

METAPHYSICS AND EPISTEMOLOGY

A priori knowledge

1. We know something *a priori* when our knowledge does not rely on empirical evidence (evidence involving experience). When it does, our knowledge is *a posteriori*. The terminology comes from Kant. A priori knowledge relies only on grasp of concepts and abstract reasoning. The knowledge we have about our environment is a posteriori, as is the knowledge provided by the natural sciences. Many philosophers have considered, on the other hand, that our knowledge of logic and mathematics is a priori.

If we know a proposition a priori, the proposition may still involve empirical concepts that is, notions we have formed by processing our experiences. The opposite of an empirical concept is an innate one; it is debatable whether we possess any innate concepts. E.g. we know a priori that red is a colour and that if someone x is an uncle of y, then y is a nephew of x. We formed the concept of colour on the basis of our sensory experience, and that of an uncle on the basis of our experience of family relations. No experience, however, plays any evidential, justificatory role in those examples: we do not run through pairs x, y of people where x is an uncle of y and find out that y is always a nephew of x.

Introspective knowledge, such as my knowledge that right now I feel angry (say), counts as a posteriori. Many 17th and 18th century philosophers, including Kant, treated introspection as an inner sense, which provides us with information about our inner world just as the five outer senses provide us with information about the world around us. Knowledge by testimony is also a posteriori. If you know that there are infinitely many prime numbers, but only know it because your reliable mathematician friend told you so, then your knowledge is not a priori. (The empirical evidence is the fact that she imparted the information to you.) On the other hand, the mathematician who is familiar with the proof has a priori knowledge.

Although the terms *a priori/a posteriori* are standardly thought of as marking two kinds of knowledge, it seems that, in the first place, they stand for two kinds of grounds supporting a belief. When the grounds involve only grasp of relations between concepts, or understanding of what we mean by saying this or that, they are a priori, and so are they when they also include reasoning; when they involve experience, they are a posteriori.

2. Many empiricist philosophers have considered that what we can know a priori is truths about concepts or truths that hold as a matter of definition, not substantive truths about the real world. So Hume believed that only relations between ideas can we know by intuition or deduction (that is, in Kantian terminology, on a priori grounds); for example, we know the basic mathematical truths by intuition and the proven mathematical truths by deduction. (Of course, this presupposes that mathematical truths are truths about ideas.) Logical positivists said that only *analytic* truths can be known a priori, and even philosophers who are not empiricists agree that analytic truths are among those we can know a priori.

The issue is complicated by the fact that not all philosophers use the term 'analytic' or its opposite, 'synthetic', in the same sense. The terms were introduced by Kant. In their Kantian sense, they apply only to true affirmative judgements that have the form subject-predicate: a judgement of this kind is analytic provided that the concept playing the role of the predicate is part of the concept playing the role of the subject, and it is synthetic otherwise. One example offered by Kant is the judgements *Bodies are extended* and *Bodies have weight*. The former is analytic because when we think of something as a body, we think of it as being spatially extended. The latter is synthetic, for it is logically possible that something should be a body without having weight. (Kant talks of judgements rather than beliefs or sentences. Judgements are mental entities, and they are supposed to consist of concepts rather than words. There occurs one whenever, within our minds, we judge things to be a certain way.) According to Kant, our knowledge of analytic truths is always a priori, but we also know some synthetic truths a priori, and the latter kind includes our mathematical knowledge as well as our knowledge of some general principles about nature (e.g. that every change involves cause and effect).

No one has claimed that only truths analytic in Kant's sense can we know a priori. Kant's notion of analyticity has limited scope because it is confined to the subject-predicate form and does not extend to e.g. disjunctions. But, surely, our knowledge that either there are stars smaller than the Earth or there are no stars smaller than the Earth is of the same kind as our knowledge that everyone who is an unmarried man is unmarried. The way Frege used 'analytic' does not suffer from that limitation. For Frege, a sentence is analytic iff either it is an instance of a logical law or results from such an instance when we substitute one or more expressions for phrases that define them. So 'Either there are stars smaller than the Earth or there are no stars smaller than the Earth' is an instance of the law of excluded middle, p or $\text{not-}p$, and 'Everyone who is an unmarried man is unmarried' is an instance of *Everything that is F and G is F* . But 'Every bachelor is unmarried' is also analytic, since 'bachelor' can be defined as 'unmarried man', and so is 'No prime number is divisible by a number other than itself and than 1'. (The examples are not Frege's.)

