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# IN DEFENCE OF A FALLACY

SUMMARY: In light of recent developments in argumentation theory, we begin by considering the account that Aristotle gives of what he calls sophistical refutations (*elenchoi sophistikoi*) and of the usefulness of being able to recognise various species of them. His diagnosis of one of his examples of the grouping that he labels *epomenon* is then compared with a very recent account of the matter, which, like Aristotle, calls on us to attribute a mistake or confusion to anyone who uses this kind of argument. From examination of three other examples that Aristotle himself supplies of *epomenon*, it appears that there are cases of inferences of this kind that we need not, and perhaps cannot, avoid making. The suggestion is made that this is because the whole family of what Peirce calls abductions have important characteristics in common with *epomenon*.

KEYWORDS: sophistical refutations, fallacies, affirming the consequent, abduction.

## Deficiencies

There has been a significant trend over recent decades to broaden traditional characterisations of fallacies as, for instance, "arguments that seem valid but are not", so as to contemplate many sorts of "deficient moves in argumentative discourse" (van Eemeren, 2001, p. 135). Proponents of this broadening, at least indirectly inspired by Hamblin (1981), such as the argumentation-scheme approach associated with Douglas N. Walton (systematised in Walton et al., 2008) and the pragma-dialectical approach associated with Frans H. van Eemeren (sys-

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tematised in van Eemeren & Grootendoorst, 2003), tend to set out argumentation schemes or rules for the conduct of discussions and indicate that violations of the schemes or infringements of the rules give rise to the deficiencies in question.

This broadening of the definition of fallacy has the merit of capturing several of the moves in argumentative discourse that appear in Aristotle's listing of so-phistical refutations in the fourth and fifth chapters of the book that carries that title (hereinafter *SEl.*, in Aristotle, 2016). Thus, *prosodia* (*SEl.*, v, 166b1–9) or *duo erotomata* (167b38–8a16), are not even arguments. Likewise, many instanc-es of *diaeresis* and *synthesis* (*SEl.*, iv, 166a6–38) or *schema tes lexeos* (166b10–19), are not likely to seem valid to most people even if unpicking them calls for some nimbleness.

The broadening also has the merit of keeping front and centre the dialogical setting that is a key to understanding why some sophistical refutations that pro-ceed by way of valid inferences should be counted as fallacies (Rapp & Wagner, 2013). Thus, *to en arche aiteisthai* (*SEl.,* v, 167a36–39, sometimes Latinised as *petitio principii* or Englished as "begging the question", though quite what is at issue would take us too far afield), of which Aristotle does not give even one example in the short chapter that unpacks it (*SEl.*, xxvii; but see *AnPr.*, II, xvi and *Top.*. VIII, xiii), and perhaps *elleipsis tou logou* (*SEl.,* v, 167a21–35, which is sometimes half-Latinised as *ignoratio elenchi*, but might be as well rendered as "missing the definition"), are often deficient moves in debate and hence falla-cies, especially when, in the former case, premises are suppressed or covert (Iac-ona & Marconi, 2005, pp. 33–34).

These merits are not negligible in prising apart the notions of deficiency and invalidity, the latter being a feature of deductive arguments such that the premis-es can be true yet the conclusion false; but the notion of deficiency in the newer definition of fallacies may itself need a little more elucidation. For instance, it seems that not all debating moves that are deficient by violating the schemes or infringing the rules in the recent approaches will be deficient in the somewhat broader sense of not being expedient tactics in discussion. After all, if one knows that one's interlocutor will not notice that a certain argmentative manoeuvre is deficient by the rules, there may be nothing to advise against its use. If such a move may be effective in embarrassing, confusing or silencing the interlocutor, that may speak in favour of its deployment (Schopenhauer, 1830). This may apply especially in encounters where the interlocutor has already shown them-selves unscrupulous: fair play is mandatory where it is reciprocal, but perhaps not otherwise. Even if one is exposed to the risk of being accused of violation or infringement, there may be circumstances in which it is worth running that risk. On the one hand, an explicit accusation, for instance, of infringing the "Validity rule" ("The reasoning in the argumentation must be logically valid or must be capable of being made valid by making explicit one or more unexpressed prem-ises"; van Eemeren, 2002, p. 183) is a very unlikely thing indeed and exposes the accuser to the counter-accusation of pedantry. And the counter-accusation will reveal a deficiency that well-meaning and broad-minded Canadians and Dutch-

men with their schemes and rules may be insensitive to. On the other, the accusation of infringing the Validity rule is defeasible because some good arguments and inferences are not logically valid, as we shall see.

