Objects as Record-Stable Equivalence Classes

A record-based ontology cannot speak only about facts, selves, measurements, and worlds. It must also explain objects.

This is not a minor issue. The ordinary world is populated by objects: chairs, stones, bodies, books, instruments, rooms, trees, animals, planets, galaxies. We do not merely encounter isolated facts. We encounter persisting things.

We track objects through time, recognize them from different perspectives, act upon them, name them, measure them, repair them, lose them, destroy them, and remember them.

If Record-Based Ontology cannot say what an object is, it remains incomplete at the level of ordinary ontology.

1. The ordinary object problem

Objects appear stable, but their physical basis is constantly changing.

A wooden table is not microscopically identical from one moment to the next. Molecules vibrate, dust settles, light changes, temperature shifts, moisture varies, scratches accumulate.

Yet we continue to call it the same table.

A human body replaces cells, digests food, changes posture, sleeps, ages, heals, acquires scars, loses hair, and yet remains identifiable as the same body.

A book may be copied, annotated, damaged, digitized, translated, reprinted, or cited. A scientific instrument may be moved, recalibrated, repaired, and still count as the same instrument within a laboratory practice.

If object identity required exact sameness of all physical details, ordinary objects would almost never persist.

If object identity required only naming or convention, objecthood would become arbitrary.

RBO takes the middle path:

> An object is a record-stable equivalence class across interactions, perspectives, and micro-variations.

This does not mean that objects are unreal. It means that their reality is structural.

An object is not a bare metaphysical nucleus hidden behind appearances. It is a stable pattern of record-supported invariance across relevant transformations.

2. Stability across change

Object identity depends on stability across change.

The phrase sounds paradoxical, but it describes ordinary experience. Something counts as the same object when it can undergo changes that do not destroy its relevant identity.

A chair can be moved. A book can be opened. A guitar can be restrung. A body can sleep. A building can be repainted. A phone can update its software. A detector can be reset between experiments.

The object persists because these changes are absorbed within an equivalence class.

Not every change is identity-preserving. A chair burned to ash is no longer the chair in the ordinary sense. A book shredded beyond recognition no longer functions as the same copy. A body destroyed beyond biological continuity no longer persists as the same living organism. An instrument whose measuring core has been replaced may or may not count as the same instrument, depending on the relevant practice.

This shows that object identity is threshold-governed.

But the thresholds are not arbitrary. They are fixed by the kinds of records that matter in a domain.

For a museum curator, material originality may matter. For a musician, continuity of function and feel may matter. For a legal system, serial numbers and ownership records may matter. For biology, metabolic organization and developmental continuity may matter. For physics, the relevant macrostate may matter more than the identity of every microscopic component.

The same physical structure may therefore be individuated differently under different record-practices.

This does not make objecthood fictional. It makes objecthood level-relative, practice-sensitive, and physically constrained.

3. Micro-variation and macro-identity

Many microstates can realize the same macro-object.

A table is not one microscopic configuration. It is a family of configurations preserving the relevant structural, causal, spatial, functional, and interactional profile.

The same is true of bodies, stones, instruments, books, and ordinary artifacts. We do not track them by requiring exact molecular sameness. We track them through stable records.

This gives a simple formulation:

> An object is a macro-identity realized by many micro-configurations under a record-stable criterion of equivalence.

Several consequences follow.

First, object identity is tolerant. It can survive many small variations because those variations do not alter the relevant record-profile.

Second, object identity is fragile at thresholds. A small change can become decisive if it enters the record-structure that individuates the object. A minor crack may be irrelevant in one context and decisive in another. A changed bit may be irrelevant in an image file and catastrophic in an encryption key. A scratch may be irrelevant on a working tool and devastating on a museum object.

Third, object identity is not merely spatial. Location helps track objects, but it is not sufficient. A cloud, river, flame, software process, melody, legal document, and living body each persist differently. Their objecthood depends on different record-stable continuities.

Fourth, ordinary objecthood prepares the quantum problem. If macro-objects are already equivalence classes across micro-variation, then it is not strange to ask whether outcomes and observer-worlds should also be individuated by equivalence over many physical realizations.

RBO does not begin by saying that quantum objects are like chairs. It says that even chairs are not as metaphysically simple as they appear.

4. Equivalence classes in everyday ontology

An equivalence class is a set of different realizations treated as the same under a specified criterion.

In mathematics, the concept is exact. In ordinary ontology, it is everywhere.

Two printed copies may count as the same text. Two performances may count as the same song. Many bodily states may count as the same person sitting in a room. Many visual appearances may count as the same object seen from different angles. Many institutional records may count as identifying the same citizen, account, contract, or property.

