


UNITED WISDOM

# Chance: an absence of causes or a limit of knowledge?

World and Consciousness

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## Epigraph

> *“[...] our ignorance of the real cause of any event has the same influence on the understanding [...]”*

David Hume, An Enquiry Concerning Human Understanding, VI, §46. This checked clause is excerpted between a semicolon and a comma; omissions are marked. Hume compares the influence of ignorance on understanding with the role attributed to chance. His opening denial of chance is a historical philosophical premise, rather than an established conclusion of contemporary physics. Context.

## What this article is about

We readily call an unexpected encounter, an unknown cause, and an unpredictable result by the same name: chance. Yet these expressions do not tell us the same thing. An encounter can arise from understandable actions without being intended by its participants. A cause may exist while remaining unknown to us. A claim about unpredictability may depend on the information available and the conditions assumed.

This article examines these distinctions through ordinary hypothetical examples and bounded passages from Aristotle, Hume, and Laplace. We will also consider why a physical experiment on randomness cannot, without additional support, become an explanation of everyday luck or human freedom. The discussion concerns the question's scope, the construction of a probability model, and the limits of knowledge. The final practice suggests a way to clarify one claim about a chance event: what is actually known, what “by chance” means, and which next question can be investigated.

## I. What exactly happened by chance?

The word “chance” becomes more useful when we add a question: chance in what respect? Imagine two acquaintances meeting at a library. One came to return a book, the other to collect a reserved volume. Their encounter was not planned, although the reasons for each person's visit may be known. The absence of a shared intention does not mean the absence of preceding conditions. This is the first meaning worth separating from the others.



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A different question asks why both reached the desk in the same minute. Answering it would require more detailed information about routes, schedules, and waiting. The participants may not have recorded that information. Saying that we do not know the encounter's precise cause then describes a limit of available information. It establishes neither that the events arose without causes nor that a special hidden power arranged them. An unknown leaves questions open; it does not confirm a convenient answer.

A third question asks how often a similar encounter would occur under specified conditions. We would now need to define a similar case and the situations being compared. One memorable encounter does not by itself provide a frequency. Without a definition, “almost impossible” may express surprise, but it is not a calculated probability. If someone finds the event significant, that is a further kind of report: a description of their relationship to what happened.

One account can therefore contain intention, causal explanation, incomplete knowledge, a probability estimate, and personal meaning. They can be discussed together while retaining different requirements. Participants can clarify intentions; a causal account needs support; a probability estimate needs a model; personal significance can be described without a general law. The historical texts below show why these distinctions matter. We will not seek a single meaning that cancels all the others. The task is to identify the question being addressed and notice when an answer is quietly transferred to a different domain.

## II. Aristotle: an event outside an intention

Aristotle considers chance in relation to causation and purposes, rather than simply as an absence of every basis. Physics II.5 offers an example of someone who comes for one reason and receives money without having come specifically to collect it. The coincidence is described through its relationship to intention. The result could have been an action's purpose, but this particular action was undertaken for something else.

Our library example illustrates the structure. If the acquaintances had arranged to meet at the desk, their encounter would relate to a shared purpose. If they independently came for their books, the same encounter could be an incidental result of different actions. The visible outcome resembles the planned one, but its relationship to intention differs. This is not a claim that every event has an assigned meaning. It is a way to distinguish a planned outcome from something that happens incidentally.

In II.6, Aristotle distinguishes chance from a broader category of spontaneity within his classification. The discussion includes ancient conceptions of nature and the capacity for choice. All those categories cannot simply be transferred to contemporary biology. In particular, a historical restriction on the domain of chance should not become our judgment

about which beings can have experience or act. We use a specific distinction here, rather than adopting the author's entire system.

This approach helps avoid an ordinary mistake. An event nobody planned is sometimes declared an event nobody could explain. These are different claims. Two routes can intersect without an intention to intersect. Explaining the routes does not prove that the meeting was arranged. Discovering a significant outcome does not retrospectively make it the purpose of every preceding action. Aristotle's example leaves room for an incidental result within a causal account. Later, it can be compared with Laplace's conception of causal relations, provided that we retain the difference between an ancient vocabulary of purposes and the other author's mathematical and mechanical project.

