Kinds of Truths

4.1 Three Distinctions among Truths

There are three interesting ways to divide up the class of true statements. A lot of philosophy depends on the relationships between these divisions.

We can distinguish:

the analytic truths from the synthetic ones
the a priori truths from the a posteriori ones
the necessary truths from the contingent ones.

The first distinction is semantic—to do with the meanings of words; the second is epistemological—to do with knowledge; and the third is metaphysical—to do with the nature of things.

4.2 Analytic and Synthetic

Analytic truths are true by definition. Their truth is guaranteed by the meanings of the words used to state them.

Here are some examples of analytic truths. All triangles have three sides. A vixen is a female fox. If John is Jane’s brother, she is his sister.
The truth of these statements falls out of the meanings of the words they contain—‘triangles’, ‘sides’, ‘vixen’, ‘female’, ‘fox’, ‘brother’, ‘sister’. The meanings of these words suffice to ensure that the statements are true.

*Synthetic* truths are those which are not analytic. Their truth depends not just on the meanings of words, but also on the actual facts.

Here are some examples of synthetic truths. Blackbirds eat worms. Bristol is west of Manchester. The sun has eight planets.

The truth of these statements isn’t just a matter of meanings, but also of how the non-linguistic world is arranged.

### 4.3 A Priori and A Posteriori

This distinction is to do with kinds of knowledge rather than the meanings of words.

A true statement is *a priori* if it can be known prior to experience of the facts. In principle, you can figure out an a priori truth just by sitting in an armchair with your eyes shut and thinking hard.

The most obvious examples of a priori truths are analytic truths. Anybody who understands the statement *triangles have three sides* won’t need to examine any physical triangles to know that this statement is true.

(In a moment we shall consider whether any other truths apart from analytic ones can be known a priori.)

A true statement is *a posteriori* if it can only be known as a result of relevant experiences. *Blackbirds eat worms* is an example of an a posteriori truth. There is no way of finding out that this statement is true without making observations.

Note that the requirement for a truth to be a priori is that it *can* be known prior to experience, not that it *must* be known in this way. I might find out that $7 \times 6 = 42$ by looking at a few actual squares made
of seven rows of six pebbles each, counting the total number of pebbles, and inferring the general pattern. But even so this is still an a priori truth, because I could have worked it out in my head without making any observations.

One last point about a priority. The idea is not that an a priori statement can be known prior to any experience whatsoever—for some experience may be necessary in order to understand the statement in the first place. Rather the requirement is that, once you have enough experience to understand the statement, you don’t need any further experience to know that it is true. For example, you may need some experience of the world to acquire such concepts as triangle and side. But anyone who has acquired these concepts can thereby know triangles have three sides without any further investigation. By contrast, someone can possess the concepts blackbird and worm but still not be in a position to know that blackbirds eat worms.

4.4 Synthetic A Prioris

Let us leave the third distinction, between necessary and contingent truths, to one side for the minute. First we need to think about the relationship between our first two distinctions, analytic/synthetic and a priori/a posteriori.

Remember that the first distinction is semantic—to do with the definitions of words. The second is epistemological—to do with acquisition of knowledge. It’s not to be taken for granted that these two distinctions line up together.

Above I said that analytic truths provided the most obvious examples of a priori truths. And in general we can see that any analytic statement can be known a priori: if the truth of some statement is guaranteed by the meanings of the words it contains, then someone who grasps those meanings will be in a position to work out that it is true.
But are analytic truths the only statements that can be known a priori? Or does the realm of things that can be known a priori extend into the synthetic truths? In short, are there any synthetic a priori truths?

Many philosophers have thought that there were. Here are some examples of statements that they have thought to be both synthetic and a priori: all triangles contain 180°, every event has a cause, nothing can be both red and green all over.

(The traditional ‘rationalists’—Descartes, Spinoza, Leibniz—are often said to be distinguished from the ‘empiricists’—Locke, Berkeley, Hume—by their belief in synthetic a priori knowledge. But take this with a pinch of salt. While it is certainly true that synthetic a priori knowledge was more important to the Continental rationalists than to the British empiricists, the latter group by no means rejected all examples of this category.)

