

Ruth G. Millikan's Biosemantics

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Main problem: What fixes the content of a representation?

First candidate (causal-statistical approach)

The content of a representation is fixed by the objects or events that cause that representation under statistically normal conditions.

Objection: This characterization would require us to determine a class of normal conditions, and that delimitation will necessarily be arbitrary.

Example: Statistically normal conditions might be arbitrarily stipulated as a percentage of occurrence ranging between 50% and 100%.

Second candidate (some teleological approaches)

The content of a representation is fixed by the objects or events that produce the representation through the actions of normal or well-functioning systems.

First objection: This characterization is too liberal because it allows many things that are not represented to be counted as represented.

Example: It is part of the design of the vascular system to produce skin reddening when we undergo physical effort. However, physical effort is not a represented of skin reddening.

Second objection: This characterization remains undetermined in cases where more than one object or event can produce the representation.

Example: Skin reddening is also produced by sunburn or overheating.

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Third candidate (Matthen, Stampe, Dretske)

The content of a representation is fixed by the objects or events that produce the representation through the action of the systems that make those objects or events to “indicate” or “detect” what they represent.

Objection: This characterization is trivial or uninformative. It is the same as saying that representations are things that have the function of representing. This move does not provide an account of how to properly naturalize the notions of “indicating” and “detecting.”

Possible amendment (Matthen)

The part of the system that produces the representation has the function of “indicating” or “detecting,” understood in terms of producing states that vary together with the world.

Objection: Not every system that produces an item that varies together with the world is a representation producer.

Example 1: There are dermatological mechanisms whose function is to produce calluses, and calluses vary together with the world. However, calluses are not representations.

Example 2: There are mechanisms whose function is to change a chameleon's skin color, and the chameleon's skin color varies together with the world. However, the skin color is not a representation.

Possible amendment (Stampe and Dretske)

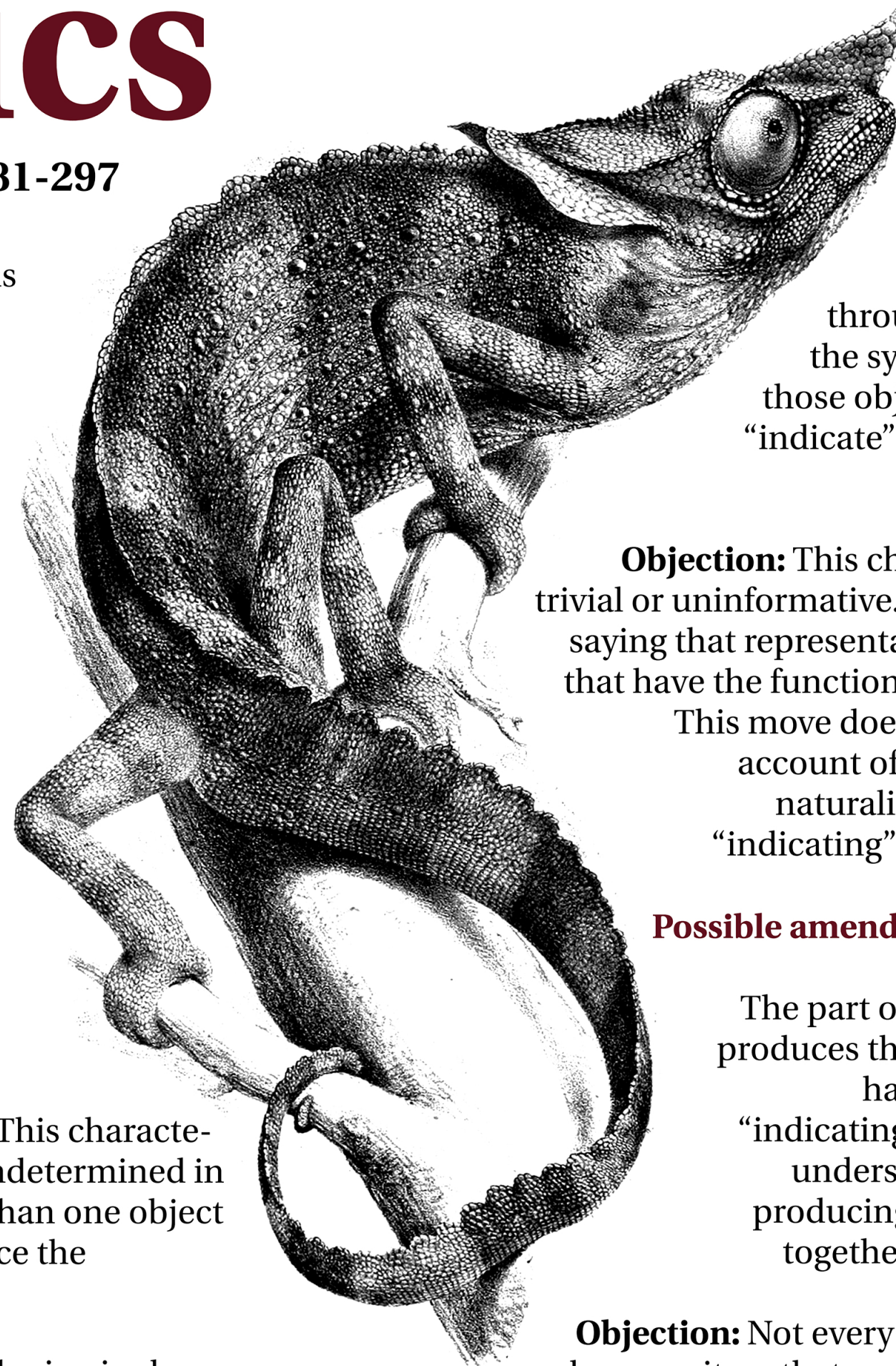
To equate having the function of representing R with being a natural sign of R when the system functions normally.

