There is a Humean problem about possibility and necessity: “Obama is president” is true insofar as it describes the way things actually are. But if it is true, “Obama could make it in the NBA” is true only because it describes a non-actual possibility. On its face, however, an appeal to that which is not actual seems absurd. Whence, then, the latter claim? I introduce this difficulty, and consider replies. In so brief an article, it will not be possible to survey views from the history of philosophy, or the full range of contemporary responses. Rather, a cross section of issues will be introduced in the context of a “possible worlds” reply, and especially linguistic ersatzism as a representative of this strategy. In the midst of objections, I try to keep things interesting, and see what there is to say on behalf of the ersatz approach.

The Problem of Modality

A proposition may be true (or false) simpliciter. But possibility and necessity are among modes of truth. Thus a proposition may be possibly or necessarily true. Among the modalities are propositions probably true, permissibly true, henceforth true, and more—where each of these raise philosophical questions about actuality and truth. Under the heading “modality” though, philosophers have been specially interested in the particular question raised by possibility and necessity. Some observations: (i) Possibility and necessity are inter-definable. Possibly Obama plays in the NBA, if and only if it is not necessary that he does not. And necessarily Obama is human if and only if it is not possible that he is not. Given this, an adequate account for either possibility or necessity is an account for both, and a problem for one is a problem for both. (ii) Possibility and necessity come in different varieties. Thus, in one sense, a bishop must move along a diagonal—for to do otherwise breaks the rules. But in another sense, the bishop can move from any square to one of a different color—for nothing is simpler than to pick it up and set it down wherever you please. And similarly different notions of possibility and necessity appear in a wide variety of
contexts. (I sometimes ask students if it is possible to drive the 60 miles from our

campus in San Bernardino to Los Angeles in 30 minutes. From natural assump-
tions about Los Angeles traffic, law enforcement, and the like, most say it is not.

But some, under different assumptions, allow that it can be done!) Philosophers

have been particularly interested in a broad, *metaphysical* sort of modality—
described by Alvin Plantinga (1974, pp. 1–2) as “broadly logical.” In this sense,

it is not possible for something to be round and not round, or for a thing to be
round and square; but it is possible for Obama to play in the NBA and for aliens
to invade the earth. More controversially, water is necessarily \( \text{H}_2\text{O} \); and it is pos-
sible for natural laws to be other than they are, and so, say, for a thing to travel
faster than the speed of light. I shall concentrate on this modality, though the
structure of the problem is parallel from one case to the next. Finally, (iii) in one
variety or another, modal notions are ubiquitous. Fundamental components of
logic depend on possibility and necessity. Even if philosophical results are not
necessary, aspects of philosophical reasoning remain subject to necessary con-
straint. One encounters modal notions in science, for natural law, and in moral
or decision theory, where it matters what one can and cannot do. And so forth.

It is natural, then, to seek an adequate account of these notions. But it is not
obvious that any such account is to be had.

Problems about possibility and necessity as such are parallel to traditional
problems about knowledge of possibility and necessity. In each case, on a plau-
sible account, supposed results outrun their actual grounds. So it may help to
begin with a sketch about worries for knowledge. It is natural to think that
knowledge of the world is derived from observation of the world. Suppose we
observe that all crows are black. Is it possible that there be a non-black crow?
The answer is not determined by our observation that all crows are black, for
not every possible situation is actual. If it is possible for there to be a non-black
crow, then some non-actual possibility is such that *if* it were actual there would
be a non-black crow. But we observe only the actual world; there is no observa-
tion of what is non-actual. And if there is not any observation of what is not
actual, then there is not any observation of correlations between the actual and
the non-actual—it is not obvious how observations of the actual are relevant
to what is merely possible. Thus, following a suggestion from Colin McGinn
(1981, p. 181), consider a theory \( T \) with consequences for non-modal prop-
erties of the actual world and for non-actual possibilities, and some other theo-
ries whose actual-world consequences are the same as \( T \), but whose non-actual
consequences are different. Insofar as observation is of actuality, there is seem-
ingly no observation to distinguish among the theories. So the empiricist, who
grounds knowledge of the world in observation, has reason to hold that obser-
vation does not ground knowledge of truth or falsity for the various modal
claims, and may find in these considerations the basis for a general skepticism
about modal knowledge.
This skepticism rests on a metaphysical difficulty according to which the requirements for possibility and necessity exceed the resources of actuality. The basic elements of the problem lie not very far under the surface of the possible worlds picture of modality. Thus consider, for example, David Lewis’s modal realism (1986). On his view, for every way a world can be, some world is. A thing is necessary if it is true in all worlds, possible if true in some. On this view, worlds are things very much like the universe in which we live, though different worlds are spatiotemporally and causally isolated; for Lewis, “actual” is analyzed indexically—the reason this world is actual for us is that it is the one we are in. Say a property is categorical if and only if it does not depend on properties at other worlds: so a thing’s being round or being 10 kilograms is categorical, where its being necessarily round or being possibly other than 10 kilograms are not; for the former, but not the latter, do not depend on how things are in other worlds. On Lewis’s view there is a plurality of worlds, where each has a distribution of its own categorical properties. In any world, every property, modal or otherwise, has a ground in the overall distribution of categorical properties. Modal properties in a world are not grounded merely in the categorical properties of their own world, but in the categorical properties of the plurality as a whole. Thus crows are possibly non-black in a world just in case there is some member of the plurality in which there is a non-black crow; crows are necessarily black just in case they are black in every world.