Perhaps geometry provides the most plausible examples of synthetic a priori knowledge. Consider the statement that all triangles contain 180°. This certainly seems to be a synthetic statement. After all, it tells us that if you cut off the three corners of a paper triangle, and then arrange them together, they will make a nice straight line. (See diagram below.) This looks like a substantial fact about the world, not something guaranteed by definition. How could a mere definition make the pieces of paper line up so neatly?
But at the same time it looks as if we can prove this statement a pri-
or, by means of the familiar schoolbook demonstration. (See Box 10.) And this proof seems to tell us beforehand what will happen when we cut out the corners and arrange them together—that is, the proof seems to enable us to know a substantial synthetic fact prior to any experience of the result.

4.5 How is Synthetic A Priori Knowledge Possible?

Here is a question. How can we possibly know a statement to be true prior to experience, if the concepts used to frame it leave it open that it might be false? The truth of such a synthetic statement will depend on the actual facts, as well as on the concepts involved. But how can we know what these facts are, prior to any experience of them?

Before the eighteenth century all philosophers would have had a ready answer. God told us—or, as they would have put it, He has endowed us with a ‘natural light of reason’ which enables us to identify certain basic truths prior to experience.

That is how we can know the truths of geometry and other such fundamental principles a priori. God has arranged our minds to make these things apparent to us.

Since the middle of the eighteenth century this answer has ceased to be acceptable among mainstream philosophers, even those who believe in God. As a result, synthetic a priori knowledge has become a problematic category for modern philosophy.

At the end of the eighteenth century Immanuel Kant offered a novel defence of synthetic a priori knowledge, arguing that certain assumptions, such as the principles of geometry, must be true of any world which we can experience. But the details of his arguments are not convincing, and in any case his approach arguably requires an idealist metaphysics which equates the world itself with the world as we experience it.
In more recent times a number of thinkers have appealed to biological natural selection to account for synthetic a priori knowledge. Even if God hasn’t shaped our minds so as to make certain truths a priori apparent to us, perhaps our biological history has done the job instead.

But there is an obvious difficulty with this biological suggestion. Maybe our biological history predisposes us strongly to certain assumptions about the world. But are these innate assumptions knowledge? The trouble is that natural selection is an unreliable informant. It instils beliefs that are practically useful in helping us to survive, but these need not always be true. (For example, humans are arguably innately inclined to believe that physical objects will stop moving unless pushed, in contradiction to modern physics.)

In this respect, natural selection differs from God. Traditional philosophers could be confident that a benevolent God would instil nothing but truths in us (‘God is no deceiver’ averred Descartes). But the practically useful assumptions bequeathed to us by natural selection can’t be taken for granted until they have been subject to further a posteriori investigation.

All in all, I myself am inclined to reject the category of synthetic a priori knowledge and hold that our first two distinctions—analytic/synthetic and a priori/a posteriori—line up together. If something can be known a priori, it must be analytic.

Still, not all contemporary philosophers would agree. The issues are complex and deserve more discussion. But this would take us too far afield here. Fortunately, nothing in what follows will hinge on my rejection of synthetic a priori knowledge.

**4.6 Pure and Applied Geometry**

If we do reject synthetic a priori knowledge, what about the earlier example of all triangles contain 180°? That certainly looked like a good case of synthetic a priori knowledge.
To show a priori that the angles of any triangle add to 180°, first draw a line through C parallel to the line AB. Then note that the two angles labelled $\beta$ must be equal, as they are alternate angles made when the line CB intersects two parallel lines; and the two angles labelled $\alpha$ must also be equal, as they are corresponding angles made when the line CA intersects two parallel lines. So the three angles inside the triangle must equal the three juxtaposed angles at point C, which together form a straight line, and so sum to 180°.

(Don’t be distracted by the visual illustration of this proof. This doesn’t mean that the theorem depended on visual experience and was therefore a posteriori. Your visual experience of the illustration played no essential role in your understanding the proof. You didn’t measure the angles in the illustration and use this to find out that they added to two 180°. Rather the diagram just helped you follow the proof. In principle you could have understood it while sitting in an armchair and concentrating with your eyes shut.)

