

# GOLD

Christopher BELSHAW\*

\* Department of Philosophy, The Open University, Milton Keynes MK7 6AA, England.

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**ABSTRACT:** Kripke's opponents claim that gold, in all possible worlds, is a yellow metal. They believe that the atomic number can vary from world to world. Kripke inverts this, holding that while gold is, in all possible worlds, the element with atomic number 79, its surface properties may vary widely from world to world. Both views are flawed, but of the two, the rival is to be preferred.

There is a better view. Gold is, in all possible worlds, the element with atomic number 79. And (given certain specifiable conditions) it is, in all possible worlds, a yellow metal. Only insofar as they give rise to familiar and important surface properties is there reason to maintain that structural properties are at the essence or nature of things.

**Keywords:** natural kind, essence, identity, water, gold, possible world, structural properties, surface properties, Kripke.

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What is gold? Kripke agrees with his rivals about which things in the actual world are, or are made of gold but disagrees, nevertheless, about the nature or essence of gold, or about which items in possible worlds, or counterfactual situations would be gold. He has won countless supporters. However, his views, at least as they are most effectively presented are, I believe, deeply flawed.

There is a wealth of literature on this. I do not consider it here.<sup>1</sup> Rather I attempt to uncover the weaknesses in Kripke's position by attending to a mere handful of remarks in the original text. At this juncture, and this distance, such an approach may be worthwhile.

### 1. *Targets*

Kant, according to Kripke, believes gold is a yellow metal. Moreover, he believes this is necessary, and knowable a priori. Thus there's a fact about the stuff gold, that there's a property it has necessarily, and then there's a fact about us, that we know this fact about the stuff, independently of experience. This can sound implausible. We are not born with this sort of knowledge. But the idea is that if we understand the term 'gold', if we grasp the concept, then we know that it is a yellow metal. Being yellow is part of what 'gold' means. Thus 'gold is yellow' is analytic.

Gold has further properties. While some of these, for example malleability, may also be considered to be necessary, and so part of the concept, and so knowable a priori, others are not. Some of these further properties, dealing with, for example, conductivity, specific gravity, or gold's location in the periodic table, have been discovered more recently. These properties may well be true of all, rather than just some, samples of gold. Even so, on the view here considered, these are but contingent properties of gold. Gold might have failed to have had these further properties, but would, in virtue of being a yellow metal, have remained gold nevertheless. Conversely, some stuff might have had these contingent properties of gold, and might also have been a metal. But if it weren't yellow, it just wouldn't have been gold.

Thus can this view properly be located within the philosophical tradition of empiricism. Empiricists believe we need experience to discover facts about the world. They further believe that the facts we discover are contingent. There could be an array of gold-like substances. But those, and only those, fitting our 'definition' are gold.

This view has for a long time been a part of philosophical orthodoxy. But it, like other aspects of that orthodoxy, is, according to Kripke, in strong need of rejection. I'll refer to it as the target view.

### 2. *Marks*

This view goes wrong, on Kripke's account, insofar as it confuses identification with identity. Confusion here is encouraged by the similarity between these terms. It can be discouraged by using different terms. Thus, the view goes wrong, on Kripke's account, insofar as it presumes too intimate a connection between, on the one hand, the everyday features used to pick out a

certain kind of thing and, on the other, the features that the thing must in every circumstance possess. But these features need not coincide.

(Gold) is *thought* to have certain identifying marks. Some of these marks may not really be true of gold. We might discover that we are wrong about them. Further, there might be a substance which has all the identifying marks we commonly attributed to gold, and used to identify it in the first place, but which is not the same kind of thing, which is not the same substance.<sup>2</sup>

There are two pairs of ideas here. One half of one pair, when disentangled, can be set aside. Both elements in the other pair remain important.

What are the sorts of marks which 'may not really be true of gold'? Kripke considers gold's colour, and the status of the commonly held belief that it is yellow. And against this he sets, first, the suggestion that we might have made an epistemological mistake -perhaps no gold is yellow, and we are all subject to an optical illusion<sup>3</sup>- and second the idea of a metaphysical mistake -perhaps, though inspected samples of gold have all been yellow, still gold is not necessarily yellow. Because there is not here the space, and because it is, in any event, tangential to Kripke's main purposes, I shall say no more about the epistemological component. The idea that remains, then, is that we might come to see that one of the marks commonly and appropriately used to identify or pick out samples of gold is not necessarily a mark of all gold. We might go on to discover some bits of gold which aren't yellow. And even if in fact there are no such bits, it still might be that there could be, or could have been, such bits.