So on this worlds picture, modal properties are not wholly grounded in actuality. But this stands in tension with the natural thought that the very idea of an (actual) property or truth not wholly grounded in actuality is bizarre or occult. Take a salt tablet. It is natural to say that it is soluble, and that it is soluble because of the categorical way it actually is. Diamonds, plastics, and the like are insoluble because they are categorically different. And similarly for a wide variety of properties. Suppose, for example, I claim to have “ultimate greatness” and insist that my dopplegänger in a world categorically the same as ours does not have it (or has it only on alternate Thursdays); when pressed for those features in virtue of which I have it and he does not, I respond, “It is a brute fact—there is no difference beyond our differing with respect to ultimate greatness.” This is bizarre. Similarly for serious moral properties. And similarly for the modal properties with which we began.

But, if these reflections are right, we have a full-blown problem about modal truth. For we seem to accept,

\[ \begin{align*}
\text{MP:} & \text{ Things actually have objective modal properties.} \\
\text{AC:} & \text{ Any property has an actual categorical ground.} \\
\text{NG:} & \text{ Actual categorical properties are not an adequate ground for modal properties.}
\end{align*} \]
MP is from the ubiquity of modality. AC is the natural claim about actual grounds. And NG is illustrated by the worlds picture. But these are inconsistent. From MP and AC, some modal properties have an actual categorical ground. And by NG, no modal property has such a ground. Standard responses take the form of denying MP, that things actually have objective modal properties, as in some versions of empiricism; denying AC, that modal properties have an actual or a categorical ground, as in appeals to possible worlds or primitive modality; or denying NG and arguing for the sufficiency of some actual categorical ground. The history of philosophy suggests that it is no easy task to make sense of the world without modal properties. Thus we concentrate on attempts to account for modality: Assuming MP, that there are modal properties, we encounter each of the other options as we proceed.

Worlds as a Solution

The standard semantics of modal logic incorporates a set of “worlds” which may or may not have restricted “access” from one to another. Assignments to basic sentences are made at these worlds. A sentence is possible at world w if and only if it is true at some world accessible from w, and necessary if and only if it is true at every world accessible from w. An argument is valid if and only if no such structure includes a world where the premises are true and the conclusion is not. The worlds approach to modality structurally parallels the standard semantics for modal logic—only with some account of worlds that makes them more than mere indices for the arbitrary assignments of logic (let each world have access to all the others). As we have seen, Lewis (1986) develops an account on which worlds are things like the universe in which we live, with different ones spatiotemporally and causally isolated.

Against Lewis, however, it is natural to object that the required plurality of worlds does not exist and attempt to attain the benefits of his “paradise” on the cheap. Thus Lewis considers abstract entities that would, from his point of view, count as substitute (ersatz) worlds. One particularly straightforward proposal is linguistic ersatzism. On this account, worlds are some collections of sentences; an ordinary sentence is true in a world just in case it is a member of the world; then a thing is possible if and only if it is true in some world, and necessary if and only if it is true in all. Supposing that there are sets of sentences, the question becomes whether these entities are sufficient for an account of modality. I consider two broad objections, first with respect to the nature and second the relevance of such “worlds.”
The Metaphysics of Worlds

An ersatz world substitutes for a universe, with all its myriads of detail. This puts burdens on the expressive power of the language for the sets of sentences—for the language should be sufficient to describe anything about a world. And, similarly, philosophers have been led to say ersatz worlds are maximal—that for any sentence \( a \), either \( a \) or not-\( a \) is an element. I raise concerns related to each point.

Expressive Power

An initial thought from Lewis (1973) is that there simply are not enough sets of sentences in a natural language to represent all the ways the world could be. Suppose there could be a Euclidean space with any combination of points filled by matter; then the number of ways the world can be is at least as great as the number of subsets of the set of all the points in the space. But sentences in a natural language are finite strings over a finite alphabet; and the number of worlds is no greater than the sets of such strings. So by straightforward cardinality considerations, it is not the case that there are as many sets of sentences as there are ways the world can be. So the ersatz strategy misrepresents the possibilities.

Say this is right. In 1986, Lewis grants that linguistic entities for ersatz worlds need not be sentences of a natural language, and goes so far as to allow that worlds may be composed of a “Lagadonian” language on which each object functions as its own name, and each universal as its own predicate; sentences are set-theoretic constructions out of this “vocabulary” along with logical connectives and quantifiers (pp. 145–6; compare Swift, III.V). On this Lagadonian account, there are words and sentences corresponding to nothing ever spoken or contemplated by a human speaker (e.g., a sentence about some object in a distant galaxy). Thus Lewis gives the ersatzer a language of exceptional power. However, he goes on to object that, even so, the ersatzer’s language does not have sufficient power to represent properly the facts of modality.

To see the worry, consider indiscernible individuals—as Napoleons in worlds of two-way eternal recurrence, or individuals that could, but do not exist. Then, though the language has the resources to describe the features of actual things down to the last detail, and to name whatever there actually is, it may seem to lack the resources to tell one Napoleon from another, or to say that a non-actual individual might have done this or might have done that. Thus, in a much-discussed example, Alan McMichael (1983) objects that the ersatzer cannot represent the possibility that JFK have had a second son who becomes senator, but who could have become an astronaut. It is simple enough to tell one story according to which JFK has a second son who becomes a senator, and another where he has a second son who becomes an astronaut. But just as someone
other than John Jr. might have been the first son of JFK (say, one born years earlier and with a different mother), so different individuals might have been JFK’s second son. And even a Lagadonian language does not name a second son of JFK. So given the one story according to which JFK has a second son who becomes a senator, the other is not one according to which he—the same individual—becomes an astronaut. So we do not represent the possibility that the individual who becomes a senator could have become an astronaut.