## Counterfeits

Though it is often thought of as the ninth book of, or as an appendix to, the *Topics* and appears in the traditional order of the Organon at the end of the sequence, it is not wild to suppose that much of the *Sophistical Refutations* dates to an early period of Aristotle's philosophical activity, in the first instance as an instructor in Plato's Academy. If we bear in mind that the text that we have may stand in some relation to lecture notes (whether Aristotle's or some collation of his students'), then we may think of the course or courses into which it feeds or from which it derives as responding to two demands, one theoretical and the other more practical.

The theoretical demand is that of putting some order into the medley of specious reasonings and wordplays presented in Plato's *Euthydemus*. Though Plato may not have had much of a theory about the differences between good and bad arguments, his exhibition of sophisms shows that he was aware that some differences can be discerned and that their perpetrators should be exposed as frauds, which is the objective of so many of the dialogues that target sophists. Aristotle sets himself to schematise such differences and explain their ruses. As the *Topics* promotes the orderly conduct of dialectical debates, so the *Sophistical Refutations*, following much the same scheme (see the correspondences listed in Aristotle, 2007, L–LI), indicates some kinds of argumentative ploys, especially in competitive encounters (*agonistikoi*; *SEl.*, ii, 165b11), that one should be forearmed against and that one should not oneself use, because they have already been exposed as fraudulent.

The practical end of the instruction that Aristotle was presumably imparting is the cut-and-thrust of the assemblies and tribunals of the Athens of his day (Ryle, 1965a; 1965b). The students in the Academy would later be called on to take part in the public life of the city and would need to know their way about good and bad arguments, so that having some theory for the former and at least some labels for and some practice at recognising the latter would stand them in good stead.

Against this background, it is perhaps not altogether surprising that the *Sophistical Refutations* does not offer more than a generic characterisation of its programme. The first line of the text we have may well be an addition from a later stage in Aristotle's career to bring it into continuity with the bulk of the *Topics* (likewise by common consent a relatively early work), but what it says is that sophistical refutations are those that "seem to be refutations while they are in fact paralogisms and not refutations" (*SEl.*, i, 164a20). *Paralogismos* is a word that Aristotle uses fourteen times in this work and it is very tempting to render it with "fallacy" with the connotations of the broader sense of that word to which

we have already adverted: "deficient move in argumentation" rather than the narrower "argument that seems valid but is not".

In addition to the reasons that have been adduced for saying that invalidity is not a necessary condition for being a paralogism or a sophistical refutation (e.g. Hansen, 2002, p. 143–145), we may note that, at the time of composing the *Sophistical Refutations*, Aristotle did not have at his disposal a perspicuous or well-defined notion of invalidity as we (may) have come to understand it. Indeed, it is only a slight exaggeration to say that, even in the later operation of building the theory of the syllogism in the *Prior Analytics*, Aristotle did not have at his disposal a perspicuous or well-defined notion of validity.

He reproposes the definition of a syllogism—literally a putting together of words—that we find in the *Topics* (I, i, 100a25–7) at *Prior Analytics* I, I, 24b19–21 saying that it is a reasoning (*logos*) in which, given certain things, something other than them follows from them of necessity; but the notion of "following" (*symbainein*) is not much worked out. In building his theory, Aristotle distinguishes between a figure, later known as Barbara, that is "perfect" or "complete" (*telaios*: the latter English rendering in Aristotle, 1989) and the figures that need to be perfected or completed by or reduced to one that is; those that do stand in that need (whatever it may be: see Striker, 1991), such as Barocco, are nevertheless valid by our lights and in the terms of the given definition of a syllogism. When Aristotle wants to say that, from some combination of things given, a certain other thing does not follow of necessity, he says simply that there is no syllogism (*ouk syllogismos*; for instance, *AnPr.*, I, iv, 26a8, 11–12, 32, and 37, 26b3, 10–11, and 17–18; v, 27a19, 27b3, 13, 23, and 36–7, vi, 28a32, 28b3–4, 22–3, 32, and 36–7, 29a9), and in the whole of the *Prior Analytics*, he uses *paralogismos* just once (II, xvi, 64b13).