There are in fact two metaphysical possibilities suggested in the passage. A bit of gold might lack some of gold's ordinary marks. And something might have all of gold's ordinary marks, and yet not be gold. On both fronts, then, the connections between gold, and gold's marks, are contingent.

However, we do well to note precisely what Kripke says here. First, gold might lack *some* of gold's ordinary marks. This seems to allow, though of course it doesn't yet imply, that no gold can lack *all* of the ordinary marks. To give an example, it may be that while some gold can fail to be yellow, no gold can be other than a metal.<sup>4</sup> Second, as there might be a distinction between identifying marks used today, and those used in the past (for common knowledge might have increased) so what Kripke says here seems to allow, though of course it doesn't yet imply, that nothing could have all of the common marks of gold which are known today, and

yet not be gold. On both counts, then, his claims are more circumspect than they might at first appear.

There is nothing special about gold here. For other substances too, what the substance really is, and what are the marks used to pick it out, need not coincide. Thus there could be a substance which looks, tastes and feels like water, but which isn't water; and there could be a substance lacking the look, taste, feel etc., of water, yet which is water nevertheless. Having the marks of water is neither sufficient, nor necessary for being water.

### 3. *Essence*

What then is gold? If we cannot say that gold is always and everywhere a yellow metal, and that the yellow etc. metal<sup>5</sup> is always and everywhere gold, what can we say? Kripke's view is well known. It is that gold is the element with atomic number 79. And his view, analogously, is that water is H<sub>2</sub>O. These are, at first blush, uncontroversial claims. Informed people will all agree. They become controversial when allied to the negative views about the marks. An uncontroversial view will be that gold is a yellow metal having atomic number 79. Kripke says that even if the substance having atomic number 79 is not yellow, not malleable etc., it remains gold. Similarly for water. The uncontroversial view will be that water is an odourless colourless liquid which has been discovered to have the chemical formula H<sub>2</sub>O. Kripke, more controversially, says that even if H<sub>2</sub>O emerges in a radically different form it is water nevertheless.

There are contrasting views here. But they have a common theme. On both views there are necessary and contingent properties of water, and of gold. On the target view the necessary properties just are the common marks, while the contingent properties are the deeper structural properties which, only recently, scientists have discovered. On Kripke's view priorities are reversed: the surface properties, the common marks, are contingent, the features that gold or water might have failed to possess, while the deeper structural properties are necessary. Water is essentially H<sub>2</sub>O, while gold is essentially the element with atomic number 79.

Let me emphasise this, to my mind, surprising amount of agreement between the views. Both hold that there could be a substance H<sub>2</sub>O which has none of the ordinary marks of water. And both hold there could be a substance having all the ordinary marks of water which has a chemical formula quite different form H<sub>2</sub>O. So both hold that the connections between the surface and the structural properties are contingent.<sup>6</sup> These properties could

coincide. Equally they could sometimes come apart. But while the target view holds that water is always and everywhere the colourless odourless etc. liquid, Kripke holds it is always and everywhere H<sub>2</sub>O.

It's worth asking what reason there could be for favouring one of these views over the other.

#### 4. *Fools*

In giving reasons, Kripke makes some appeal to fact. There is a substance having the common marks of gold, but which is not yet gold. There is iron pyrites. But iron pyrites

is not another kind of gold. It's a completely different thing which to the uninitiated person looks just like the substance which we discovered and called gold.<sup>7</sup>

This is a real example, then, of a substance having the common marks of something of a certain kind and yet not being of that kind. Perhaps there's a real example, too, of something's being an instance of a certain kind of thing, and yet not having that thing's common marks. Kripke refers to the 'polywater allegedly discovered in the Soviet Union, with very different identifying marks from that of what we now call water', saying that this 'is a form of water, because it is the same substance, even though it doesn't have the appearances by which we originally identified water.'<sup>8</sup> By 'same substance' he means, I take it, that this stuff is H<sub>2</sub>O.

But these examples, even if real, are weak. Pyrites just doesn't have, and never did have, all of the ordinary marks of gold. Gold does not merely glitter -it is malleable, not easily tarnished etc. These are its ordinary marks, features of gold known of, and cared about, for thousands of years. So pyrites isn't a good example of what is needed here. It isn't a good example of something's having gold's ordinary marks, past or present, and yet not being gold.