Could it be that what we can know a priori are just truths expressible in sentences that are analytic in Frege's sense? It doesn't seem so. See the following examples:

- (1) If the number x is greater than y , and y is greater than z , then x is greater than z .
- (2) Every triangle has three sides.
- (3) No surface is both green and red all over.

(Cf. Bonjour's book, p. 88.). The truths expressed in (1) and (2) seem to be prime examples of truths we know a priori without reasoning. But neither (1) nor (2) appears capable of being transformed into an instance of a logical law by replacing synonym for synonym. E.g. 'triangle' means 'closed plane figure with three angles', not 'closed plane figure with three sides'; and (1) seems to be a law of arithmetic rather than an instance of a law of logic. Examples like (3) were much discussed in the mid 20th century. It is not realistic to consider that 'green' means 'not blue and not yellow and not red and ...'. (Substituting the latter phrase for 'green' in (3) does yield an instance of a logical law.) But it is usually thought that we have a priori knowledge of the truth expressed in (3).

Is that really so? I think the knowledge may be empirical. We never see two colours, e.g. green and red, as superimposed on each other but characterizing the same surface. I am inclined to think, though, that that is a possible experience (although it may not be

possible for us humans) and the fact that we never have such an experience is what grounds our knowledge that nothing is both green and red all over.

Perhaps the empiricist restriction of a priori knowledge to analytic truths will fare better with the third sense of 'analytic', the sense we find in logical positivists. After all, they were empiricists, whereas Kant and Frege were not. For logical positivists, a sentence is analytic iff it is true in virtue of its meaning. They considered that both the sentences that are true as a matter of logic and those that are part of our mathematics are true solely in virtue of the meaning they have. Our linguistic conventions create truths, so it is no wonder that we can know such truths a priori. For logical positivists, analytic truths, necessary truths and truths we can know a priori coincide, and so do synthetic truths, contingent truths, and truths we can only know a posteriori.

The problem is that there does not seem to be any sentence true solely in virtue of its meaning. The sentence 'Schnee ist weiss' (German for 'Snow is white'), which has empirical content, is true because of two factors: the one is that snow is white; the other is the sentence's meaning, it means that snow is white, and not anything different. (The example is clearer when one uses two languages, as I have just done.) But the same remark seems to apply to all sentences. The sentence 'Jeder Planet ist ein Planet' (German for 'Every planet is a planet') is true because, on the one hand, every planet is a planet and, on the other, the sentence has a certain meaning. If, now, it is due to the meanings of words that every planet is a planet, then we can say that the sentence 'Jeder Planet ist ein Planet' is true solely in virtue of meanings. But it cannot be due to the meanings of words that every planet is a planet. Even if there were no languages and no meaning, every planet would still be a planet. So there seem to be no analytic sentences in the positivists' sense of 'analytic'.

3. Although many empiricists accepted the existence of a priori knowledge but confined it to analytic truths, their stricter counterparts, such as J. S. Mill in the 19th century and W. V. O. Quine in the 20th, denied that we have any a priori knowledge. The demise of logical positivism was due in large measure to Quine's attack on the analytic-synthetic distinction. He argued that there is no satisfactory way to define those concepts and, more generally, there is no way to draw a distinction between the sentences that the positivists described as analytic and those they characterized as synthetic. In particular, we cannot make the distinction in terms of what we know a priori and what we know a posteriori. For we know nothing a priori.

Quine espouses an epistemological holism. In his view, when we test a scientific theory empirically, what faces the tribunal of experience is not any isolated statement, but our total science. It is true that, within our science, some statements, concerning particular macroscopic physical objects, are closer to experience while others, such as statements about atomic objects or law-like generalizations, are further away from it, and statements of pure mathematics and logic are furthest from it. We can envisage our science as a system that impinges on experience at its periphery and has mathematics and logic at its centre. Nevertheless, when we face a recalcitrant experience and have to change our science in order to accommodate it, we can do so by reevaluating either some statements that lie on the periphery or some in the interior of the system. For example, new observations made through telescopes may lead us to abandon the statement 'Mars is smaller than Earth' or instead abandon the physical laws that we

consider govern the functioning of telescopes or even change our mathematics. (The example is mine.) But the closer to the centre the statements are that we choose to replace, the more extensive changes we have to make to our total science. So it is to be expected that we prefer to avoid a major disturbance and modify a part that is not far from the edges. In principle, however, it may happen that the only simple way to accommodate the new experiences requires us to modify the centre of the system, e.g. logic itself. No part of the system is immune from revision.