There are different responses available. Problems go away if in some sense there exist merely possible individuals, or essences for individuals that could but do not exist; for then the language might name a second son of JFK in some straightforward way (Plantinga, 1976; Zalta, 1983). But there exist also responses that do not require “extra” ontology (Roy, 1995; Sider, 2002). So, extend the Lagadonian language $L$ to a language $L^*$ with the addition of some extra constants. (Perhaps the pair $\langle N, x \rangle$ names object $x$ and $\langle n, x \rangle$ is an extra constant; then there are as many extra constants as things and so, with sets as things, as many as sets.) Tell stories in the extended language. Then it might be that ($\alpha$ is a second son of JFK who becomes a senator) is true in some $w_1$ and ($\alpha$ becomes an astronaut) is true in $w_2$. Given the world where $\alpha$ becomes an astronaut ($\alpha$ is a second son of JFK who becomes a senator, and could have become an astronaut), is true in $w_1$. On this scheme, extra constants work as “placeholders” for individuals; stories in $L^*$ use the constants to indicate the places. But the extra constants do not name anything; they rather indicate places something could occupy. So it is generalizations in the original $L$, indicating just the places, which represent real possibility. Thus, generalizing on $\alpha$, (something is a second son of JFK who becomes a senator and could have become an astronaut) is true in $w_1$; and since there is such a world, we have that possibly something is a second son of JFK who becomes a senator and could have become an astronaut in actuality. Similarly, one might tell stories according to which there are qualitatively identical but distinct Napoleons. And similarly for related objections about properties that are indiscernible or could but do not exist.

**Maximality**

Suppose that for any proposition $a$, some sentence expresses $a$ and some sentence expresses not-$a$. (Perhaps, depending on the metaphysics of propositions and the Lagadonian language, sentences just are propositions.) Then the supposition that worlds are maximal and so include one of $a$ or not-$a$ for every sentence is incoherent. Consider a world $w$, and the set $P(w)$ which has as members all the subsets of $w$. By Cantor’s Theorem, there are more sets of sentences in $P(w)$ than sentences in $w$. Trouble. But first, the Theorem.

Set $A$ is a subset of set $B$ if and only if every member of $A$ is a member of $B$ (this is understood to imply that the empty set $\phi$, with no members, is a subset
of every set). Set A has at least as many members as set B if and only if there is a one-to-one map from (some of) the members of A onto all the members of B. Suppose \( P(w) \), the set of all the subsets of sentences from world \( w \), does not have more members than there are sentences in \( w \); then \( w \) has at least as many members as \( P(w) \), and there is a one-to-one map \( h \) from members of \( w \) onto all the members of \( P(w) \). Since \( h \) is a function from sentences to sets of sentences, we may ask if a given sentence \( a \) is itself a member of \( h(a) \). Thus, with integers, if some function \( f \) has \( f(2) = \{2,4,6\} \) and \( f(3) = \{19,127\} \), then 2 is a member of \( f(2) \) but 3 is not a member of \( f(3) \). Consider \( C = \{a \in w \mid a \not\in h(a)\} \), the set of all elements \( a \) in \( w \) such that \( a \) is not a member of \( h(a) \); \( C \) is formed by collecting every sentence \( a \) in world \( w \) which is not a member of the subset to which it is mapped by \( h \). Any sentence in \( C \) is collected from \( w \); so \( C \) is a subset of \( w \) and thus a member of \( P(w) \). But \( C \) is designed so it differs from every \( h(a) \) in membership of \( a \): Consider an arbitrary \( h(a) = A \); if \( a \) is a member of \( A \), then by construction, \( a \) is not included in \( C \), so \( A \neq C \); if \( a \) is not a member of \( A \), then by construction, \( a \) is included in \( C \), and again \( A \neq C \); either way, \( h(a) \neq C \). So there is no \( a \) such that \( h(a) = C \); so \( h \) does not map onto all the members of \( P(w) \). This contradicts the specification of \( h \); reject the initial assumption: there are more elements of \( P(w) \) than of \( w \).

And this generates a problem about the maximality of \( w \). Suppose \( w \) is maximal; then given our assumption that there are sentences to express any proposition and its negation, for any \( A \) in \( P(w) \), \( w \) includes one or the other of,

\[
\begin{align*}
    a_1 & \text{ Some member of } A \text{ is true;} \\
    a_2 & \text{ No member of } A \text{ is true.}
\end{align*}
\]

So \( w \) includes at least one sentence for each member of \( P(w) \); so there are not more members in \( P(w) \) than \( w \). This is impossible; reject the assumption: \( w \) is not maximal.

So given a language with adequate expressive power, the very attempt to say everything about a world is self-defeating. But there is a reason for maximality in the account of necessity. Suppose non-maximal (partial) “worlds,” and for some necessary \( a \) consider a world \( w \) that does not include \( a \). Then, on the account we have offered, \( a \) is not true in \( w \). So \( a \) is not true in every world and, on the usual account, \( a \) is not necessarily true, contrary to assumption. (Exercise for the reader: Adapt the above reasoning to show that there is no set of all necessary truths, so that any set of sentences is missing some necessary \( a \). Hint: if members of \( A \) are necessary, then \( a \) is necessary; and if \( A \) is empty, \( a \) is necessary.)

A natural response is to obtain the function of worlds but without maximality (Humberstone, 1981; Roy, 1995). Thus, for example, require that a (partial) story be a fully extended set of sentences.
Modality

i. \( t \) extends \( s \) \((t \geq s)\) if and only if \( t \) includes every member of \( s \) \((t \supseteq s)\).

ii. \( s \) is fully extended if and only if for any \( a \), some extension of \( s \) includes \( a \) or not-\( a \).