The polywater is an alleged substance. Perhaps it doesn't really exist. But if it did exist, it would presuppose, rather than establish Kripke's claim. That claim, remember is not simply that something could be H<sub>2</sub>O, and yet lack water's characteristic marks. Polywater, if it exists, would fulfil that role. This isn't Kripke's claim, for this is a point with which his opponents are in agreement. Kripke's claim is that this stuff would be a form of *water*. And it is begging the question to assume that because this stuff has the same chemical formula as water, it therefore is water. So even if polywater exists, it isn't uncontroversially, a good example of some-

thing's being an instance of a certain a kind, and yet lacking that kind's characteristic marks.

The weaknesses in these examples are different. But if the weaknesses are pursued, connections will emerge.

Pyrites is a real substance. Not for nothing is it known as fools' gold.<sup>9</sup> It is wrongly taken for gold. It fools people. And now we can consider hypothetical substances which will threaten to fool. Consider water:

We identified water originally by its characteristic feel, appearance, and perhaps taste (though the taste may be due to impurities). If there were a substance, even actually, which had a completely different atomic structure, but resembled water in these respects, would we say that some water wasn't H<sub>2</sub>O? I think not. We would say instead that just as there is a fool's gold so there could be a fool's water, a substance which, though having the properties by which we originally identified water, would not in fact be water.<sup>10</sup>

And consider again gold.

Suppose that all the areas which actually contain gold now, contained pyrites instead, or some other substance which counterfeited the superficial properties of gold but lacked its atomic structure. Would we say, of this counterfactual situation, that in that situation gold would not even have been an element, (because pyrites isn't an element)? It seems to me that we would not. We would instead describe this as a situation in which a substance, say iron pyrites, which is not gold, would have been found in the very mountains which actually contain gold and would have had the very properties by which we commonly identify gold. But it would not be gold; it would be something else. (...) Given that gold *is* this element, any other substance, even though it looks like gold and is found in the very places where we in fact find gold, would not be gold. It would be some other substance which was a counterfeit for gold.<sup>11</sup>

Both examples are unclear. I shall suppose that they are meant as relevant examples, examples of things having all the common marks, yet not being of the purported kind. I need to suppose this, as Kripke is not explicit as to whether this fools' water, and this (what I shall call) superfools' gold have all or, like fools' gold, merely some of the ordinary marks.

Now the problem is this. The idea of being fooled, which in the case of real fools' gold is transparent, has here become obscure. Fools' gold, as a name, is apt, because we take it for gold. We acquire false beliefs about it, assuming it will not tarnish, can be made into rings or candlesticks, is rare enough to allow us to barter, and so on. But it isn't at all clear how we are fooled by superfools' gold. This yellow metal is malleable, doesn't tarnish, resists aqua regia, and so on. It does (because it is, in Kripke's thought experiment stipulated to do) what real gold does. We don't have false

beliefs about it, and so we are not fooled, and so superfools' gold, as a name, is inapt. Similarly for fools' water. Not only does this feel, appear and taste like water, it doesn't poison us or animals or plants, it boils for tea, freezes for ice cubes, and so on. It does these things, otherwise it doesn't, as stipulated, have the ordinary marks of water. We expect such things of it, and our expectations are fulfilled. Again, we do not seem to be fooled.

There's a reply. Kripke might say we are fooled, by these supposedly counterfeit substances, into thinking they share structural properties with their originals. We are fooled into thinking the so-called gold is an element with atomic number 79, and that the seeming water, like standard water, is H<sub>2</sub>O. Now I agree we might make such assumptions. And so we would, in this case, acquire false beliefs. But it still isn't clear we were fooled. We might eventually discover that fools' water isn't in this one respect like standard water, but there's no clear reason why we shouldn't view this as a quite incidental respect, not something we have reason to care about, and not something which in any ordinary sense of the word fooled us, or took us in. There's no clear reason, then, why we shouldn't prefer to describe this so-called fools' water as just a different form of water. And similarly for superfools' gold.

Go back to polywater. This substance, remember, has the chemical formula of water, but lacks some of water's ordinary marks. Suppose it lacks many. It's opaque, solid at room temperatures, very smelly. Might we be fooled here into thinking that this substance isn't water, but is, contrary to Kripke's claim, a different kind of thing? We might, of course, assume that this stuff doesn't have the formula H<sub>2</sub>O. For thus far all and only standard water has turned out to have this formula. And if we were to assume this we'd have made a mistake. But have we made a mistake in denying that it's water? There's no clear reason, so far as I can see, why, having acknowledged that H<sub>2</sub>O can manifest itself in quite disparate ways, we should not elect to refer to just one of these manifestations as water, and the other, or the others, as something else. Indeed, things might well be less confusing that way. Were we to refer to quite disparate substances by the same name, we might, unwittingly perhaps, fool people into thinking they were getting something they weren't.