Nevertheless, for the purposes of the *Sophistical Refutations*, it remains reasonable to say that, if a proposed refutation is an argument and is not a syllogism, then it is a paralogism. If, that is, the other thing, which is the contradictory of the thesis being defended, does not follow of necessity from the given things, then the refutation is sophistical. Or, in more modern garb: even if it is not necessary (and, so, not part of the definition of paralogism), invalidity is sufficient for fallacy.

As to the "seems" element in the traditional definition of fallacy, we have already heard Aristotle saying that sophistical refutations seem to be refutations but are, in reality, paralogisms, and terms germane to *phainomenon* (*SEl.*, i, 164a20) recur insistently in the opening moves of the book (164a24, a26, b20 and b26). To get a grip on the respect in which this seeming is also a deceiving, we may briefly relay the four (or five) analogies that Aristotle offers for the relation between sophistical refutations and refutations in good order.

The first analogy (at i, 164a26–b21) is with the difference between beauty and the appearance of beauty. An argument that is in good order is genuinely beautiful, while a paralogism is a make-up effect. As cosmetics do not aim at the health of the subject, but only at the fleeting and deceptive pleasure of the beholder (a Pla-

tonic theme: *Grg.*, 462c3–d10), so paralogisms do not aim at rational persuasion, but only at seducing the opponent. A paralogism is a painted meretrix.

The second (at i, 164b21–4) is between the glittery outward appearance of a metal, such as tin or iron pyrites, and the inner constitution and valuable properties, such as low chemical reactivity and malleability, of what it might be mistaken for, such as silver or gold respectively. An argument in good order is precious, but only the gullible would take a paralogism for a syllogism.

The third analogy (at i, 164b26–5a1) seems to involve both lack of expertise and inability to look more closely. This is what the rehearsals of the *Topics* are meant to cure. If one is not already alert to where tricks might be pulled, one might be unready to fend off the paralogisms that are deployed in discussion.

And the fourth (at i, 165a5–15) appears to offer two contrasts between mental arithmetic and the use of an abacus. The simpler would be that, if we try to do sums in our heads, we are more likely to overlook mistakes (our own or others') than if we set things out explicitly and keep tabs. The more complex depends on the fact that any given word has to stand for (*semainein*: 165a13) many (indeed infinite) things. Thus, as the position of a bead on an abacus changes its value according to its position, so also the words in an argument may change their meaning according to context. A sly use of paralogism is a trick in which the moves look obvious but are not and will deceive the unwary.

I have deliberately—perhaps even illicitly—presented Aristotle's analogies as evoking low-life traffic to bring out a sense in which, for him and for much of the later tradition, the use of ploys similar to the list of sophistical refutations in *SEl.*, iv–v is dirty play. In line with the broader definition of fallacy, it is a violation of the schemes or an infringement of the rules that pretends not to be.

## Conversions

We have already noted that, in Aristotle's listing of thirteen sophistical refutations, the relations between the labels adopted and the examples furnished are not entirely unproblematic. Of *to en arche aiteisthai* not even one example is given and those that appear under *diaeresis* and *synthesis* are so heterogeneous as to have inspired poor William of Heytesbury to distinguish eight different phenomena here (Guglielmus, 1494); likewise with *para to pe* (*SEl.*, v, 166b37–7a20), which seems hardly more "in a given respect" (traditionally *secundum quid*) than "part for whole" (cf. the case of the Indian at 167a8–9). In the case of the eleventh label—*epomenon* (*SEl.*, v, 167b1–20)—we have five examples that all seem to conform to a single logical structure, even if they are further subdivided, for instance, by Peter of Spain in his re-casting of them in a syllogistic format (Petrus, c. 1230, VII, §§ 150–163).