## III. Hume: ignorance and expectation

In Section VI of the Enquiry, Hume considers the relationship between unknown causes, differences among possible outcomes, and expectation. At the beginning of §46, he starts from a denial of chance in the world and then discusses ignorance's influence on understanding. Historical reading needs to preserve both parts. The first is the author's premise; the second raises a question about judgment when information is missing.

His die example considers equally possible sides bearing repeated markings. More sides with one marking support expectation of that outcome. This is a limited example involving a distribution of cases and the formation of belief. It does not entitle us to treat any two verbally identified outcomes as equally probable. “An encounter will occur” and “an encounter will not occur” are not six equal sides of a die. Those two sentences do not specify the experiment's structure.

In §47, Hume turns to expectations formed from previous cases. The account belongs to a historical philosophy of human understanding. Its medical and weather examples are not present-day recommendations or forecasts. The broader distinction matters here: a set of observations and the extension of an expectation to the future are different elements of reasoning. We need to know what was compared and why a new case is being treated as corresponding to earlier ones.

In our library story, imagine someone who often visits at the same time and therefore expects to see an acquaintance. That expectation differs from surprise following a single encounter. Even a regular visitor may not know all the conditions determining another person's presence. Additional information would be needed for a precise conclusion. Hume helps us see that confidence itself can be a subject of inquiry. Its strength is not automatically equivalent to the completeness of a causal explanation. We can describe an expectation carefully while also asking whether its scope matches the support available to it.

## IV. Laplace: imagined completeness of knowledge

Laplace connects chance with the limits of knowledge within his causal conception. In Chapter II of A Philosophical Essay on Probabilities, he describes a hypothetical intelligence that knows the forces at work and the state of things and can encompass them in its analysis. Past and future would not be concealed from such an intelligence. This is a thought construction, rather than an existing method of obtaining every necessary piece of information.

The text itself emphasises the distance between the human mind and that ideal. Two claims must therefore be distinguished: a world can be conceived as causally determined, while a forecast available to a person can remain limited. Invoking the hypothetical intelligence does not make a particular event actually predicted. A premise of complete knowledge cannot substitute for having complete knowledge. It expresses a position concerning what explanation would be like under the stated ideal.

Return to the library encounter. We can suppose that a sufficiently complete account of both people's actions would explain their arrival at the desk. That does not mean we possess such an account or that any outside observer could have calculated the encounter's minute in advance. It also does not mean the outcome was someone's purpose. Comparing Laplace with Aristotle is useful here: preceding relationships and the absence of a common intention can be discussed together without merging their philosophical systems.

Laplace's ideal provides a clear and strong formulation of a question. It reveals how much must be assumed in a claim of complete predictability. When an ordinary discussion suggests that everything could have been known beforehand, we can ask: by whom, with which information, and through what analysis? The answer may be far more limited than the initial statement. That does not automatically refute philosophical determinism. It separates a metaphysical or model-based claim from a forecast actually presented. Otherwise, an imagined completeness of explanation can easily become a promise nobody has fulfilled.

## V. Probability needs conditions

A numerical probability becomes meaningful when we know the conditions of its construction. In Chapter II, Laplace examines distributions of possible cases; at the beginning of Chapter III, he separately cautions against assuming that cases are equally possible without grounds. This is an important boundary around an elegant formula. The ratio of favourable cases to all cases works in a suitable model; it does not create that model from an arbitrary list of words.

Imagine a box containing ten cards that feel identical, two of them marked. If we specify drawing one card in a way that treats each as equally possible, we have a particular model. If the cards differ, the drawing procedure changes, or the number of marked cards is unknown,

the old estimate needs reconsideration. This example was invented for explanation. It gives no probability of a particular piece of good fortune and establishes no claim that real-life events behave like cards.

Laplace also considers how an estimate changes with information about an urn's contents. This helps explain his view that probability is relative to knowledge and ignorance. The point is not that every number is a matter of taste. Different information can support different estimates; incorrect information can support an erroneous one. When comparing numbers, it helps to record the conditions considered known and the assumptions being made alongside them.