First objection: In many systems, the production of a natural sign can be an accidental effect—and not a function—of their normal operations.

Example: Skin reddening is a side effect—and not a function—of our vascular system.

Second objection: Some representations do not carry natural information.

Example: Some predator avoidance mechanisms occur more often in the absence of, rather than the presence of, actual predators. They might, therefore, not carry natural information about the predators they nonetheless represent.



Millikan's diagnosis

(i) An appeal to *teleology* and *functional* ascriptions is necessary but not sufficient for capturing the conditions that fix the content of a representation.

(ii) The problem with previous teleological approaches is that they focus on the *production*, rather than the *consumption*, of a representation.

(iii) The required concept of function for addressing this issue is the concept of *proper function*.

Millikan's proposal

Think of systems as having two parts:

(A) A part that produces representations.

(B) A part that consumes representations.

The content of a representation is fixed by the systems that *consume* the representation within a system that was selected to do so. A representation is not merely a natural sign.

Example 1: The beaver's splash represents danger because only when it corresponds to danger does the natural response on the part of the other beavers serve a purpose.

Observation 1: Representations are articulate (splashes vary with the time and location of the danger).

Observation 2: Representations need not be internal (splashes occur in the open).

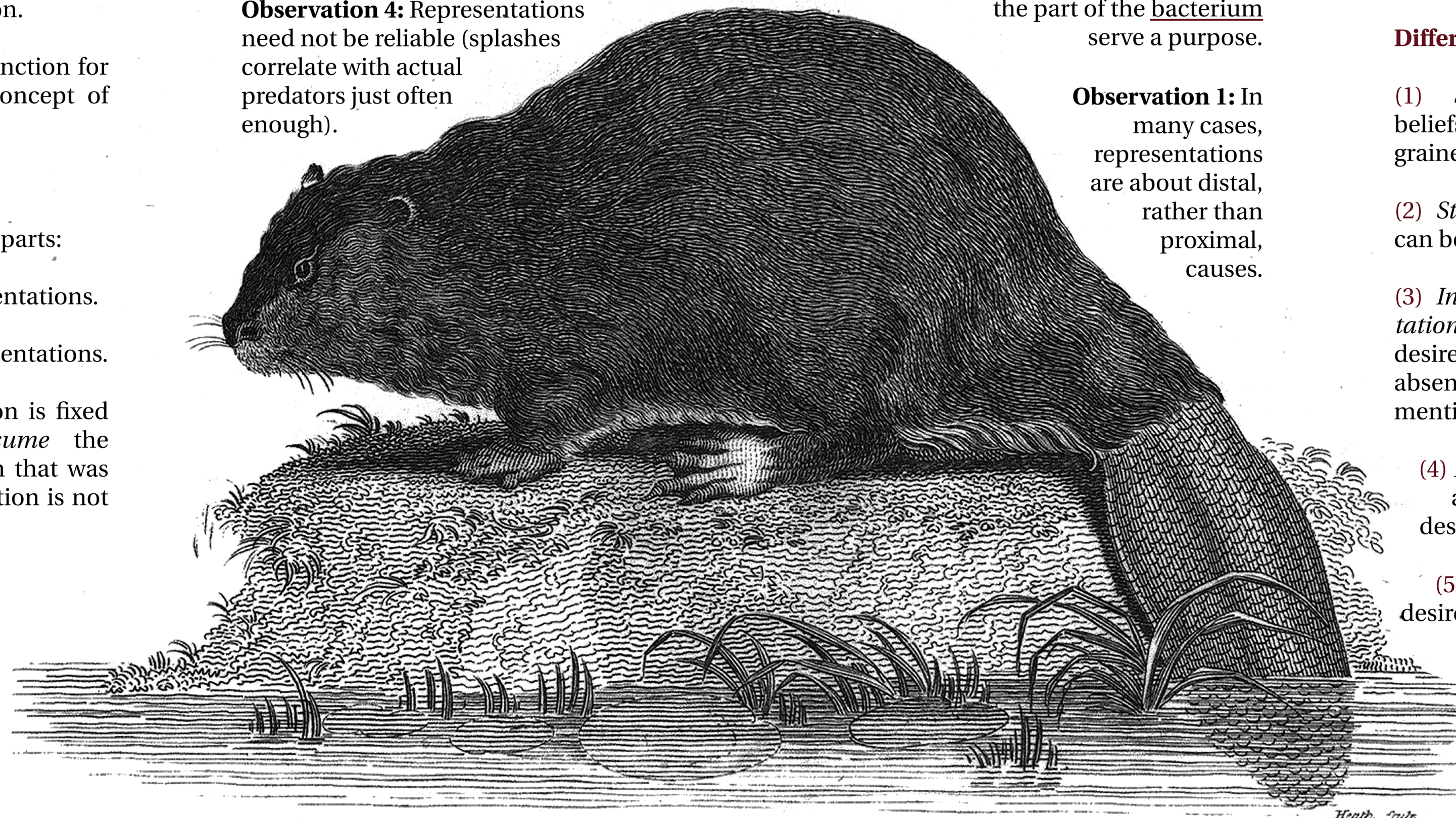
Observation 3: Representations need not be true (splashes can occur in the absence of predators).