Then say an ordinary \( a \) is true in \( s \) if and only if every \( t \geq s \) has a \( t' \geq t \) such that \( a \) is an element of \( t' \). So a sentence is true in a story so long as, no matter how the story is extended, the sentence always shows up eventually. Consider stories that are possible in the sense that they could be true, and consider a story \( s \) and extension \( t \) of \( s \). Where story \( t \) is possible, for any necessary \( a \), \([a] \cup t\) — the story that adds \( a \) to \( t \) — is possible as well. So among possible stories, every extension \( t \) has an extension with \( a \) as a member, and \( a \) is therefore true in \( s \). Given this, proceed in the usual way: A thing is necessary if and only if it is true in all stories, possible if it is true in some. Insofar as stories are not maximal, there is no problem about maximality — though there is the related requirement that stories be fully extended.

This strategy seems to accommodate related objections. Consider a case derived from Kit Fine (2003, pp. 169–71). Grant the possibility of “telepathic Cartesian egos.” Suppose,

\begin{enumerate}
\item a. There could be at least one Cartesian ego.
\item b. If it is possible that there are some egos, it is possible that for any (sub)set of them, an ego is in telepathic communication with just the egos in that set.
\item c. If some egos can exist, it is possible that they all exist together.
\end{enumerate}

From (c) there is a story (Descartes’s story) according to which all possible egos exist, and from (a) according to Descartes’s story there are some egos. From (b), one might conclude,

\begin{enumerate}
\item d. If it is possible that there are some egos, then possibly there are more egos than that.
\end{enumerate}

So some story has more egos than Descartes’s story. But (d) follows from (b) only with the assumption that the egos that exist according to any given story comprise a set. The immediate consequence of the Cantorian argument is that any set has more subsets than members; if there can be some set of egos, by (b) there can be an ego corresponding to every subset of it; so there can be more egos than are in the set. On our assumptions, however, there need not be a set of all the egos. Suppose there is a set \( A \) of egos according to story \( s \); then there may be an extension \( t \) of \( s \) according to which there are all the egos in \( A \) and for any subset of \( A \), some ego is in communication with just the egos in that set. Say the egos in \( t \) comprise a set \( B \); then there may be an extension of story \( t \) according
to which there are all the egos in $B$ and for any subset of $B$ some ego is in communication with just the egos in that set. And so forth. So it is possible that for any set of egos, there are more egos than are in it. And this seems just right, given the assumptions with which we began. All the possible egos appear eventually in extensions of Descartes’s story, so according to Descartes’s story they all exist; but no extension of Descartes’s story has a set of all the possible egos. So attempts to show that ersatz entities (stories in this case) are “too small” to include everything are correct, but the force of them is undercut by allowing the ersatz entities to extend, just as a universe of sets (or egos) itself extends under Cantorian pressures.

The Relevance of Worlds

So far, we have addressed technical problems with technical solutions. If ersatz entities do not properly represent the facts of modality, then ersatzism cannot hope to provide an adequate analysis of modality. Suppose such problems are resolved, and some ersatz entities do adequately represent the facts of modality. Even so, there are reasons to question the adequacy of a worlds approach. Perhaps worlds exist as advertized, but still do not solve the problem. I turn now to concerns of this sort.

Lewis

Lewis does not appeal to modality in his specification of worlds. On his theory, there are some worlds; possibility and necessity are defined on them. And given the nature of his worlds, there is no question that their features are possible. But he objects that the ersatzer can give no such account (1986). Rather, he says, the ersatzer must appeal to modality in specification of her stories. It is not enough that stories are some fully extended sets of sentences (or whatever), for the stories must be possibly true. But an account which appeals to modality does not explain it. So if the ersatzer simply says, “stories are possible and fully extended sets of sentences,” she does not account for modality; ersatz worlds may have some utility, but not for an account of modality as such. Lewis anticipates a reply according to which stories may be merely consistent relative to syntactic criteria—relative to some axioms and derivation rules. So if axioms include “No dog is a cat” and a story says Fido is both a dog and a cat, contradiction follows in the usual way, and the story is not consistent. So far, so good. But, says Lewis, any plausible specification of the axioms will itself rely on primitive modality.

Primitive modality will not go away. The axioms to do the job may exist, but the ersatzer will not be in a position to specify them. He can only declare:
the axioms shall include whichever sentences of such-and-such form are necessarily true. Once he says that, all his analyses from there on are modal. (Lewis, 1986, p. 154)

So, again, modality is required for a specification, and the ersatz stories do not suffice for an account of modality.

For the moment, grant that we are in no position to specify stories except by appeal to modality. Still, the ersatzer might attempt a “brazen” reply: Suppose some sets are all the possible stories, or sentences are a specification of all the axioms. Seemingly God, at least, could survey the sets or the sentences, “point out” the relevant ones, and say, “Thus I identify the possibilities.” So God could give an analysis of modality in terms of linguistic entities making no appeal to modality. But for an adequate analysis of some feature of the world, it should not matter who does the analysis. Lewis says worlds are determinative of modality; the ersatzer, God in this case, says that particular sets and sentences do the job. Each points and says “voilà.” And relative to God, the human ersatzer’s problems may seem to be (merely) epistemic and practical. Lewis grants that the ersatzer may legitimately depend on knowledge of modal facts for axiom specification. But it is unlikely that some modal facts will ever be known. So the human ersatzer is in the position of being unable to determine whether certain sentences are axiomatic or not. And perhaps there are “too many” axioms for any finite being to specify them all. But, again, these are not problems for ersatzism as such. So far as primitive modality goes, then, Lewis and the ersatzer are in very much the same boat. When they “point,” it is required that they point to all and only the possibilities. In either case, once this is done, the analysis is complete without appeal to modality.