For the library account, it is insufficient to say there were two outcomes: meeting and not meeting. Arrival times, locations within the building, attendance, and definitions of an encounter can differ. The question must be selected before calculation begins. Otherwise, a number merely lends the appearance of precision to an unprepared comparison. Hume's die and Laplace's examples can be compared through the role of defined cases. An account of expectation's formation and a mathematical description of probability nevertheless remain different tasks. A good estimate answers its chosen question while retaining the conditions under which it makes sense.

## VI. Physical unpredictability and its boundaries

Physical research on randomness asks a narrower question than whether everyday luck exists. In Bierhorst and colleagues' 2018 paper, photon-experiment data are used to certify random bits under physical and informational assumptions. These include non-signaling, choices of settings, and classical side information. The Methods separately describe predictable demonstration settings and trust that the devices cannot predict them. We therefore describe neither an assumption-free test nor an unrestricted security guarantee.

For our map, the important feature is the structure of the claim. There is a particular experiment, a defined result, conditions supporting the inference, and a limit to its application. The word “randomness” does not automatically transfer the conclusion to human encounters, the meaning of coincidence, or freedom of choice. Such a transfer would need a demonstrated relationship between the subjects while preserving the relevant conditions. Reusing the same word does not establish that relationship.

Consider two entirely different questions: whether an observer can guess the outcome of a specified trial, and why an event matters to a participant. Their answers concern different subjects. Even a rigorous investigation of the first does not calculate personal meaning for the second. Conversely, an expressive account of an event's significance cannot replace an

experimental procedure. Both can be discussed without making one answer stand in for the other.

This limitation does not diminish science's value. It helps us see more precisely what has been accomplished. An ordinary conversation may warrant a much smaller conclusion: we cannot predict a certain result with the information we have. A claim of fundamental unpredictability would require a stated model, available information, and supporting grounds. A metaphysical claim that causes are absent altogether is a further transition. Attention to conditions prevents a physical term from being used as a decorative seal of certainty on a proposition the experiment itself did not investigate.

## VII. Unpredictable does not necessarily mean causeless

Failure to forecast a result in a particular situation is not yet evidence that it has no cause. A prediction may lack data, a suitable method of analysis, or a clearly defined subject. These possibilities should be considered before a general conclusion. At the same time, every limit of prediction need not be declared merely temporary ignorance: that universal statement would also need support. Caution keeps the question open in both directions.

Imagine a librarian unable to say who will reach the desk next. Perhaps visitors' routes are unknown, or no record of their arrival patterns exists. The failed forecast concerns this observer's ability under these conditions. It does not establish properties of every possible explanation of the world. Finding a record later would change available knowledge, rather than prove that the librarian secretly possessed that knowledge all along.

Laplace's thought construction names an opposite extreme: imagined access to all necessary information and analysis. Between that ideal and a particular librarian's ignorance lie many different questions. Explaining causes after an event, forecasting it beforehand, and estimating a probability have distinct requirements. We can explain an important factor without predicting an exact outcome. We can offer a probability estimate without claiming which outcome must occur. Those results should retain their own names.

Investigating the possibility of prediction also differs from considering personal action. An unknown result does not automatically make someone free in every philosophical sense. A causal explanation does not prove that every action was imposed from outside. Questions about freedom require separate consideration of the capacity to act, relevant conditions, and the definition of freedom being used. This article does not settle them through the word “chance.” It retains a boundary so that a new question can receive appropriate material. Where all we know is our own predictive limit, we can state that precisely without converting it into either universal causelessness or a promise of a future all-knowing system.

## VIII. The significance of coincidence

A coincidence can have personal significance without its causal mechanism having been established. The acquaintances may be pleased to meet; the encounter might remind them of a long-postponed conversation. This describes what the event means to them. A numerical probability need not be required. When that significance becomes a general rule about the world, however, a new claim appears with a new requirement for support.

“I am glad we met today” differs from “one hidden power arranges every important meeting.” The first expresses a relationship to a particular event. The second proposes an explanation of many events. The encounter's unknown cause does not automatically confirm the latter. At the same time, lacking confirmation of the general rule does not cancel the pleasure or value of the conversation. The distinction preserves a person's freedom to interpret an event without requiring its mechanism to be declared proved.