However modern physics suggests that this statement, far from being knowable a priori, is not even true. Actual space is ‘bent’ in such a way that straight lines, defined as the shortest distance between two points, can form triangles whose internal angles do not sum to 180°. (Our earlier ‘proof’ hinged on the assumption that there is always a
single line parallel to another given line through any given point, and that the corresponding and alternate angles made by a line cutting these two parallel lines will be equal. But this assumption need not hold in a ‘bent’ physical space. See Box 11.)

Some readers might object to this argument against a priori geometry, on the grounds that lines in a bent physical space are not really straight. Over two thousand years ago Euclid laid down a set of axioms for geometry. (See Box 12.) These specified a number of properties of points and straight lines, including the postulate that there is always a single line parallel to another given line through any given point. If you stick to these axioms, then the shortest distances between two points in bent spaces will not count as ‘straight’, since they do not satisfy this ‘parallel postulate’. By the same coin, if you do stick to Euclid’s axioms, then you can continue to be sure that all triangles made of Euclidean straight lines will contain 180°, since by definition Euclidean straight lines do satisfy the parallel postulate, and our earlier proof that triangles will contain 180° can be retained.

However, while this line of thought does yield a kind of a priori geometrical knowledge, this knowledge has now ceased to be synthetic. The problem is that, if you insist that nothing will count as a ‘straight line’ unless it satisfies the axioms of Euclidean geometry, you thereby render all the claims of Euclidean geometry analytic matters of definition, including such theorems as that triangles will contain 180°.

We can distinguish between two ways of understanding geometry. Applied geometry is in effect a scientific theory of real physical space. Here we start by specifying how terms like ‘point’ and ‘straight line’ refer to items in the real world, and in particular specify that straight lines are the shortest distances between points in real physical space. Once we have defined our terms in this way, it is then a synthetic
Box 11 ‘Bent’ Space

The geometry of the surface of a sphere offers a two-dimensional analogue for the way three-dimensional space can be bent. Note how straight lines (the shortest distances between two points) on the surface of a sphere will be curved, and how no two of these lines will be parallel in the sense of never meeting. As a result, our earlier proof does not apply, and triangles on the surface of a sphere can contain more than 180º. For example, the angles in the illustrated triangle add up to three right angles, that is, to 270°.

Of course, we have illustrated the idea of bent space by considering the two-dimensional surface of a sphere existing inside normal three-dimensional space in which straight lines still behave as traditionally supposed. But now simply imagine that straight lines in three-dimensional space behave like the ones on the surface of the sphere. (Which in fact is roughly what they do, though the distortions are normally too small to be noticed.)
question whether ‘straight lines’ so understood satisfy the axioms of Euclidean geometry, and consequently whether all triangles contain 180°. But this synthetic question cannot be answered a priori. We need a posteriori experience of the world, in the form of scientific measurement and experimental results, to tell whether real space is Euclidean. And indeed the a posteriori answer to this question turns out to be ‘no’—modern physics tells us that real space does not satisfy the axioms of Euclidean geometry.

Alternatively, we can treat geometry as a purely mathematical construction, with no implications about the structure of physical space. In this kind of pure geometry, we start by specifying the axioms something must satisfy by definition to count as a ‘point’ or ‘straight line’—but leave it quite open whether or not real space contains entities of that kind. It can then become a matter of definition that ‘straight lines’ satisfy the parallel postulate and that all ‘triangles’ contain 180°. And this definitional knowledge will now be available a priori—but only because it is analytic. Geometry so understood is no longer giving us substantial information about the real world, since its ‘straight lines’ are no longer guaranteed to correspond to anything in real space. Rather its claims are simply consequences of the way it has defined its terms.

So, whichever way we turn it, geometry fails to deliver any synthetic a priori knowledge. We can treat geometry as a pure mathematical theory, in which case it will be a priori, but only because it is analytic. Or we can treat it as an applied physical theory, in which case it will be synthetic, but now something that can only be decided a posteriori.
Euclid lived in Alexandria during the reign of Ptolemy I (323–283 BC). In his classic textbook the *Elements* he deduced many principles of geometry from five axioms.

**Axiom 1.** There is a straight line through any two points.

**Axiom 2.** Any straight line can be extended indefinitely.

**Axiom 3.** Given any line segment starting at any point, there is a circle with that point as centre and that line segment as radius.