Perhaps there is something deeply unsatisfying about “brazen linguistic ersatzism.” Parity between Lewis and the ersatzer may motivate rejecting the views together, rather than accepting one or the other. One can point to any old entities, a stack of books or whatever, and say a thing is possible if true according to some, and necessary if true according to all. Even if a proposed analysis is extensionally correct, it may not immediately be clear how or why the entities constitute the modality. It is surely implausible that the modal facts are constituted by any stack of books! One wants to know what it is that connects modality to Lewis’s worlds, or some abstract stories, or the books, or whatever. This concern underlies a critique developed by Michael Jubien, especially in his (2009); compare (Jubien, 1988, pp. 303–05) along with (Lycan, 1979, pp. 308–12) and (van Inwagen, 1986, p. 199).

Jubien
To set the stage, Jubien emphasizes that the “worlds” of semantics for modal logic are (mere) indices in a mathematical structure. By means of the structure,
there are results for validity and invalidity of arguments. But the mathematics is not metaphysics. A theorist who accepts the “central tenet” of worlds theory according to which a thing is possible if and only if true in some possible world, adopts a position structurally parallel to the standard semantics for logic. But this is not a mathematical justification for the central tenet. Rather, a thesis about the metaphysics of modality requires metaphysical justification. In particular, the central tenet “cannot rise to the status of an analysis of the notion of possibility until we have been told what the possible worlds are like and why what goes on in other possible worlds has anything to do with what is true in a given possible world” (Jubien, 2009, pp. 69–70). Both Lewis and the ersatzer make headway toward accounts of what the worlds are like. This leaves the question about what other worlds have to do with what is true in ours. And, though worlds might reflect modal reality, Jubien maintains that they do not ground it.

Against Lewis, Jubien invites us to consider the “pure, untitled ontological picture of detached realms” (Jubien, 2009, p. 62). Suppose there are two such realms, or 27. Say the latter, but all of them include stars. On the face of it, the detached realms are not so much as relevant to the question whether stars are necessary beings. Similarly for a stack of 27 books, each asserting that there are stars. So far, the view lacks “modal oomph” to connect the realms to what can and must be. Lewis argues from theoretical fruit to the result that for every way a world could be some detached realm is that way. This fruit requires treating the realms as possibilities. But even the fruitful hypothesis that detached realms are the possibilities does not itself remove the question how or why this is so.

Lewis’s counterpart theory may seem to provide the relevant oomph. On this theory, different worlds represent our world as being other than it is. So for example (parts of) worlds represent Hubert Humphrey, the former Vice President and 1968 United States presidential candidate.

Humphrey may be represented in absentia at other worlds, just as he may be in museums in this world. The museum can have a waxwork figure to represent Humphrey, or better yet an animated simulacrum. Another world can do better still: it can have as part a Humphrey of its own, a flesh-and-blood counterpart of our Humphrey, a man very like Humphrey in his origins, in his intrinsic character, or in his historical role. By having such a part, a world represents de re, concerning Humphrey—that is, the Humphrey of our world, whom we as his worldmates may call simply Humphrey—that he exists and does thus and so. By waving its arm, the simulacrum in the museum represents Humphrey as waving his arm; by waving his arm, or by winning the presidential election, the other-worldly Humphrey represents the this-worldly Humphrey as waving or as winning. That is how it is that Humphrey—our Humphrey—waves or wins according to the other world.
This is counterpart theory, the answer I myself favour to the question how a world represents *de re*. (Lewis, 1986, p. 194)

So other realms are relevant to our world to this extent: they represent it as different than it is. Given counterpart theory, then, Lewis and the ersatzer each offer representations of actuality.

Jubien argues that “no one could bring it about that an entity represents Humphrey without being causally connected to both Humphrey and the entity” (Jubien, 2009, p. 65). If this is right, Lewis’s entities do not represent actuality, and to this extent, his view is at a disadvantage relative to ersatzism. But allow that similarities are sufficient to set up representation even without causal interaction. Then the worlds as representers land in very much the same boat as ersatz stories. A set of sentences can represent what is not possible. This is the reason for axioms, or the like, to constrain stories. But so a concrete entity may represent what cannot be. Thus Saul Kripke argues that, if Queen Elizabeth II is not in fact the natural daughter of the Trumans, it is metaphysically impossible for her to have been the natural daughter of the Trumans (Kripke, 1980, pp. 110–13). Say this is right. Still, “this would not prevent someone from staging a play in which she was represented as being the Truman’s daughter” (Jubien, 2009, p. 66). One might require “similarity with respect to necessary features” for representation; but then worlds are not doing the modal work. One might postulate that other realms just have making it possible that Humphrey won. But, again, this is an appeal to modality best avoided.

So any worlds theory must appropriately connect its worlds to what is actually possible and necessary. But, says Jubien, there is a “deep and fundamental weirdness” in the supposition that any such connection exists.

The weirdness is this. Suppose it’s necessary that all As are Bs. The central tenet *analysis* is that in every possible world, all As are Bs. So the necessity arises from what goes on in all the worlds taken together. There’s nothing intrinsic to any A-containing world, even in all of its maximal glory, that forces all of its As to be Bs. It’s as if it just happens in each such world that all of its As are Bs, that from the strictly internal point of view of any world, it’s contingent, a mere coincidence. . . . The theory provides no basis for understanding why these contingencies repeat unremittingly across the board (while others do not). As a result, it provides no genuine analysis of necessity. . . . Of course if something is necessary, and there really are all these “possible worlds,” then the something that is necessary will be true in each of them. But that doesn’t tell us why it is true in each of them, in other words, what its necessity consists in. (Jubien, 2009, pp. 74–5)
So worlds do not explain necessity. And an account of whatever intrinsic features constrain worlds to be the way they are would seem to render the worlds superfluous for an analysis of modality, as the real work is done by the account of the intrinsic features.