The first example that Aristotle gives of *epomenon*, at 167b5–6, may be reconstructed as follows:

(Y)        If this is honey, then it is yellow

           This is yellow

(therefore)  This is honey

Though Aristotle formulates the case in terms of neuter adjectives (likewise at vi, 168b30), our indexicals and anaphoric "it" play much the same logical role for the purposes of exposition.

The reason why Aristotle includes a piece of reasoning like (Y) in his listing of sophistical refutations is that the premises may be true, but the conclusion false As some recent commentators on the text say, lumping (Y) together with the other examples that we shall come to, (Y) is a "logical error" (Aristotle, 1995, p. 296) or a "paralogism" (Aristotle, 2007, p. 122). That is to say, (Y) is an invalid argument because, holding firm the premises, we might replace the conclusion with some other sentence that is true and that does not say that this is honey, indeed that says that this is not honey. The replacement that Aristotle hints at is: "this is bile". If this is bile, then it is yellow but is not honey, which may be a play on an opposition of honey as sweet and bile as bitter. Likewise, if this is a lemon, then it is yellow but is not honey, which also plays on an oppostion between the sweet and the sour. As well we all know, many things, including bile and lemons, other than honey are yellow.

In Scholastic parlance, doubtfully attributable to Aquinas (ps-Thomas, 1998, Chap. 3), the invalidity of (Y) is its *causa defectus*: what makes it a fallacy (cf. Ebbesen, 1987); but perhaps more interesting is what makes us fall into it, its *causa apparentiæ*. Aristotle offers a diagnosis of this in two phases.

The first phase is to say that there is the supposition (*to oiesthai*; 167b1) that the terms of the conditional in the first premise ("if this is honey, it is yellow") convert (*antistrephein*; 167b1–2) meaning that there is the supposition "if this is yellow, it is honey". It is worth noting how impersonal is this bit of supposing: it is not explicitly associated either with the attacker of the thesis (that this is honey) or with its defender. And, if it were pinned on anyone, it would in any case be rather forced. On the one hand, there are not many people who think of terms as converting or otherwise; such arcana of logical jargon are perfectly alien to the overwhelming majority, who do not suppose so because they have never thought of it or do not know the verb "to convert" in this sense. On the other, it is hard to think that anyone at all supposes that, if something is yellow, it is honey; to suppose so would be to suppose something that everybody knows is false. And it is better not to attribute to people supposings they know not of or that they flatly reject because they know something of bile or lemons and other yellow things.

Yet, Aristotle himself in *SEl.*, viii (169b30–7) seems to suggest that, in every sophistical refutation, there is some suppressed premise that the opponent of the thesis defended smuggles in to blindside the defender; and there are highly sophisticated modern accounts of how the thesis of the "false validating premiss" can make sense of how paralogisms can take in the unwary (Fait, 2012). So: what sort of supposing must be in play here?

The root verb, *oiomai*, from which Aristotle's gerundialisation derives can be naturally rendered in many contexts as thinking or believing or even, with respect to goods, hoping and, with respect to harms, fearing. But, in the context we are considering, it must be a fainter thing, closer to the concessive or intercalary uses that turn up when one wishes to admit to possible ignorance instead of certainty or to soften an assertion with an "it seems to me" (the "methinks" of yesteryear). Indeed, fainter still: the depersonalised supposition (*to oiesthai*) may, indeed, be a letting-it-pass or a not-noticing-that-not. That is, someone who uses an argument structurally similar to (Y) is not presenting himself as believing that terms that take the places of "honey" and "yellow" in (Y) convert, nor that only honey is yellow; rather, he is seeing whether he can get away with it.