**Axiom 4.** All right angles are equal.

**Axiom 5.** There is always a single line parallel to another given line through any given point (where ‘parallel’ means that the two lines never meet).

The fifth axiom is the interesting one. (In fact Euclid himself gave a slightly more complicated version of this axiom.) From the start mathematicians were uneasy with this fifth axiom—‘the parallel postulate’—as it seemed less obvious than the others. For over two thousand years they sought to show that it followed from the other axioms. Finally in the nineteenth century they realized that it isn’t in fact required by the other axioms, and indeed that ‘non-Euclidean’ geometries can be defined by combining the first four axioms with alternatives to Euclid’s parallel postulate.
FURTHER READING

In the 1950s the American philosopher W.V.O. Quine mounted an influential attack on the analytic–synthetic distinction in his paper ‘Two Dogmas of Empiricism’ (reprinted in his collection From a Logical Point of View, Harvard University Press second edition 1980).


There is also a useful Stanford Encyclopedia entry on ‘A Priori Knowledge and Justification’ by Bruce Russell, which among other things discusses recent attempts to defend synthetic a priori knowledge: <http://plato.stanford.edu/entries/apriori>.

Rationalism, Empiricism and Pragmatism by Bruce Aune (Random House 1970) is a helpful introduction to the historical division between rationalists and empiricists.


EXERCISES

1. Give three clear examples of analytic statements, and three of synthetic statements.

2. Which of these would you say was analytic and which synthetic? (In some cases the answer is indeterminate.)

(a) Vixens are female foxes.
(b) Leaves contain chlorophyll.
(c) All spinsters are unmarried.
(d) Blood transports oxygen.
(e) Silkworms eat mulberry leaves.
(f) Energy is always conserved.
(g) Bicycles have two wheels.
(h) All atoms contain nuclei.

3. Explain briefly the difference between being synthetic and being a posteriori.

4. There are obviously some synthetic a posteriori and analytic a priori statements, and some philosophers have defended synthetic a priori statements. What, if anything, is wrong with the idea of an analytic a posteriori statement?

5. Give two examples of statements that have been thought to be examples of synthetic a priori truths.

6. Suppose, for the sake of the argument, that the genes bequeathed to us by natural selection ensure that babies are born believing that physical objects don’t just disappear spontaneously. Which of the following, if any, are good reasons for denying that the italicized statement is synthetic a priori knowledge?

   (a) The statement is a matter of definition.
   (b) The babies have acquired their belief from experience.
   (c) Natural selection instils plenty of false beliefs in humans.
5

Possible Worlds

5.1 Necessity and Contingency

In the last chapter I said that there are three distinctions among truths—analytic/synthetic, a priori/a posteriori, necessary/contingent. And I discussed the first two at length. Let us now consider the last distinction.

A true statement is *necessary* if it could not have been false.
A true statement is *contingent* if it could have been false.

At first sight it may be unclear why this contrast is any different from the a priori/a posteriori distinction. What can it mean to say that a statement ‘could not have been false’, apart from saying that there was no room for experience to disprove it because it is a priori? And what can it mean to say that a statement ‘could have been false’, apart from that it would have proved false if the evidence had turned out differently?

Certainly many philosophers have agreed that ‘necessary’ means nothing but ‘a priori’ and ‘contingent’ nothing but ‘a posteriori’. (If you look in the Index to A.J. Ayer’s influential *Language Truth and Logic*, 1936, the entry under ‘necessary propositions’ simply reads ‘see a priori propositions’.)

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However, this conflation of the two distinctions is now widely rejected. Over the last few decades, nearly all contemporary philosophers have been persuaded by Saul Kripke’s book *Naming and Necessity* that the *meta-physical* distinction between necessary and contingent is different from the *epistemological* distinction between a priori and a posteriori.

According to Kripke, not all necessities are a priori—there are also some *a posteriori necessities*. And not all contingencies are a posteriori—there are also some *contingent a prioris*.

I shall say a lot more about necessity and contingency in this chapter and the next. But let me start by illustrating Kripke’s claims that the necessary/contingent and a priori/a posteriori distinctions can come apart, by offering some simple examples of *a posteriori necessities* and *contingent a prioris*.