The key question is always the criterion.

What differences are ignored?

What differences count?

What transformations preserve identity?

What changes break it?

RBO makes this criterion explicit.

An object is not the totality of every microscopic detail associated with it. It is the equivalence class of configurations that preserve the relevant record-conditions for tracking, recognizing, interacting with, and updating on that object.

This explains why objects can be both real and conventional.

They are real because their equivalence classes are constrained by the physical world. One cannot arbitrarily decide that smoke and a stone are the same object under ordinary conditions. Their record-profiles, interaction patterns, persistence conditions, and causal roles differ too much.

They are conventional because the criteria of equivalence can vary by domain. The same ship repaired plank by plank may count as the same ship legally, historically, or functionally, but not materially in the strictest sense. A restored painting may count as the same artwork under one standard and as compromised under another. A repaired instrument may count as the same tool for use but not the same artifact for provenance.

Objecthood is therefore neither primitive nor arbitrary.

It is record-stable identity under a domain-relevant equivalence criterion.

5. Records and object tracking

Finite systems track objects through records.

The record may be sensory: shape, color, texture, sound, resistance, location.

It may be bodily: the feel of a tool, the weight of an instrument, the posture required to use it.

It may be social: a name, ownership history, institutional registration, legal classification.

It may be scientific: a measurement profile, calibration record, serial number, chemical composition, astronomical trajectory.

It may be environmental: tracks, marks, scars, wear, decay, imprints, residues, or effects on other systems.

An object becomes stable for finite systems when enough of these records support continued tracking across variation.

This is why object recognition is not merely visual. We recognize a cup by sight, but also by touch, use, location, memory, ownership, and expectation. We recognize a person by face, voice, body, name, habits, history, social records, and practical relations. We recognize a planet by trajectory, mass, observational records, gravitational role, and astronomical classification.

Objects are not given as bare units. They are stabilized through convergent record-structures.

6. Objecthood and error

Because objecthood is record-mediated, it can fail.

A person may mistake one object for another. A museum may misattribute an artifact. A scientific instrument may be misidentified after repair. A legal archive may confuse two properties. A digital system may merge two records that should remain distinct, or split one object into multiple entries.

These failures do not show that objects are unreal. They show that object-individuation is fallible.

To identify an object is to apply a criterion of continuity and difference under available records. That criterion can be too coarse, too fine, misapplied, corrupted, or defeated by later evidence.

Objectivity about objects therefore depends on record-reconciliation.

The same object must be trackable across multiple records, perspectives, and interactions. When records conflict, objecthood becomes contested: is this the same artifact, a copy, a restoration, a fake, a replacement, a continuation, a replica, or a different object altogether?

RBO does not eliminate these disputes. It explains why they arise.

7. Why objecthood matters for RBO

Objecthood is a crucial test case for Record-Based Ontology.

If RBO applied only to consciousness or quantum measurement, it would look too narrow or too exotic. Objects show that the record-based logic is already present in ordinary ontology.

We already treat objects as stable across irrelevant variation.

We already rely on records to track them.

We already distinguish identity-preserving changes from identity-breaking changes.

We already use domain-sensitive equivalence criteria.

We already correct object-identifications through stronger records.

The record-based account does not invent a strange new ontology. It makes explicit the structure that ordinary objecthood already presupposes.

8. From objects to observer-worlds

The analysis of objects also prepares the transition to observer-worlds.

If ordinary objects are record-stable equivalence classes across micro-variation, then observer-worlds can be understood similarly at a larger scale.

A finite agent does not inhabit every microscopic detail of the global physical state as a separate world. It inhabits an effective world structured by stable, accessible, update-constraining records.

Many physical configurations may realize the same object-world for that agent. Prior equivalence breaks when a difference enters the agent's record-structure in a way that changes what can be inherited, expected, compared, corrected, or acted upon.

This is the same logic that later becomes central in the quantum application.

Do not count worlds, outcomes, or subjects more finely than the records that make their differences difference-making for finite systems.

9. The object formula

The record-based account of objecthood can be summarized as follows:

> **An object is a record-stable equivalence class of physical configurations, tracked across relevant transformations by finite systems under domain-sensitive criteria of continuity and difference.**

Or, more simply:

> **Objects are real patterns of record-stable invariance.**

This view avoids two errors.

It avoids primitive object metaphysics, where objects are treated as bare identities persisting behind all change.

It also avoids arbitrary constructivism, where objects are treated as mere products of naming, convention, or perspective.

Objects are neither primitive substances nor free inventions.

They are stable, physically constrained, record-mediated structures of finite definiteness.

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