Industry Report (preliminary figures at TIFFCOM, October 2025 and October 2026), as reported by Variety, Screen Daily and Anime News Network.

Anime market 3.84 trillion yen in 2024 and 4.45 trillion yen ($28.2 billion) in 2025; overseas 56 % and 57.1 %; overseas first larger than domestic in 2020; Infinity Castle $793 million.

[80] Kim, S. (2026). Sony wil met anime de groei voor de komende decennia veiligstellen. Het Financieele Dagblad, 22 November 2026 (Bloomberg, trans. H. Scholten).

Sony's anime strategy: Aniplex and Crunchyroll (21 million paying subscribers), Demon Slayer, Peanuts (80 %), studio Hayate, a shortage of animators, production time grown from one to three or four years.

[81] Tivoli Gardens, The History of Tivoli Gardens (tivoli.dk). With Wikipedia, Tivoli Gardens (secondary).

Opened 15 August 1843 by Georg Carstensen under royal licence on about 15 acres; Dyrehavsbakken (1583) is older; 4.25 million visitors in 2024; Carstensen: 'Tivoli will never be finished'.

[82] History.com. Disneyland opens (17 July 1955). With ABC7 (2021) and Reader's Digest on the first year.

Built in one year for $17 million on 160 acres of orange groves in Anaheim; 28,000 on the invitation day; about 3.6 million visitors in the first year.

[83] Themed Entertainment Association and AECOM. TEA Global Experience Index 2024 (October 2025), as reported by Fox and Attractions Magazine.

Magic Kingdom 17.8 million visitors in 2024, Disneyland 17.3 million; the top 25 theme parks together almost 246 million; Universal Studios Japan third.

[84] Lamarre, T. (2009). The Anime Machine: A Media Theory of Animation. Minneapolis: University of Minnesota Press.

Distinguishes cinematism (one viewpoint, movement into depth) from animetism (flat, layered planes sliding over each other); the multiplanar animation stand as the core apparatus of anime.

[85] Dentsu (2025). Anime fan survey; and NRG for Crunchyroll (2025), Gen Z and anime, as reported in trade press.

About three in ten consumers worldwide watch anime weekly, about half among millennials and Gen Z; in the NRG survey 54 % of Gen Z call themselves anime fans.

[86] Computer History Museum. Pong (Revolution exhibit) and 50 Years of Fun With Pong (2022). With American Heritage, The Mother of All Video Games.

Pong prototype installed at Andy Capp's Tavern, Sunnyvale, 1972; its coin box jammed with quarters within two weeks; Magnavox Odyssey (1972) was the first home console; 2,500 Pong machines sold in the first year, 8,000 the next.

[87] The Strong National Museum of Play, Space Invaders (Hall of Fame 2016); Wikipedia, Golden age of arcade video games; Third generation of video game consoles (secondary).

Space Invaders by Taito, 1978; US arcade machine sales rose from $50 million (1978) to $900 million (1981); the Famicom launched in Japan on 15 July 1983, the year of the US video game crash.

[88] Newzoo. Global Games Market Report 2025 (September 2025) and update (2026), as reported by PocketGamer.biz and PC Gamer.

3.58 billion players in 2025 (3 billion mobile, 936 million PC, 645 million console); revenue first forecast at $188.8 billion, later reported at $201.6 billion, mobile $113.3 billion.

[89] Esports Charts data as reported by Statista (2025) and esports.net (2025).

League of Legends World Championship finals: peak of 6.86 million concurrent viewers in 2024 (record), 6.75 million in 2025, excluding China.

[90] Hagley Museum and Library, On this day: the Palais Royale nickel-in-the-slot player; Yahoo/ Mental Floss, Who invented the jukebox?

Edison filed his phonograph patent in 1877; Louis Glass and William Arnold installed a coin-operated Edison Class M phonograph with four listening tubes in the Palais Royale Saloon, San Francisco, on 23 November 1889.

[91] Federal Communications Commission (2020). Celebrating 100 Years of Commercial Radio. With IEEE Milestone: Westinghouse Radio Station KDKA, 1920; CBS News Pittsburgh, KDKA Firsts.

KDKA in Pittsburgh broadcast the Harding-Cox election returns on 2 November 1920, the first scheduled broadcast of a licensed commercial station; 100 watts on 360 m. KDKA's own list of firsts (CBS Pittsburgh) includes the first broadcast of a world heavyweight boxing championship, Dempsey-Carpentier, 2 July 1921.

[92] Encyclopaedia Britannica. Woodstock. With National Archives (Prologue blog, 2019).

Woodstock, Bethel, New York, 15-18 August 1969; few tickets sold; about 400,000 people came, against an expected 100,000-200,000.