### 5.2 A Posteriori Necessities

First for some a posteriori necessities.

My parents were Owen and Constance Papineau. Could I have had different parents? Surely not. A person with different parents would not have been me. So it is necessary that *David Papineau’s parents were Owen and Constance Papineau*. But this statement is surely not a priori. You need evidence to know who my parents were. It’s not something you can find out just by thinking. So that’s one example of an a posteriori necessity.

Here is another. *Hydrogen is made of atoms containing one electron*. This is surely necessary too. *Hydrogen* couldn’t have had a different atomic structure. Anything with a different atomic structure wouldn’t be hydrogen. But this statement too is obviously a posteriori. Physicists didn’t figure out the structure of hydrogen by sitting in an armchair. They needed to perform a great number of detailed experiments and observations.

Perhaps the most obvious examples of a posteriori necessities are simple identities involving proper names. *Marilyn Monroe is Norma*
Jeane Baker. This again is necessary. Marilyn Monroe couldn’t not have been Norma Jeane Baker. That would require her somehow not to have been herself, which would be absurd. But Marilyn Monroe is Norma Jeane Baker is not a priori. Somebody could understand this statement perfectly well and yet not know it is true. (Imagine someone who grew up with Norma Jeane but lost touch with her, and had heard of Marilyn Monroe but not seen any of the films.)

5.3 A Priori Contingencies

Now for the converse category of a priori contingencies.

Kripke’s own example involved the platinum rod in Paris that once defined the metre as a unit of length. He pointed out that, given this definition, it was a priori that the Paris platinum rod is one metre long. We could know this without further ado, given that the rod provided the standard for determining what a metre is. But at the same time this statement seems contingent. That selfsame rod might well have been shorter than a metre, if its manufacturer had chosen to make it so.

If there seems an element of trickery about this example, here is another example that makes it clearer what is going on.

Suppose we are discussing the history of inventions, and are particularly interested in what kind of person might have invented the zip. But we get bored having to say ‘the inventor of the zip’ all the time, so we adopt the name ‘Julius’ to refer to the inventor of the zip, whoever he or she might have been. Now given this convention, the statement that Julius invented the zip (assuming it had a single inventor) is

1 The qualification ‘assuming it had a single inventor’ is to cover such possibilities as that a team invented it, or perhaps it happened by chance. I’m going to drop the qualification henceforth in the interests of simplicity—it makes no difference to the argument. (The example of Julius is due to the Oxford philosopher Gareth Evans (1946–1980).)
surely a priori. We don’t need to investigate the world to make sure that it was Julius who invented the zip.

The statement that *Julius invented the zip* may be a priori, but it is surely not necessary. Julius might have been dropped on his head when little, and grown up too stupid to invent the zip. Or an unhappy love affair might have made him join the French Foreign Legion before he made his breakthrough. The statement that *Julius invented the zip* could well have been false, if things had turned out differently. So this statement is both a priori and contingent.

### 5.4 Possibility and Necessity

It will be helpful to bring in the idea of a statement being *possible*. A statement is possible if it *might* be true.

Both true statements and false statements can be possible. In this sense, both *David Papineau is a philosopher* and *David Papineau is a lawyer* are possible. The first is true and the second false, but neither is ruled out by the nature of things. I could have been a lawyer, if my life had taken a different course.

Possibility can then be contrasted with necessity. A necessary statement is one which *has* to be true. It couldn’t be false. For example, *seven is a prime number*. There are no circumstances in which this statement would be false.

I started this chapter by drawing a contrast between necessary and contingent *truths*. A contingent truth is a true statement that is not necessarily true.

The contrast between necessity and possibility is different. A statement can be possible without being true. The necessity/possibility contrast thus marks a division among *all* statements, rather than just among the *true* statements.

(In terms of possibility, a contingent truth can thus be defined as a statement which is true but could possibly have been false.)
Necessity and possibility have a neat relationship. A statement is necessary if and only if its negation is not possible. That is: necessarily \(p\) iff not possibly \(\neg p\).

