IFL: Logicbite 2

Forms of inference

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A brief preliminary remark. As you will have already seen from the first two chapters of *IFL*, each chapter ends with a bullet-pointed summary. So I don't plan to start these logicbites with *another* summary of where we've just been. If you've left it a while between logic readings, then refresh your memory by quickly reviewing summaries of relevant recent chapters of *IFL* before pressing on.

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We've already seen in *IFL* §1.5 how arguments come in families whose members share the same form or type or pattern of inference step and stand together as far as validity is concerned. Here's E.J. Lemmon making the same point in his classic *Beginning Logic* (1965):[1]

> If we compare the two arguments
>
> (1) Tweety is a robin; no robins are migrants; therefore Tweety is not a migrant
>
> and
>
> (2) Oxygen is an element; no elements are molecular; therefore oxygen is not molecular.
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> both of which are valid (one drawn from ornithology, the other from chemistry), it is hard to escape the feeling that they have something in common. This something is called by logicians their *logical form*, and we shall have more to say about it later. For the moment, let us try to analyse out in a preliminary way this common form. The first premiss of both (1) and (2) affirms that a certain particular thing, call it m (Tweety in (1), oxygen in (2)), has a certain property, call it F (being a robin in (1), being an element in (2)). The second premiss of (1) and (2) affirms that nothing with this property F has a certain other property, call it G (being a migrant in (1), being molecular in (2)). And the conclusion of (1) and (2) affirms that therefore the object m does not have the property G. We may state the common pattern of (1) and (2) as follows:
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> (3) m has F; nothing with F has G; therefore m does not have G.
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> Once the common logical form has been extracted as in (3), a new feature of it comes to light. Whatever object m is picked out, whatever properties F and G are chosen to be, the pattern (3) will be valid: (3) as it stands is a pattern of a valid argument. For example, take m to be Jenkins, F and G to be the properties respectively of being a bachelor and being married: then (3) becomes
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> (1) Jenkins is a bachelor; no bachelors are married; therefore Jenkins is not married,
>
> which, like (1) and (2), is a valid argument. Yet (3) is not tied to any particular subject-matter, whether it be ornithology, chemistry, or the law; the special terminology—'migrant', 'molecular', 'bachelor'—has disappeared in favour of schematic letters 'F', 'G', 'm'.

[1] I've renumbered the examples, and changed 'sound' to 'valid' a couple of times to make Lemmon's terminology match ours.

John Lemmon was a logician, particularly working on modal logic, who died while mountain climbing in his mid thirties. His book was for many years the introductory text of choice at least in UK philosophy departments. I'm not sure students entirely appreciated this! – for the proof-system that Lemmon deploys is not at all as user-friendly as e.g. a Fitch-style system as in the second edition of *IFL*.

> Form can thus be studied independently of subject-matter, and it is mainly in virtue of their form, as it turns out, rather than their subject-matter that arguments are valid or invalid. Hence it is the forms of argument, rather than arguments themselves, that logic investigates.

I'd wouldn't myself say that (3) *states* the common pattern of (1) and (2); I'd rather say it *displays* it. And two more quibbles: Lemmon says that (3) is "the common logical form" of (1) and (2): but what justifies the singular 'the' here? I'd also question his last sentence too. For isn't it odd to say that logicians don't investigate arguments like (1) and (2) themselves? Surely it would be better to say something like: logic investigates such arguments – yes, the arguments themselves! – by investigating their shared form of inference.

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You will find Lemmon's final idea frequently echoed in other texts too. For just one example, in his much used *Logic and Philosophy: A Modern Introduction* (1969: 13th edition 2021!) Howard Kahane[2] writes:

> Logic is concerned primarily with *argument forms*, and only secondarily with arguments, for all arguments that have a valid argument form are valid, and all other arguments are invalid.

But even if all valid arguments exemplify some reliable form of inference which can be shared with other arguments (which is far from obvious), why would it follow that logic is only secondarily concerned with arguments?

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Quibbles apart, though, it is obviously important that we can and do talk about forms of arguments (which is not to say that the idea of form her is transparent: it needs investigation). And it is convenient and perspicuous to talk about forms of arguments by using schematic letters like Lemmon's 'F', 'G', 'm' in displaying these forms.

This use of schematic letters, indeed, is there from the very start. Here is just a snippet from Aristotle in *Prior Analytics* (as translated by Robin Smith):

> If A is predicated of every B and B of every C, it is necessary for A to be predicated of every C .... Similarly if A is predicated of no B and B of every C, it is necessary that A will belong to no C.

Here Aristotle is talking about a syllogism of the kind 'All B are A, All C are B, hence all C are B'. And why does he use the letters here?

> He uses letters in his exposition in order to indicate to us that the conclusions do not depend on the matter but [on the form of the argument]. For so-and-so is deduced syllogistically not because the matter is of such-and-such a kind but because the combination is so-and-so. The letters, then, show that the conclusion will be such-and-such universally, always and for every assumption.

So wrote the ancient commentator Alexander of Aphrodisias (active in the late second and early third century CE).

So the schematic letters are to do generalizing work. They stand in for terms like 'animal', 'man', 'horse', 'white', 'snow' (or those are Aristotle's examples: and look how far he is in fact abstracting from the surface grammatical differences between such terms in ordinary language by lumping them together for his current purposes – he is already in effect working with arguments framed in a simplified language, in a way which we'll find is characteristic of logical theory).

[2]Kahane wrote particularly on what is often called informal logic. His book *Logic and Contemporary Rhetoric: The Use of Reason in Everyday Life* (1971) seeks to teach students how to use logical principles to spot correct or fallacious reasoning in a wide variety of contemporary political and social debates.

There is certainly no novelty, then, in the use of schemas in talking about forms of argument. We need though to pause to think a bit more about their use, and to think more too about talk of 'the' form of an argument. This is the business of *IFL* Chapter 3. So now read on!