Jubien himself holds that necessities are constrained by relations among Platonic properties—it is from these relations that we obtain the required modal oomph. According to Platonism, for something to be a horse is for it to instantiate the property being a horse, and for something to be an animal is to instantiate the property being an animal. This requires that the properties themselves have distinct intrinsic natures. Given the natures, the reason that necessarily horses are animals is that “the two properties intrinsic natures together guarantee it” (Jubien, 2009, p. 93). Thus one property may entail another. Similarly, horses are possibly wild if the properties being a horse and being wild are compatible in the sense that neither entails the negation of the other. Jubien has “no opinion” about the details of property entailment (Jubien, 2009, p. 94). In particular, it is not a thesis about property constitution. Thus, when something instantiates being a horse it instantiates not being a xylophone—though the one is not a constituent of the other. For Jubien’s analysis, it is sufficient to think of the entailment relations as primitive, if not simple. In the end, then, for “necessarily all horses are animals” and “possibly some horses are blue,” Jubien gives, “necessarily anything that instantiates being a horse instantiates being an animal,” and “possibly something instantiates being a horse and being blue.” The first is necessary insofar as being a horse entails being an animal. The second is so if being a horse is compatible with being blue.

Worlds Again
So the charge is that worlds, ersatz or otherwise, are superfluous for an analysis of modality. But there may yet be a role for worlds. Begin with some simple analyses (compare Mondadori and Morton, 1976): A notion of entailment (or provability) is familiar from logic. But on the standard account,

\[D\text{ \textit{Sentence }a\text{ is provable} if and only if there is a derivation of it}\]

where a derivation is a sequence of sentences such that each member is either an axiom or follows from previous members by a rule. Similarly, in a game of chess,

\[G\text{ \textit{White can win from position }p\text{ if and only if some game overlapping }p\text{ results in checkmate of black} }\]

where a game is a sequence of moves respecting the rules of chess. Without an account of the derivations or games, it would be bizarre simply to point at
some sequences of sentences and say, “a is provable if and only if one of these has a as its last element”; or to some sequences of moves and say “white can win if and only if a sequence overlapping p results in checkmate of black.” As such, pointing leaves it open whether the relevant sequences respect the rules, and whether they are all the sequences under the rules. It is mysterious how entities not subject to the constraints could be relevant to the analyzed notions. But quantifications over proofs and games are relevant precisely because of the constraints to which they are responsible. Proofs and games become relevant insofar as they represent all the combinations subject to the constraints. The “modal oomph” results from their relation to basic rules functioning as a constraint on the range of combinations.

Similarly, one might think ersatz stories could be relevant to metaphysical modality. Suppose partial stories and truth in them as above. Then one might offer,

Q Sentence a is possibly true if and only if there is a consistent story according to which a

where we require of consistent stories that they respect some basic constraints. Let the constraints be precisely the ones to which Jubien appeals. Thus all consistent stories make it true that anything that instantiates being a horse instantiates being an animal, and the like. So the suggestion is that possibility is a quantification over stories; and stories become relevant insofar as they represent combinations subject to constraints grounded in the actual intrinsic natures of properties.

Jubien might allow the biconditional Q. He would not, however, allow it as an analysis of modality. Though worlds may represent possibilities by respecting intrinsic constraints, they are superfluous if the constraints do all the work: Necessities are given by property entailment; at best, stories merely exhibit what they are. But note that derivations and games are not superfluous to D or G. Their rules do not simply list all the entailments. Rather, rules function as basic constraints; the full range of entailments is fixed by rules only in combination with quantification over the derivations or games. In this way, the derivations and games are essential to accounts D and G.

Jubien accounts for all necessity by property entailments. With this done, there is no work left for stories to do. But even supposing his Platonism, not all property entailments are so straightforward as in the case of being a horse and being an animal, or being a horse and being wild. Consider whether pigs can fly. This does not seem to be a simple matter intrinsic to being a pig and being a flying thing. Rather, the possibility depends on some complex interaction between the density of pigs, the nature of gravity, the atmosphere, laws of flight and the like. One might respond that being a flying thing builds in features of gravity, the
atmosphere and laws of flight, so the relations remain intrinsic. Even so, surely entailments of being a flying thing are not independent of entailments from being gravity, being an atmosphere and being laws of flight. It is natural to think entailments of a complex being a flying thing result from entailments of constituent properties. But if this is right, there remains room for a class of “basic” entailments from which others result. Pigs cannot fly when every combination of basic properties rules it out. But with entailments of complex properties given by combinations subject to basic constraints, one might offer quantification over all stories that respect the basic constraints (or maybe better, over complex properties) precisely in order to complete the account of entailment and compatibility. In this case, even under an entailment picture, stories have a non-weird role for an account of modality.

Of course, if stories are constrained by entailments, and the entailments are themselves modal, we appeal to modality for the account of the stories. Again, however, there is apparently no such appeal in D or G. Any derivation makes it true that each sentence is an axiom or results from previous sentences by a rule, and each of the games makes it true that a bishop moves along a diagonal. Then on the proposed accounts, modal notions are quantifications over all the entities with these features. So long as, with Jubien, we hold no opinion about the details of property entailment, the stories of Q are no doubt modal at bottom—for we appeal to basic and modal property entailments as constraints. But one might hope to lever the picture of property constituents into something like an account of the basic entailments. Thus one might accept,

\begin{align*}
\text{cnj} & \quad \text{A thing has } p \text{ and } q \text{ if and only if it has } p \text{ and } q \\
\text{dsj} & \quad \text{A thing has } p \text{ or } q \text{ if and only if it has } p \text{ or } q \\
\text{neg} & \quad \text{A thing has } \neg p \text{ if and only if it does not have } p
\end{align*}

Though any such suggestion must be controversial, perhaps a thing has being not p when it instantiates a property in a complement of being p relative to some background property class—as a thing is not a pine when it is a cedar, an oak or the like (Figure 1).