It works the other way round too. A statement is possible iff its negation is not necessary. That is: possibly \(p\) iff not necessarily \(\neg p\).

Logicians use the symbol ‘\(\square\)’ (called ‘box’) for necessarily, and \(\Diamond\) (‘diamond’) for possibly.

Then we can write:

\[
\square p \text{ iff not } \Diamond \text{ not-}p
\]

and

\[
\Diamond p \text{ iff not } \square \text{ not-}p.
\]

(If you’d like help remembering which is which, think of the box as solid, stable, it couldn’t be different; the diamond by contrast is balanced on its tip, and so could go either way.)

5.5 Possible Worlds

It helps to think of these matters in terms of ‘possible worlds’.

A possible world is a fully specific way the world might be. Imagine a world which is just as detailed as the actual world, but which differs from the actual world in various respects.

In this context ‘world’ means the whole universe, not just the planet Earth. Other possible worlds aren’t faraway planets within the actual universe. Rather they are alternative universes, with their own space and time. Many of them will contain their own stars and planets and so on—though some of them won’t have stars and planets at all.
So there are (many) possible worlds where it is true that David Papineau is a lawyer, or that donkeys talk or that the sun has twenty planets or even that there is no force of gravity or that the whole universe is nothing but mud and telepathic worms are the only intelligent life. (See Box 13).

5.6 Necessity and Possibility in terms of Worlds

It is easy to explain necessity and possibility in terms of truth at possible worlds:

Necessarily p iff p is true at all possible worlds
Possibly p iff p is true at at least one possible world

Note how neatly this way of understanding necessity and possibility explains our two earlier equivalences.

(I) Necessarily p iff not possibly not-p.

In terms of possible worlds, the left-hand side of this equivalence now means *p is true at all possible worlds* and the right-hand side means *there are no possible worlds where not-p is true*. The equivalence is now obvious.

And similarly with:

(II) Possibly p iff not necessarily not-p.

The left-hand side now means *p is true at at least one possible world* and the right-hand side means *it’s not the case that not-p is true at all possible worlds*. Again the equivalence is obvious.
5.7 Constraints on Possible Worlds

It would be nice to be more specific about which worlds are possible.

As Box 13 explains, possible worlds aren’t constrained to respect ordinary scientific principles or anything like that. There are possible worlds containing nothing but two dragons fighting for five minutes.

However, possible worlds do obey some constraints.

For a start, there are no possible worlds which violate logic or definitions.

So there are no possible worlds where it is true that *the earth has a moon and does not have a moon* or that *all cats are black and some are not black* or that *triangles have four sides* or that *John is both taller and shorter than Jim*. These worlds would be inconsistent with logic or definitions. (What about the possible worlds where it is true that *Julius does not invent the zip*—because he was dropped on his head when little, say? Aren’t they ruled out by logic and definitions, if Julius is defined as the inventor of the zip? I’ll come back to this in the next chapter.)

In addition to restrictions that derive from logic and definitions, possible worlds must also respect the *essential properties* of things, such as facts of identity, origin, and constitution, even when these are not required by logic or definitions.

So there are no possible worlds where it is true that *Marilyn Monroe is not Norma Jeane Baker* (a fact of identity) or that *David Papineau has parents other than Owen and Constance* (a fact of origin) or that *hydrogen is made of atoms with two electrons* (a fact of constitution). These worlds may not be ruled out by logic or definitions, but they are not ‘metaphysically’ possible. They are inconsistent with the nature of the entities at issue.
Box 13 The Reality of Possible Worlds

Do other possible worlds really exist?

Some scientists argue that quantum mechanics and cosmology provide evidence for other ‘branches of reality’ apart from the one we live in. But these scientifically motivated alternative universes are different from the philosophers’ ‘possible worlds’. There are far fewer of them and they are all constrained by the actual laws of physics. Scientists speak of them as together comprising the one actual ‘multiverse’.

The ‘possible worlds’ of the philosophers, by contrast, include a far wider range of alternatives, including worlds with different scientific laws and disparate origins, and indeed worlds which display no order at all. In this sense there are ‘possible worlds’, for example, which contain nothing but two dragons fighting for five minutes.