In this picture, accepting standard mathematics and classical logic is warranted because they are an integral part of our science, and our science is justified to the extent it agrees with our experiences. In the future, new data may make it unjustified to cling to our logic and mathematics. There is no room for a priori justification. However, Quine knew of intuitionistic mathematics, which is different from standard mathematics, and of non-classical logics, but he considered that, as a matter of fact, there were no adequate reasons to adopt any such deviant system.

4. From Kant's time until fairly recently, philosophers usually connected necessity with a priori knowledge and contingency with a posteriori knowledge. They considered that if a truth is necessary, and we can know it, then we can know it a priori. Kant, for example, thought that necessity in what is known is a mark that the knowledge is a priori. So if a truth can only be known a posteriori, it is contingent. They also considered that, conversely, if we can know a truth a priori, then the truth is necessary; for if it is a contingent fact that p , how can we know that p without looking at the world? So if a truth is contingent, and we can know it, we can only know it a posteriori. These connections came under attack in S. Kripke's *Naming and Necessity*. Kripke argued that there are many necessary truths that we can only know a posteriori and that there are also contingent truths that we know a priori.

Kripke's most famous examples of a posteriori necessity presuppose his semantic views about proper names. There are, however, different examples too, such as those concerning the chemical composition of substances and the atomic number of elements. We know that water has the composition H_2O . We know that a posteriori, as a finding of natural science, and could not have known it otherwise. Yet it is necessarily the case that water has that chemical composition; the composition is an essential property of the substance. If, in some possible world, there is a liquid that resembles water but has a different composition, then it is not water; for it is not this substance (the one that fills our lakes and rivers). We also know a posteriori, and could not have known a priori, that the atomic number of gold is 79 (the atoms of gold have 79 protons). But it is necessarily the case that gold has that atomic number. It may be that, in some possible world, there is a material that has all the superficial properties of gold but is either a composite substance or an element with a different atomic number, say 200—in the actual world there is no such element. Such a material will not be gold; it will rather be a counterfactual analogue of fool's gold (a substance in the actual world that looks like gold but is not).

Kripke's example of the contingent a priori concerns the expression 'metre', which we suppose is defined as it was in the past, namely, by reference to a standard rod kept in Paris: one metre is the length of that rod. Let's call the rod 'S'. Then, it is a contingent fact that the length of S is one metre. For S would expand if heated, and its size would also change if it were put under appropriate pressure. These things never happen, as the rod

is protected from changes in the temperature and the like, but could have happened. Nonetheless, we do not need empirical research to find out that the length of S is one metre. We can realize that by just reflecting on what we mean when we say that something is one metre long. So we know a priori that the length of S is one metre.

Another example, in the same spirit, is due to G. Evans and involves a proper name. We know that someone was the inventor of the zip, but we don't know who that person was. Under those conditions, we introduce the name 'Julius' as a name of the inventor; that is, we decide that the name will refer to the person who invented the zip, whoever that person may be. And we begin using the name accordingly. Now, Julius could have done different things in life; Julius could have failed to invent the zip because he or she could have engaged in activities different from those that in fact occupied him or her. So it is not a necessary truth that Julius invented the zip. Yet we know a priori that Julius invented the zip; we can realize that just by reflecting on what we mean by 'Julius'. Or, to put it more carefully, we know a priori that if someone invented the zip, then Julius did so. (The more careful formulation is needed because our knowledge that someone invented the zip will not be a priori.) We need no empirical research to find out that if someone invented the zip, Julius did so. Still, it is not a necessary truth that if someone invented the zip, then Julius did so. If history had been different, the zip could have been invented by someone else and not Julius.

Kripke's views initiated a long series of discussions. It is fair, however, to say that they have become orthodoxy.