So if being an animal is a conjunctive part of being a horse, horses are animals. And if being a horse is a disjunctive constituent of not being a xylophone, then a
thing that is a horse is not a xylophone. (So though being a horse is no part of being a xylophone it might, notwithstanding the above suggestion, be a part of not being a xylophone; in this case constituency does account for the entailment from being a horse to not being a xylophone.) I do not mean to offer an account of basic constraints! Perhaps there is no theory of properties sufficient for a complete account of entailments. Still, the Platonist accepts that properties have some intrinsic natures. Supposing basic constraints are a function of intrinsic categorical features (as above or otherwise) then, even if a complete specification of them requires modality, the constraints themselves rest on an actual categorical ground. If this much is right then, on the model of D and G, Q contributes to a theory on which there is a categorical ground for modal reality.

Observe that the present approach does not somehow eliminate modality. At best, modal notions are “reduced” to ones that are non-modal in the sense that stories and quantification, themselves not modal, combine to constitute possibility and necessity. So stories play a non-weird role in a complete account of possibility and necessity. Or one might try for something less: perhaps stories exhibit combinations under basic, but modal constraints. Again, then, there is a non-weird role for worlds, though in something less than a complete account of modality.

Philosophers have not generally attempted so much. While there are different accounts of what worlds are like, in typical cases, either there is modality in the account, or it is left unclear how or why they matter. So there is no single way an appeal to worlds addresses the problem with which we began. Lewis denies AC by denying that every property has an actual ground. This view, together with brazen ersatzism, faces relevance objections. With primitive modality, one denies AC by denying that every property has a categorical ground. Depending on how much is primitive, in this case, worlds may (or may not) play a role in something less than a complete account of modality. The present story account, in its strongest version, denies NG, by holding that actual categorical elements are an adequate ground for modal properties. So modality is explained on the basis of categorical elements alone.

**De Re Modality**

Traditionally, philosophers have distinguished between modality *de dicto* and modality *de re*—where “possibly there is a blue horse” is *de dicto* and “Possibly Obama plays in the NBA” is *de re*. On a worlds picture, *de re* modality “tracks” particular objects across worlds, where *de dicto* modality does not. So, for example, “Possibly Obama plays in the NBA” depends on how Obama is in different worlds; it is true just in case there is a world where he plays in the NBA. In contrast, “possibly there is a blue horse” depends on horses in the different
worlds, but without respect to how a thing is from one world to the next; it is true if and only if there is a world where something is a blue horse. So de re modal claims, in contrast to de dicto, have to do with the modal properties of particular things.⁸

Though he is not enthusiastic about necessity and possibility on any account, it is well known that W.V.O. Quine, and many others, have thought that de re modality is particularly problematic (Quine, 1976, 1980). Suppose property entailments, or the like, underwrite de dicto results of the sort, “necessarily horses are animals” and “necessarily no horses are xylophones.” Still, these entailments do not obviously suffice for the de re case. Given de dicto principles sufficient for the result that there is no story where something is both a horse and a xylophone, we do not yet have the result that something that is a horse in one world is not a xylophone in another. So we do not yet have that Seabiscuit, say, is not possibly a xylophone. Insofar as the entailments are necessary de dicto, they have no consequences for modal properties of particular individuals. So a solution to the problem of de dicto modality leaves the problem of de re modality intact.

But the difficulty is not merely that a solution to one leaves the other intact. Rather, Quine argues that there are special difficulties for the de re case. By the indiscernibility of identicals, if \( x \) is identical to \( y \), then \( x \) has the same properties as \( y \). Quine thinks this principle fails for supposed modal properties, and therefore that the very idea of a modal property is incoherent. Quine’s own examples tend to depend on descriptions, and there are well-known replies. Here is a case, like Quine’s, that illustrates the difficulty: “Necessarily the inventor of bifocals invents bifocals” seems true, and “Necessarily the first Postmaster General invents bifocals” false. But the inventor of bifocals is the first Postmaster General. At one level, then, Quine would like to see us as first granting and then withholding being necessarily the inventor of bifocals to Benjamin Franklin, and so as violating the principle. Arguably, however, these claims are not de re at all. It is enough that no world has something that is and is not the inventor of bifocals, but some world has a thing that is Postmaster General and not the inventor of bifocals. So there is no question about Franklin in different worlds. Against Quine, then, Ruth Barcan Marcus, Saul Kripke, and others have responded that it is important to separate proper names which may be rigid in the sense that they track with particular things across worlds, from descriptions which need not work this way; they suggest that if one does keep them and their roles distinct, problems evaporate (Kripke, 1980, pp. 6–15; Marcus, 1961; Plantinga, 1976, pp. 14–26; Smullyan, 1948).

Here is a case that seems to avoid such replies (Gibbard, 1975). Suppose God creates ex nihilo a clay statue, and later annihilates it into nothing. Then it is uncontroversial that the statue and the lump or mass of clay of which it is composed coincide over their entire career. On some occasion, a person points to
the statue and says, “Let this statue be called ‘s’”. Prima facie, “s” is as good a proper name as any. Similarly, on some occasion, a person points to the clay and says, “Let the clay of which this statue is composed be called ‘c’. The name enters the language and is transmitted in the usual way. Prima facie “c” is as good a proper name as “s.” The statue and the clay have their actual categorical features: shape, weight, spatiotemporal location, and so forth, all in common. Thus one might think that s = c. But then there is a problem if we admit both of the (apparently) de re claims,

\[ \text{S: Necessarily \( s \) is not as flat as a pancake} \]
\[ \text{C: Possibly \( c \) is as flat as a pancake} \]

for then we seem to allow that c has being possibly as flat as a pancake but s does not. With s = c, then, there is conflict with the indiscernibility of identicals. But even if the statue is distinct from the clay, insofar as the statue and the clay are categorically the same but modally different, there is a difficulty about AG, the principle that any property has an actual categorical ground. Where both designators are plausibly rigid, it is not obvious how the standard anti-Quinean strategies apply. So it is important for this case that “s” and “c” are rigid, one no less than the other (see Della Rocca, 1996).