The American philosopher David Lewis (1941–2001) was a full-blooded realist about all these possible worlds. According to Lewis, all possible worlds are just as real and concrete as the actual world. The only sense in which this world is ‘actual’ is that it is the one we happen to be in.

Most philosophers, however, regard this view as untenable, and deny that other possible worlds have the same kind of reality as the actual world. Some equate possible worlds with sets of statements or with rearrangements of actual objects and properties. Others regard them as useful fictions.

Still, whatever view we take of possible worlds, it is uncontroversial that talking about them can be a great help in understanding the structure of necessity and possibility.
5.8 Essential Properties

I said that possible worlds must respect the essential properties of things. Some properties of things are essential, others are accidental.

I am only accidentally a philosopher and only accidentally live in London. I might have been a lawyer living in Los Angeles.

But I am essentially the child of Owen and Constance Papineau. If you posit a being with different parents, it cannot be me. Similarly, I am essentially a human being. I could not have been a fish or even a chimpanzee. A being of a different species would not be me.

Again, hydrogen essentially has atoms with one electron, but is only accidentally used to make bombs, and Marilyn Monroe is essentially identical to Norma Jeane Baker, but is only accidentally a film star.

Statements ascribing essential properties to things are necessary truths. It is necessary that David Papineau is the child of Owen and Constance Papineau, and necessary that David Papineau is a human being.

Note however that the necessity of these statements does not make me a necessary being. It is certainly possible that I might have failed to exist—suppose, for example, that my parents had never met each other. I am a contingent being, not a necessary one—I exist, but might not have.

Necessities like David Papineau is a human being show that we need to be a bit careful about our earlier equation of necessity with ‘truth at all possible worlds’. After all, the statement that David Papineau is a human being won’t be true at those possible worlds where it is false that I exist.

The best way to deal with this is to recognize that necessary truths ascribing essential properties to contingent beings are implicitly conditional. If you think about it, what is really necessary is that if David Papineau exists, then he is a human being, not that David Papineau (exists and)
is a human being. As we have seen, the latter claim could easily have been false—for example, if my parents had never met.

5.9 The Nature of Necessity

By now some readers might be starting to feel suspicious of the whole apparatus of necessity and possibility. Who makes the rules about what is necessary and what is merely possible? Why are my parents and my species necessary to me, but not my being a philosopher and my location? More generally, what does it really mean to say that some truths are necessary and others only contingent?

This is a deep and difficult subject, about which it is hard to say anything without being controversial. Indeed there are philosophers who would dispute some of the examples of essential properties I have given so far. I shall return to this issue at the end of the next chapter. But at this stage it may be helpful to make some brief general remarks.

Modal claims—that is, claims about what is necessary and possible—are arguably grounded in our practice of reasoning about non-actual scenarios. It is very common, outside philosophy as much as within it, to think about how things would be if reality were different in various respects. Such thinking is important in many ways—in constructing plans, in ascribing responsibility, in learning from experience, and so on. Would a reduction in taxes cause inflation? Could Bush have invaded Iraq without Tony Blair’s support? Would Johnny have got better if he hadn’t taken the pills? Could life have evolved if there had been no force of gravity? (In Chapter 8 we shall look briefly at the ‘subjunctive conditional’ statements which play a central role in this kind of reasoning.)

Now, we can think of modal facts as constraints governing reasoning about non-actual scenarios. Necessary facts are those which must
be respected in such reasoning. Possible facts are those which may be entertained in such reasoning. (Thus it makes sense to consider what would have happened to me if I had studied law, but not what would have happened to me if I had been a fish or conceived by different parents.)

This might not tell us very much about modal facts, without some further account of non-actual reasoning. (What is such reasoning about, after all?) But at least we can say this much: modal facts mark out the limits of the space we explore in non-actual reasoning. This kind of reasoning deals with scenarios that are not actual, but it draws the line at scenarios that are not possible.

5.10 Different Kinds of Possibility

Isn’t it impossible that a donkey should talk, or that pigs should fly, or that a human being should run a mile in one minute?

But this is only true in a different sense of impossibility. Possible worlds where donkeys talk, or pigs fly, or humans run one-minute miles, are not ruled out by logic or definitions or the essential properties of things. So, for all that has been said so far, these things are possible. When people say that these things are impossible, what they mean is rather that they are not naturally possible.