[93] IFPI (2026). Global Music Report 2026: State of the Industry. London: IFPI, 18 March 2026.

Recorded music revenue $31.7 billion in 2025, eleventh year of growth; streaming 69.6 %, paid subscriptions 52.4 %; 837 million paid subscription users; the low point was $13.1 billion in 2014.

[94] International Olympic Committee. Athens 1896: the revival of the Olympic Games (olympics.com).

241 male athletes from 14 nations in 43 events, 6-15 April 1896; Pierre de Coubertin founded the IOC in 1894.

[95] Anadolu Agency (13 July 2026), Explainer: first World Cup kicked off today in 1930; FIFA audience data as reported by Sports Illustrated.

First World Cup in Uruguay from 13 July 1930, 13 invited teams, 18 matches, Uruguay beat Argentina 4-2; 48 teams in 2026; the 2022 final reached close to 1.5 billion viewers by FIFA's figures.

[96] Nielsen (11 February 2025). Super Bowl LIX makes TV history with over 127 million viewers.

Super Bowl LIX averaged 127.7 million US viewers, peak 137.7 million; Fox's domestic NFL rights deal is reported at $2.25 billion a year.

[97] Netflix and YouTube corporate histories as summarised by Wikipedia (secondary); AFP (2025), YouTube turns 20.

Netflix began as a DVD-by-mail service in 1997 and launched streaming on 16 January 2007, passing 300 million paid memberships by 2025; the first YouTube video (19 s) went up on 23 April 2005; more than 20 billion videos uploaded in 20 years.

[98] Amazon.com, Inc. (25 August 2014). Amazon.com to Acquire Twitch (Form 8-K, Exhibit 99.1). With Britannica, Twitch.

Twitch launched in June 2011 as a gaming spin-off of Justin.tv; Amazon bought it for about $970 million in cash in 2014, when it had 55 million monthly visitors.

[99] nippon.com, Japan Data: Comiket, a small fan gathering that grew into a huge event; Anime News Network (2025), Comic Market 107. With Smithsonian, San Diego's first Comic-Con.

First Comiket 21 December 1975, about 700 visitors and 32 circles; about 300,000 over two days at its 50th anniversary; San Diego's first Comic-Con 1970 with 145 attendees, now over 135,000.

[100] Guinness World Records. Fastest social media network to reach 1 billion monthly active users (TikTok, 2021).

Douyin launched in China in September 2016; TikTok internationally in 2017; 1 billion monthly users announced 27 September 2021, about five years after launch; Facebook needed 8.7 years, Instagram 7.7, YouTube 8.1.

[101] Media Partners Asia (2025-2026). The Micro-Drama Economy; ReelShort / Crazy Maple Studio report; as reported by Variety and Indian Television. With CNBC (2025).

Episodes of 90 seconds to two minutes; China microdrama revenue from $0.5 billion (2021) to $7 billion (2024), passing local box office; outside China $2.7 billion in 2025; ReelShort revenue $785 million in 2025.

[102] Deezer Newsroom (January 2025 - July 2026), as reported by TechCrunch and Engadget.

Fully AI-generated tracks rose from 10 % of daily uploads (January 2025) to 44 % (April 2026) and over 50 %, about 90,000 a day (June 2026); 13.4 million tagged in 2025; only 1-3 % of streams; 97 % of listeners could not tell AI from human music in a blind test.

[103] Gower Street Analytics (January 2026). Highest grossing December since 2019 adds $3.5bn for $33.6bn global total in 2025 (gower.st).

Global cinema box office about $33.55 billion in 2025, $30 billion in 2024, $42.3 billion in 2019 as reported by Koimoi; 2025 still 16 % below the 2017-2019 average.

[104] SportBusiness (October 2026). Global Media Report 2026, as reported by Reuters and City AM. With S&P Global Market Intelligence (2025, 2026).

Global sports media rights a record $65.82 billion in 2026, up 15 % on 2025; $62.4 billion in 2024; the US holds 53.9 % of the value; S&P Global estimates $57.2 billion for 2025.

[105] PwC (July 2025). Global Entertainment & Media Outlook 2025-2029. With press release, 24 July 2025.

Entertainment and media revenue rose 5.5 % to $2.9 trillion in 2024, projected $3.5 trillion in 2029; connectivity (internet access) is the largest sector.

[106] The Trit Tile, Section 21 (see [2]); this book's own test script rhythm_test.py, run on the catalogue v0.4 (22 November 2026).

The test of Chapter 20: 166 unique positions; fractional parts compared with a within-layer shuffle (20,000 runs); Rayleigh test for ratio 3 and ratio 2; hits near whole numbers and near closure depths.