Responses to this problem are tangled with accounts of designation and of what it is to be a thing. If the statue and the clay are distinct things, then we may accept both S and C, but at the apparent cost of denying AG. Then there is no problem about the indiscernibility of identicals, insofar as s ≠ c. If the statue and clay are a single thing, at least one of S or C is false—or, if we are to preserve the data, one of S or C is something other than a straightforward de re claim about the thing. So, for example, one might say that reference for relevant terms switches so that one of S or C is a true claim about some fictional object, process or the like (see Zimmerman, 1995). Or, finally, we might accept that neither S nor C is a straightforward de re claim about a thing, and accept some alternate analysis of both.

Without venturing so far as an analysis of S and C, it might be possible to say something about the modal reality underlying such claims. Again following Jubien for basic constraints, say a property is singulary if it cannot be instantiated by more than one thing at a given time. A k-essence is a property, like being that specific dog or being this specific human that, for kind k, must always be instantiated by the same k. Being president of the United States is singulary, but not a human essence—for it might be instantiated by different humans. On Jubien’s account, for any kind k and entity x of kind k there is a k-essence (Jubien, 2009, p. 90). So there is being this statue and being this clay. Then, from property entailments in the usual way, necessarily nothing instantiates being this statue and being as flat as a pancake; and possibly something instantiates being this clay and
being as flat as a pancake. More generally, we might accept principles according to which, if something instantiates a statue essence and has some shape, then necessarily a thing with that essence retains (roughly) that shape; and if something instantiates a lump-of-clay essence and has some shape, then possibly a thing with that essence has a different shape; and so forth. It seems possible to adopt this much independently of whether the statue and clay are distinct, and how “s” and “c” designate.

And nothing stops incorporating principles like these as basic constraints into stories. Thus we might accept principles according to which, if something instantiates a statue essence and has some shape, then in any story in which a thing has the essence, the thing has (roughly) that shape. Such principles may seem to result from the nature of properties as before. Suppose we have as a constraint that if something instantiates a horse essence, then in any story a thing with that essence is a horse. Then, supposing also that necessarily no horse is a xylophone, there is no case where a particular horse in one story turns out to be a xylophone in another. Given that stories are so constrained, we have already much of what is likely to be required of stories for a full analysis of things, and of S and C. And if the constraining principles rest on the categorical nature of properties, we have all the elements of the solution from before. Possibility and necessity are quantifications over consistent stories, where consistent stories respect basic constraints from the (categorical) nature of properties. So both modality de dicto and (what we have been able to say about) modality de re are explained on the basis of categorical elements. 9

Notes

1 A semantics for modal logic is developed in Kripke (1963a, 1963b) and Hintikka (1963). Graham Priest (2008) is an accessible introduction.
2 For \( n \) the set of all natural numbers, the cardinality of the points in a Euclidean space, like that of the real numbers, is \( P(n) \) the set of all the subsets of natural numbers; so there are \( PP(n) \) sets of points in the space and, on our assumption, as many ways to distribute matter. But there are just \( n \) finite sequences of a finite vocabulary; and no more ersatz worlds than there are sets of sentences; so the number of worlds is at most \( P(n) \). So by Cantor’s Theorem, there are more ways the world can be than ersatz worlds. These basic cardinality claims arise in, say, the first couple chapters of Boolos et al. (2002). For Cantor’s Theorem, see the discussion of “Maximality” just below.
3 This point is from Jubien (1988, p. 307), Grim (1991, pp. 91–124), and others. Jubien (2009, pp. 78–82) develops a nice version that does not depend on the specifically set-theoretic nature of worlds. He argues that no “world proposition” (or related entity) is both consistent and maximal in the sense that it entails every proposition or its negation.
4 On this account, a sentence may remain neither true nor false when some extensions of a story have \( a \) and some not-\( a \). But this is a mere feature of story incompleteness, rather than of the world as such. Constraints on modal access, as in modal logic, are possible but introduce complications (see Humberstone, 1981).
Modality

5 So, for example, Robert Adams (1974, p. 225), “A [world story] is a set which has as its members one member of every pair of mutually contradictory propositions, and which is such that it is possible that all of its members be true together.” And Plantinga (1974, p. 44) says a possible world is a possible and maximal state of affairs. Of course, these thinkers have other applications for worlds.

6 If there are entailments between basic properties, as between having mass and having extension where one is no part of the other, constituency does not take us the whole way. In this case, either there is more to say, or we are saddled with primitive modality. Perhaps there are no such entailments, or no basic properties. Or perhaps having mass and having extension are basic but “unsaturated” so that one is instantiated only in conjunction with the other (see Denkel, 1996).

7 A potential exception are the combinatorial theories of modality which take worlds to include all combinations of some basic entities. For a combinatorial theory, see David Armstrong (1989).

8 There is a corresponding formal distinction. Formally, a sentence is de re if and only if it has a subformula that, taken alone, has an individual constant or free variable inside the scope of a modal operator; a sentence is de dicto if and only if it is not de re. Thus, “possibly Obama plays in the NBA” and “there is a man such that possibly he plays in the NBA” with their natural symbolizations, “◊Po” and “∃x(Mx ∧ ◊Px)” are de re; “possibly there is a blue horse” with its symbolization, “◊∃x(Hx ∧ Bx)” is de dicto.

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References

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