### 5. Cases

Pyrites and polywater do not, I want to claim, lend support to Kripke's view. Moreover, other cases work against the view, aiding instead the orthodox position.

Consider one thesis about marks. Kripke holds that if a substance has a particular structure, it has that structure necessarily -thus, superfools' gold isn't gold. But this isn't true. Jade is a stone which actually has two different chemical and crystalline structures. But there isn't, because of this, both genuine and fools' jade. There isn't this distinction because both types of jade do what jade is supposed to do. The actual stones are different, and scientists have a perfectly adequate vocabulary for distinguishing between them. And they have no need to make claims about the proper and improper uses of the ordinary word 'jade' in order to do this.

And consider the second thesis. Kripke holds that even if a given structure gives rise to different sets of marks only one kind of thing is involved -thus, polywater is water. But again this isn't true. Coal is not diamond. When it was discovered that diamond is a form of carbon, it wasn't thereby discovered that diamond is carbon, and carbon diamond in all possible worlds. Carbon isn't always diamond even in this world. Again, there's a surfeit of words. We can use some to refer to structures, and others to refer to particular surfaces to which those structures can give rise.<sup>12</sup>

It might be objected that Kripke is talking about gold and water, and that remarks about jade and carbon are just not to the point, This is a somewhat poor objection -Kripke has no particular interest in water and gold, but an interest in kinds of things generally. But in fact the account is not even true of water.

First, water isn't H<sub>2</sub>O in all possible worlds, because it isn't (all) H<sub>2</sub>O in this world. Heavy water, containing the isotope of hydrogen, deuterium, is D<sub>2</sub>O. This substance has almost all the ordinary properties of water, it is water, but it has a different atomic structure.

Second, H<sub>2</sub>O isn't water in all possible worlds because it isn't always water even in this world. Steam is not water, but water vapour, and ice isn't water, but frozen water. A cold world might contain a lot of H<sub>2</sub>O, but no water.

Of course, these claims will meet considerable resistance. It will be objected that heavy water doesn't really have a different structure from standard water, but that it is H<sub>2</sub>O in which the hydrogen takes on a different form. What, though, could make it true that isotopes are variants of one



kind of thing, rather than different kinds of thing?<sup>13</sup> An alternative objection (and one at odds with the first) is that heavy water may be called water, but that it's really an excellent fools' water, and so isn't really water after all. But what could give support to such a view?

The second claim invites the objection that ice and steam are forms, not only of H<sub>2</sub>O, but also of water. And so they are water. Again, what could establish this? Imagine a group of people who agree that ice is H<sub>2</sub>O, that at 0oC it turns into water, but who deny that it is presently water. What could be said to show that these people are wrong?

### 6. *A New View*

The target view is not yet discredited. If, as I am assuming, both sides can agree as to the facts, then there is no evident reason why ordinary pre-scientific terms like 'water' and 'gold' should not be used to track, through possible worlds if you like, those substances manifesting the standard group of surface properties. Whether they are so used is a factual question about linguistic practice. And it is far from implausible to suppose that defenders of the target view show here the greater insight.

But this is, so far, to overlook a further line of support for Kripke's view. Scientists, he suggests, might already have settled matters for us.

Let us suppose that scientists have investigated the nature of gold and have found that it is part of its very nature, so to speak, that it have the atomic number 79...<sup>14</sup>

Were they able to do this, uncovering natures or essences, then there would be a reason, provided by science, for denying that even superfools' gold is really gold. And were they able to do this, then there'd similarly be a reason, provided by science, for maintaining that polywater is really water. If science might settle matters then there are, presumably, substantive issues to be addressed after all. Appeal to what we ordinarily might say will be less than decisive.

But what on earth are we supposed to suppose, when we are to suppose that scientists have made any such discovery? This is still unclear. There are, remember, no evident matters over which Kripke and his rivals disagree. The problem, it is beginning to seem, is in identifying areas of genuine dissent.

There is, however, an alternative. And that is to opt for a new view. This new view is, in an important respect, sympathetic to Kripke's position.

And it is sympathetic to the suggestion that science might have, after all, a substantial role to play in unpacking the natures of things. I shall explain.