Aristotle offers a way to consider an unplanned result of action. Hume and Laplace offer different approaches to ignorance, expectation, and probability. These texts do not investigate the meaning our invented encounter must have. We use them to clarify different questions rather than decide on the participants' behalf. Keeping that limit visible also avoids attributing a contemporary piece of advice to a classical author who did not give it.

Personal significance supplies no grounds for demanding that someone else share an interpretation. One participant may see an important sign; another may see a convenient opportunity to talk. Agreement about the encounter's circumstances can survive disagreement about its meaning. If a joint action is being considered, it helps to identify which part of a decision rests on conditions that can be checked and which reflects a personal relationship to the event. Coincidence can then remain part of lived experience without becoming compulsory evidence for another person. We need not choose between dismissing an unexpected event and turning it into a universal promise.

## IX. Three hasty conclusions

Discussions of chance often go wrong through unnoticed transitions. The first moves from having no known explanation to asserting a specific hidden cause. Not knowing why the acquaintances met confirms neither a secret plan nor the absence of all causes. A proposed account can become a research question, but its possibility is not evidence of its truth. We can ask what information would distinguish it from another account.

The second transition moves from a small number of named outcomes to equal probabilities. “Either they meet or they do not” does not mean each occurs in half the cases. We have grouped many possible situations under two expressions without specifying their distribution.

Laplace's requirement of equally possible cases protects this boundary. Without a model, surprise or lack of an estimate can be described honestly, leaving numbers for tasks in which they can be supported.

The third transition moves from naming a scientific field to proving a personal conclusion. The word “quantum” does not connect a library encounter to a particular experiment. Mentioning a rigorous physical result does not remove the need to explain the transition. Otherwise, the impression of reliability is borrowed while the conditions limiting that reliability disappear. This is a problem in reasoning regardless of whether we like the original interpretation.

Correcting such transitions begins with a specific question rather than a label attached to the speaker. We can ask for support for an account, clarification of a probability estimate's construction, or an explanation of why a physical study applies to the event being discussed. Sometimes clarification provides support for a strong claim. Sometimes it becomes clear that an image or personal significance was intended. Sometimes a conclusion remains unconfirmed. All three are substantive outcomes. They should not be replaced in advance by a demand to accept our own explanation. The map makes a claim's scope visible so that investigation can address precisely that claim.

## X. What can be known with sufficient precision

Precision does not always mean a complete answer about the world. Sometimes we can establish quite precisely what remains unknown. We can know that an encounter was not a shared purpose while lacking its full circumstances. We can have information supporting an expectation without grounds for a numerical estimate. We can assess a conditional model without forecasting a particular outcome. These states differ and deserve different formulations.

Historical comparison helps retain this map. Aristotle relates chance to an incidental relationship with purposes. Hume considers unknown causes and the formation of expectation. Laplace describes an ideal of causal completeness and probability's dependence on information. Their answers do not combine into a single theory of everything accidental. They offer different ways of posing questions. We preserve the disagreements rather than declaring them dissolved by one contemporary retelling.

A limited account of the library example might say that both came for their books, had not arranged to meet, encountered each other at the desk, and were pleased to talk. Unknown route details should remain unknown. If probability was not calculated, the event need not be called statistically almost impossible. Its importance can be expressed in the participants' own words. This contains more clarity than a strong general statement blending fact, ignorance, and metaphysics.

The next question begins there. A causal explanation may require clarifying conditions. A probability estimate needs an appropriate model. Understanding personal significance can involve listening without imposing a general law. A philosophical dispute over determinism requires a separate discussion of assumptions. Each step should not be treated as performing all the others. Sufficient clarity in one field does not automatically complete the whole topic. It makes it possible to proceed with a concrete question while retaining the right to stop when the task relevant to this conversation has been answered. Chance ceases to serve as a universal explanation and becomes the name of a question that can be clarified.

## What this means in practice

Take a short account of a chance event. An ordinary case that is not too personal is a useful starting point. Record what happened without adding a proposed cause. Then identify which meaning of “by chance” is being used: the event was unplanned, its cause is unknown, it could not be predicted, it seems rare, or someone finds a particular significance in it. Several meanings may appear in one account.