We can understand ‘natural possibility’ as requiring possibility plus consistency with the laws of nature. (Think of the laws of nature as the general truths that science aims to uncover.) Talking donkeys, flying pigs, and one-minute miles are not naturally possible because they are inconsistent with the actual laws of nature. But they are possible in an absolute sense, because there are possible worlds where different laws of nature do allow such things.

In line with this, we can define the naturally possible worlds as those absolutely possible worlds where the actual laws of nature obtain. A naturally
possible statement is then one which is true at at least one naturally possible world, and a naturally necessary statement is one which is true at all naturally possible worlds. Trivially, then, the laws of nature themselves are naturally necessary, even if they are not absolutely necessary.

Just as we can define ‘natural possibility’ as absolute possibility plus consistency with the laws of nature, so we can define ‘geographical possibility’ as absolute possibility plus consistency with the truths of geography, ‘moral possibility’ as absolute possibility plus consistency with the truths of morality, and so on.

In what follows these narrower kinds of possibility will not be at issue. From now on all talk of possibility and necessity should be understood as referring to absolute possibility and necessity.
FURTHER READING

Modern work on necessity and possibility starts with Saul Kripke’s book Naming and Necessity (Blackwell 1980). (In fact the main text was published a decade earlier in article form, after two of Kripke’s colleagues transcribed three lectures he delivered without notes at Princeton in 1970. The book simply adds an Introduction to the transcript of the lectures.)

Naming and Necessity is itself very readable. For an overview and some criticisms of Kripke’s views, see Kripke by Christopher Hughes (Oxford University Press 2004).

David Lewis’ realism about possible worlds is explained and defended in his On the Plurality of Worlds (Blackwell 1986).

EXERCISES

1. Which of these truths are necessary and which contingent?
   (a) All triangles have three sides.
   (b) There are no snakes in Ireland.
   (c) Water is \( \text{H}_2\text{O} \).
   (d) My car is blue.
   (e) My car is blue or not blue.
   (f) George Eliot is Mary Ann Evans.
   (g) David Papineau is a philosopher.
   (h) George Eliot wrote Middlemarch.

2. Give an example of (a) an a posteriori necessity, (b) an a priori necessity, (c) an a priori contingency, (d) an a posteriori contingency.

3. Which of the following fall into which of the four categories specified in question 2?
   (a) Squares have four sides.
   (b) David Papineau lives in London.
   (c) Cary Grant is Archie Leach.
   (d) The Paris platinum rod is one metre long.
   (e) Prince Charles is the son of Queen Elizabeth and Prince Philip.
   (f) It is raining or it is not raining.
   (g) Julius (as defined in section 5.3) invented the zip.
   (h) London is the capital of Great Britain.
4. Which of these implications are correct? (In each case explain your answer in terms of what the first and second clauses respectively require of the possible worlds \( p \) is true in.)

(a) If \( p \) is necessary, it is possible.
(b) If \( p \) is possible, it is necessary.
(c) If \( p \) is necessary, it is not possible.
(d) If \( p \) is true, it is possible.
(e) If \( p \) is false, it is possible.
(f) If \( p \) is not necessary, it is not possible.
(g) If \( p \) is not possible, \( \neg p \) is necessary.

5. For each of the following impossibilities, say whether they are ruled out (i) by logic and definitions or (ii) by the essential properties of things.

(a) Some birds fly and all birds don't fly.
(b) Water is sodium chloride.
(c) Archie Leach is not Cary Grant.
(d) David Papineau has parents other than Owen and Constance Papineau.
(e) It is raining and it is not raining.
(f) Some squares have three sides.

6. For each of the following false statements, say whether it is (i) naturally possible, (ii) absolutely but not naturally possible, (iii) neither.

(a) Some birds fly and all birds don’t fly.
(b) Tony Curtis is Kirk Douglas.
(c) Some pigs fly.
(d) Hydrogen atoms contain two electrons.
(e) David Papineau is a lawyer.
(f) The earth revolves once an hour.
(g) David Papineau has run ten miles in under ten hours.
(h) David Papineau has run ten miles in under ten minutes.