Can he reasonably hope to get away with it? If the second phase of Aristotle's diagnosis of the *causa apparentiæ* of (Y) is correct, then the answer will be "often enough". As we shall see a little further on, the sorts of inference of which (Y) can be taken as an unnourishing example are our daily fare because they are about beliefs deriving from the senses (*peri ten doxan ek tes aistheseos*: 167b4). But from these, Aristotle says, arise tricks or deceptions (*apatai*; 167b4). Which is a pretty shocking thing for him to say. While we might expect sceptics to harp on about sticks looking bent in water, towers that look round and square, and so on, it is quite unexpected to find Aristotle being so harsh on beliefs deriving from the senses; but the gist of this passage seems to have to be that, when dealing with beliefs deriving from the senses, we are apt to fall into tricks or deceptions of which (Y) is an example.

There are perhaps two things to note here. One is that hardly anyone would persevere with an argument that depended essentially on (Y). It is, so to say, a counter-instance to the logical structure of which it is an example. We shall come in a moment to consider some ways of illustrating the structure in question with the use of variables. But (Y) is an instance that does have to do with beliefs deriving from the senses, and that shows that the structure might be a source of trickery and deception because the premises may be true but the conclusion false. The other thing to note is that it is hard to imagine that talk about honey and yellow will figure in the sort of debates that the cycle of lessons from which *SEl*. presumably derives is supposed to be preparing its students for. To this end, it may be that school exercises were set that took as their ostensible subject-matter also metaphysical arguments like that attributed to Melissus at 167b12–17; but these do not have anything to do with beliefs deriving from the senses. Indeed, we shall have no more to say about Melissus' argument precisely because such trickery and deception as it involves has to do with the very abstract notions of the ungenerated and the infinite.

Aristotle's overall diagnosis, and his reason for including *epomenon* in his list of sophistical refutations, then, is that it involves a supposition that it is hard to suppose anyone making in any full-blooded sense (whether about conversion or about yellow things), and that it arises from the tricks and deceptions of the senses. These two elements correspond in some degree to the Scholastic categories of

the *causa defectus*, which is a matter of what is amiss with the argument, and of the *causa apparentiæ*, which is what makes us fall into the trap.

## Mistakes and Confusions

In 2019, Robert Arp, Steven Barbone and Michael Bruce edited a book with the unequivocal title *Bad Arguments* (2019), in which they collected short essays on "100 of the Most Important Fallacies in Western Philosophy", of which the second is called "Affirming the Consequent". And its prominent position in so lengthy a listing gives us reason to think that instances of affirming the consequent are among the most important of the most important fallacies in Western Philosophy: not only bad arguments, but conspicuously bad arguments.

The author of the essay on affirming the consequent, Brett Gaul, begins by giving a rather abstract account of this "fallacious form of reasoning in formal logic" (Gaul, 2019a, p. 42). If, by this, he means no more than that arguments that exhibit a certain structure may have true premises and false conclusion, then we need not worry. Indeed, it is the sort of thing that most readers of this journal will have enountered in the first month or so of an elementary logic course. The trouble is that the editors' *Introduction* to *Bad Arguments* proposes to recognise only two basic types of reasoning, deductive and inductive (Arp et al., 2019, p. 13), and proceeds as if an argument that is proposed as deductive but that may have true premises and false conclusion is a fallacy and "a fallacy is a bad thing [and] should be avoided at all costs" (p. 19). This is less than convincing, but it may not represent the view of Gaul himself.

Gaul expounds his abstract account of affirming the consequent in terms of major and minor premises of a propositional syllogism and this expository choice puts anything that answers to the account pretty firmly in the class of arguments that are to be judged by the standards of deductive reasoning. As an anonymous commentator for this journal aptly expresses it, an affirmation of the consequent "shoots at" validity. And misses.

The major premise is described as both "general" and a "conditional", which "expresses a link between the antecedent […] and the consequent" (Gaul, 2019a, p. 42). Then, like Aristotle with his *antistrephein*, Gaul says that affirming the consequent is "the mistake of assuming that the converse of an 'if-then' statement is true" (2019a, p. 42). But, as we suggested of Aristotle, it is hard to think that, on most occasions that a consequent is affirmed, the affirmer is assuming anything of the sort, except in the very faintest way indicated earlier. We do not really have here a full-blooded assumption, if only (i) because the notion of a converse is at the disposal of those who have studied some formal logic (however little); and (ii) because anyone who was asked whether "if $p$, then $q$" is equivalent to "if $q$, then $p$" would very likely deny it, at least once what is meant by talking about $p$ and $q$ is explained. Here, though, we have the elements of *causa defectus* of affirming the consequent: it is defective because, taken as a deductive argument, it may have true premises and false conclusion.