Give each meaning its own question. For intention, do you have the participants' account? For causation, what information is available and which explanations are only proposed? For rarity, has a set of comparable cases been defined? For unpredictability, who attempted the forecast and with what information? For significance, does the interpretation belong to a person, or is it offered as a general rule for others? You need not answer every question at once.

Choose one next step proportionate to the task. You might clarify a visiting time, read a quotation's context, record a simple model's conditions, or leave a numerical estimate undetermined. An unknown need not be filled immediately with any available explanation. If knowing that the encounter was unplanned is enough for your discussion, investigating every circumstance may be unnecessary. The depth of inquiry depends on the claim you actually want to make.

Then rewrite the outcome. For example: “We had not arranged to meet and encountered each other at the desk. We do not know the detailed causes, have not estimated a probability, and found the encounter important.” This preserves the event and its significance while leaving open only what has not been established. Our approach is an editorial application of distinctions, rather than a validated programme for improving well-being. It promises no successful forecast. Its outcome may be a clear question, a refined account, or a straightforward recognition of the information's limits. Participation and further discussion remain voluntary.

## Key quotation

> *“Probability is relative [...]”*

Pierre-Simon Laplace, A Philosophical Essay on Probabilities, Chapter II, F.W.Truscott and F.L.Emory's 1902 translation from the sixth French edition. This is the checked opening clause; the omission is marked. The following words relate probability to ignorance and knowledge. The passage does not say that every number is arbitrary or every opinion equally supported. The French original was not checked. Context.

## Connections between traditions

| Comparison | Working connection | Boundary |
|---|---|---|
| Aristotle, Physics II.5 / Hume, VI§46 | Chance can be clarified through its relationship to intention or through an unknown cause. | An incidental result of purposeful action and ignorance about causes are different meanings, rather than one common definition. |
| Aristotle II.5, receiving money / Laplace II, hypothetical intelligence | Preceding relationships need not make a result anyone's purpose. | An ancient framework of purposes and Laplace's mechanical ideal are not a single causal theory. |
| Hume VI§46, the die / Laplace II, urns; III, second principle | Working with distributions requires a specified trial and grounds for equal possibility. | Naming two outcomes does not establish equal probability; an account of expectation is not a numerical model. |
| Hume VI§47, expectation from previous cases / Bierhorst et al., main assumptions and theorems, manuscript pp 2–5 | Inference from a familiar pattern differs from a formal protocol's result. | A philosophy of belief and conditional physical certification use different grounds. |
| Laplace II, distance from an ideal intelligence / Bierhorst et al., introduction and information conditions | Name the observer, information, and constraints of a prediction. | Imagined complete knowledge and a bounded experiment do not settle every metaphysical position. |
| Laplace II, changing information about an urn / Bierhorst et al., Methods, demonstration-settings paragraph | Reassess a conclusion when information or trust in its conditions changes. | Epistemic probability and physical certification are not identical; conditions cannot be omitted. |

These comparisons belong to this article. They establish neither a common authorial project nor historical borrowing.

## Primary sources

• Aristotle, Physics II, R.P.Hardie and R.K.Gaye's translation. II.3–6 were read in full; II.5–6 are used for chance and purposes. An ancient philosophical text, without transferring its whole classification to contemporary science.

• David Hume, An Enquiry Concerning Human Understanding, VI§§46–47, original English, Selby-Bigge's 1902 edition of the 1777 text. The section was read in full. A historical account of expectation, rather than current medical or weather guidance.

• Pierre-Simon Laplace, A Philosophical Essay on Probabilities, F.W.Truscott/F.L.Emory's 1902 translation from the sixth French edition. Chapters I–II and the opening of III, its first three principles, were read in full. The French original and remainder were not checked.

• Peter Bierhorst et al., experimental randomness certification, 2018 manuscript; Nature publication. Main text and Methods read; appendices, data, and proofs were not independently reproduced.

## Tags

chance, cause, coincidence, ignorance, prediction, probability, conditions, model, information, expectation, intention, purpose, incidental result, Aristotle, Physics, Hume, Laplace, determinism, ideal intelligence, equal possibility, distribution, die, urn, physical experiment, randomness certification, limits of inference, personal meaning, interpretation, justification, uncertainty

## About the authors

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