There are different views about what we can imagine, and different views about how what we can imagine connects with how things can be. One such view, associated with Hume in particular, will have our imaginings rich, and the connections tight. On this view, we can imagine a substance having not just one or two, but all the non-structural properties of water or gold, and yet still differing from water or gold at the structural level. There could, for example, be a Twin Earth, with an abundance of a substance having the chemical formula XYZ, which substance is yet indiscernible in any further respect from ordinary water. And there could be, on this earth, a substance composed exclusively of H<sub>2</sub>O which is indiscernible in any further respect from styrofoam.

Now what we are imagining here, once again, is a distinct lack of connection between structural and surface properties. Some people have no difficulty in imagining such a thing. Both Kripke on the one hand, and his rivals on the other, seem to be among these people. Would XYZ be water? If water is H<sub>2</sub>O in all possible worlds then clearly it would not. For it isn't H<sub>2</sub>O. But my contention is that if there is no connection between surface and structural properties, then there is no reason for holding that water is necessarily H<sub>2</sub>O. It remains the case that all the water we've so far come across has this property, but this is just a mildly interesting aside. It explains nothing, gives rise to nothing, plays no role.

Adopt a different view of what we can imagine, or of how what we can imagine connects with how things can be. I find it easy to adopt this view. I sometimes want to say I can't imagine XYZ, and sometimes that even if I can imagine it, it shows nothing. For I think there are connections between structural and surface properties. I agree that water is H<sub>2</sub>O in all possible worlds, but I agree with that because I believe that nothing could have all the superficial properties of water, and yet have a radically different chemical composition. And I believe, also, that nothing could be H<sub>2</sub>O, and yet have completely different superficial properties from those that H<sub>2</sub>O actually has. The element with atomic number 79 must have (in standard conditions) the ordinary marks of gold. And so on.<sup>15</sup>

On this account, then, there is some real content to the suggestion that scientists might discover that it is part of water's nature (so to speak) that it is H<sub>2</sub>O. What that comes to, on this view, just is the contention, familiar and untroublesome beyond the confines of philosophy, that a substance's being H<sub>2</sub>O gives rise to, explains, permits inferences to, further and mani-

fest properties. Structure and surface are not separate. Given the one, the other, inevitably, follows.

There are moments when Kripke hints at just such a view. The moments are few, and their style parenthetical.<sup>16</sup> Nevertheless, this may be the view which, in the end, he wants to endorse. If so, there is no quarrel between us. But a dilemma remains. Either structural and superficial properties are disconnected, in which case identification between structure and nature or essence is unmotivated. Or the different properties have necessary connections between them. And in this case vexing counterfactual situations just cannot obtain. Here, as elsewhere, only uneaten cake can be had.

### Notes

- 1 It will be clear, however that I am influenced by the writings of (among others) Hilary Putnam, Hugh Mellor, Nathan Salmon and Derek Parfit.
- 2 Kripke, Saul: 1980, *Naming and Necessity*, Harvard University Press, pp. 118-119. All further page references are to this work, in this edition.
- 3 See p. 118.
- 4 Though, as Kripke observes (pp. 117-119), the whole notion of what it is to be a metal is complicated.
- 5 The 'etc.' here is a shorthand: as I've suggested the idea that gold may be defined simply as a yellow metal may be too austere. Defenders of the target view must be permitted some expansion to the set of necessary properties which are, conjointly, sufficient.
- 6 Someone might doubt that the distinction between structure and surface is as straightforward as I seem here to suggest. I share those doubts. But it is not possible, in the present context, to give them space.
- 7 P. 119.
- 8 Pp.128-129.
- 9 I've always understood pyrites to be *fools'* gold -a substance which fools all the fools. Kripke particularises it, as if only one person is taken in. Perhaps he is more charitable about the human condition.
- 10 P. 128.
- 11 Pp. 124-125.
- 12 I cannot here consider the suggestion that some appeal to the notion of an 'initial baptism' (see especially pp.135-140) might afford some rejoinder to these claims. I believe, however, that no such appeal will be effective.
- 13 This looks like a rhetorical question, but an answer (though one unfavourable to Kripke) will begin to emerge in the next section. See footnote 15.
- 14 P. 124.

- 15 Thus there is a reason for maintaining that deuterium is a form of hydrogen (and, more generally, that isotopes are variants on elements, and not different kinds of things). It has the same chemical properties.
- 16 See, in particular, the tantalising remarks about the status of physical necessity (p. 99, p. 164).

*Christopher Belshaw* is presently a member of the Department of Philosophy at the Open University (UK). His current research interests concern questions of identity, personal identity, the metaphysics of death, and moral philosophy. Recent papers on certain of these topics have appeared in *Bioethics* and *Philosophical Studies*.