A further suggestion that Gaul makes is that those who affirm the consequent sometimes do so because "it is mistaken for" (2019a, p. 42) the valid argument form *modus ponendo ponens*, and he then sets the two out side by side in skeletal format using propositional variables (p. 42):

| | | |
|---|---|---|
| If $p$, then $q$ | | If $p$, then $q$ |
| $p$ | | $q$ |
| (therefore) $q$ | (therefore) | $p$ |

While affirming the consequent is what Aristotle would call a paralogism and sophistical because it seems like or resembles a syllogism, Gaul thus suggests which syllogism it is that it resembles, which is a *causa apparentiæ*.

Descending from this level of abstractness, Gaul offers a comparison between a *modus ponendo ponens* with the two premises (1) "If Sophia is in the Twin Cities, then she is in Minnesota" and (2) "Sophia is in the Twin Cities" to arrive at the conclusion (3) "Sophia is in Minnesota", and the affirming of the consequent with the same first/major/conditional premise (1) plus (4) "Sophia is in Minnesota" which fail to "guarantee" (Gaul, 2019a, p. 43) the conclusion (2) "Sophia is in the Twin Cities".

The example is well-chosen for anyone who believes that the Twin Cities fall within but are not coextensive with Minnesota (though I gather that two counties of this conurbation are in fact in the territory of Wisconsin). One reason why the choice is good is that the spatial relations between being in the Twin Cities and being in Minnesota can be very intutively rendered with Euler/Venn set diagrams. The lack of the guarantee in the passage from (1) and (4) to (2) can be seen from there being areas of Minnesota that are not in the Twin Cities, such as Marshall in Lyon County, where Brett Gaul teaches. While being in the Twin Cities is a sufficient condition for Sophia's being in Minnesota, her being in Minnesota is a merely necessary condition for her being in the Twin Cities, and Gaul suggests that affirming the consequent arises from a "confusion" of these (2019a, p. 44). Yet it may just be the case that Sophia, supposing her to be an obdurate city-dweller, would never go anywhere in Minnesota outside the Twin Cities, but this is not guaranteed by the conjunction of (1) and (4).

Gaul is by no means alone in characterising passages from premises to conclusion that lack deductive guarantee as "mistakes" and "confusions", but I elected to look at his essay because it is recent, short and very clear indeed in the position it takes on the need to "avoid committing this fallacy" (2019a, p. 45), where the choice of the verb "to commit" would indicate a sin or a crime: not merely a bad argument, but a bad thing, to be "avoided at all costs" (Arp et al., 2019, p. 19, cited above). It may be salutary, therefore, to look a little more closely at some classic cases of this infamy and to seek some understanding of why we are so inclined to "commit" it.

## Three Examples

After the example of honey and yellow, Aristotle offers four examples of *epomenon*, and we have already said we shall not further consider the case of Melissus because it does not fit the diagnosis of arising out of the tricks or deceptions of the senses. Which leaves three. Because I do not possess a fully worked-out algorithm for getting from the textual traces to formal presentation of arguments, it is with due hesitation that I offer the following suggestions.

At 167b6–8, we seem to have an argument that would, when more fully spelt out, look like this:

(W)        The ground is wet

           When it has rained, the ground is wet

(therefore)   It has rained

The inversion of the order as between what Gaul calls the major and minor premises is of no logical significance, although it seems to possess a greater naturalness. In (Y) and Gaul's Sophia examples, the dominant functor in the major premise is "if", but in (W) it is "when". This seems a close enough relative of "if" (think German *wenn*) to have many of the same logical powers, and, indeed, might be appealed to to supply the link that Gaul refers to between antecedent and consequent in a conditional—in (W), a temporal and causal sequence. But, as Aristotle says, it is "not necessary" (*ouk anankaion*; line 8), which will remind us of "not a syllogism".