Observation 4: Representations need not be reliable (splashes correlate with actual predators just often enough).

Example 2: The honey bee's dance represents the nectar's location because only when it corresponds to the nectar's location do the natural response on the part of the other bees serve a purpose.

Example 3: The magnetosomes alignment in a magnetotactic bacterium represents the direction of oxygen-free water because only when it corresponds to the direction of oxygen-free water does the natural response on the part of the bacterium serve a purpose.

Observation 1: In many cases, representations are about distal, rather than proximal, causes.



Continuity with human cognition

Much like beavers' splashes were selected in virtue of producing the adequate behavioral response, our cognitive systems, along with their capacities for believing and desiring, were selected in virtue of producing the appropriate paths of action.

Observation 1: False beliefs need not be detrimental.

Differences from human cognition

(1) *Self-representing Elements.* E.g., beliefs can be indexical in a more fine-grained manner.

(2) *Storing Representations.* E.g., beliefs can be stored away.

(3) *Indicative and Imperative Representations.* E.g., beliefs are indicative, while desires are imperative (this distinction is absent in the animal representations mentioned above).

(4) *Interference.* E.g., beliefs and desires are combined with other beliefs and desires to yield new beliefs and desires.

(5) *Acts of Identifying.* E.g., beliefs and desires employ common representations to track their representeds.

(6) *Negation and Propositional Content.* E.g., beliefs are ruled by the law of non-contradiction, and have propositional structure.