The next example (167b10–11) is introduced by Aristotle's saying that something of the sort might be used in the rhetorical elaboration of an accusation, presumably for immorality. Unlike the honey and yellow example, this brings us closer to the wider world outside the Academy. Suppose the accused is Coriscus; thus, the argument would run:

(A)        Coriscus is abroad at night smartly turned out

           Those who are having an affair are abroad at night smartly turned out

(therefore)   Coriscus is having an affair

Again, the minor premise is placed first. The major is not explicitly quantified and the conditional functor is likewise rather implicit in the generalisation, which could be spelt out rather too explicitly for plausibility as "If someone is having an affair, he/she is abroad at night smartly turned out".

After his exertions, Coriscus may return to fill out Aristotle's last example of *epomenon* (167b18–20):

(F)     Coriscus is running a temperature

        A fever makes you run a temperature

(therefore)   Coriscus has a fever

Naturally, the major could be expressed as an explicit conditional: "if you have a fever, you run a temperature", and even impersonally with "one" or "any-one" and an anaphoric "he/she"; as it is, the "makes" indicates the link between antecedent and consequent.

One thing to observe about (W), (A) and (F) is that they all exhibit the same logical structure as (Y), Gaul's skeletal uses of variables and his Sophia example. If being a fallacy were purely a question of logical form, then we might expect that any argument that shared a logical form with a fallacy would be a fallacy. There are general reasons for doubting this (Davies, 2012), but, on one plausible assessment, (W), (A) and (F) are all arguments that we might find ourselves proposing.

Another thing worth observing is that, from consideration of (W), (A) and (F) set out in full, we can see pretty much straight off that Aristotle's list of thirteen sophistical refutations is incomplete. For he nowhere takes account of the struc-ture specular to *epomenon*, which a later tradition labels *negatio antecedentis* and Gaul's following essay in *Bad Arguments* calls "denying the antecedent" (Gaul, 2019b); Gaul gives both the skeletal structure with propositional variables "If $p$, then $q$, but not-$p$; therefore not-$q$" and fits a Sophia-and-Twin-Cities case into this logical form. Without over-regimenting (suppressing the major in each case), arguments specular to (W), (A) and (F) may be set out in a quasi-dialogic form:

(W*)    It hasn't rained? The ground will be dry and I needn't put my boots on.

(A*)    Coriscus isn't having an affair? He'll be at home this evening, so I'll pay him a call.

(F*)    Coriscus doesn't have a fever? He won't be running a temperature.

If Aristotle had noticed something similar to them, then *epomenon*'s mirror im-age might have lengthened his list to fourteen, still nowhere near Arp & Co.'s 100, Calemi and Paolini Paoletti's "exactly 150" (2014, p. 7) or the vulgarity of Ben-nett's "Over 300" (2015), to notice but a few of the recent counts. It would be another story to explain why such counts are, in the nature of the case, spurious.

## An Abductive Defence

The apparently provocative "defence of a fallacy" promised in my title amounts to little more than the observations: (i) that (W), (A) and (F) are exam-ples of the sorts of inferences we make much of the time; and (ii) without such

inferences, we would be quite at a loss to go about our everyday business. But I permit myself to flesh them out a little.

Let us look again at (W) and (W*). One or other is among the first inferences I make pretty much every morning, even before drinking a coffee. If I look out of the window on the street and see that there is water on the ground, and I look out of the window on the courtyard and see that there is water on the ground, I infer that it has rained: (W). For sure, the street may have been cleaned by the public services and the courtyard may have been sprayed by my neighbour washing his car. Thus, my premises (what I see out of two of my windows) would be true but my conclusion (that it has rained) could be false. But nothing induces me to suppose such wayward coincidences, which do not, in any case, exclude its having rained. Viceversa, if the street and the courtyard are both dry, I infer that it has not rained and choose my shoes accordingly: (W*). Not to make such inferences would not be loyalty to formal logic, but early-morning doziness.

As the day goes on, I continue to make inferences that conform in one way or another to (W), (A) and (F) in affirming the consequent or to (W*), (A*) and (F*) in negating the antecedent. When I arrive at the bus stop, if I see that there is no-one waiting, I infer that the bus has just passed because, when the bus has just passed, there will be no-one waiting: those who had been waiting have got on and are no longer waiting. In more challenging environments, such as the work-place, the inferences I make become ever more adventurous, interesting and risky: more likely for the premises to be true though the conclusion may turn out to be false (especially when they involve attributing specific mental states to my colleagues). But still I make them, and I take it that this is not a merely autobio-graphical confession. Rather, it reflects what we all do most of the time.

I am very slow to allow that we are all making mistakes and confusions all day long or that we are supposing that terms that plainly do not convert convert. If I did allow such a thing, then we would all have to attribute to everybody massive amounts of logical ineptitude in making such mistakes and confusions. Yet, there is strong evidence to show that, even when we are challenged in circumstances that put us on our mettle, the drive to affirm the consequent is strong and constant.

Traces of this evidence can be found in the robustness of the results of a cele-brated test first made explicit by Peter Wason (1968) and variously reproduced (Evans, 1982; Manktelow, 1999). The so-called selection task induces about 90% of the general population (and about 75% of mathematics majors) to affirm the consequent when asked to verify a conditional in the rather artificial conditions of a psychology experiment, though this figure is significantly lower in "thicker" social settings (e.g., Cosmides, Tooby, 1992). There has been considerable debate about just what is going on here (Motterlini, 2008, pp. 20–28, 263–265), but one fixed point seems to be that the Wason effect is an obstacle to people's arriving at the "correct" or "optimal" (Oaksford & Chater, 1994; Zenker, 2017, pp. 449–452) solution to the task proposed.

It is indeed true that when the task is one of verifying a conditional such as "If there is an 'A' showing on one side of a card, then there is a '2' on the other",

turning over a card with a "2" showing is perfectly irrelevant. But, of a morning, what I am doing is not seeking to verify the quasi-conditional "When it has rained, the ground is wet". At most, I am reassuring myself that nothing too untoward has been going on in the night. That is, the water on the ground both in the street and in the courtyard is explained most simply by its having rained. And the simplicity here can be put numerically. If the water in the street could have been due to the public cleaning service and that in the courtyard to my zealous neighbour—two causes for two effects—the rain's causing both dousings can be regarded as one cause for perhaps just one effect, and gives rise to no need to puzzle over a temporal coincidence. Rain removes any cause for surprise at widespread water: if there has been rain in the night, water on the ground is a matter of course.

For someone living in Manchester, water on the ground is not at all surprising; but for someone living in the Atacama desert, it is. In the one, an inference like (W) is a matter of course and alternates with (W*) in a ratio of about 7:12 over the course of the average year; in the other, there may be years when (W) doesn't occur even once to the inhabitants, who are condemned to repeating (W*) and never needing to put on waterproof shoes. If we are loyal to formal logic, we may say that Mancunians switch between affirming the consequent and denying the antecedent, while a certain number of Chileans do nothing but deny the antecedent.

Inferences (A) and (F) and their counterpart denials of the antecedent, call for slightly different criteria of evaluation. Just how good (A) and (A*) are as inferences depends on what Coriscus is like. Though we know of a historical Coriscus, a friend of Aristotle's in the time he spent at Skepsis, his name appears as a dummy for this or that man more than 60 times in the *Corpus*. In our ignorance of what he is like, we may entertain two hypotheses about him (as we could about Gaul's Sophia and her potential refusal to visit Minnesota outside the Twin Cities). If Coriscus is generally a stop-at-home sloven, then his being out and about and well turned out is a change in his behaviour that is rather surprising and that calls for some explanation. If he has recently been heard talking excitedly about someone in particular, then we have a clue in favour of (A). But if he has long been a party-goer with a sharp dress sense, then it is hard to be sure whether he is taken up with anyone in particular just at the moment, so that (A) is rather under-motivated. Conversely, (A*) is boosted if he has just broken up and is that bit depressed so that maybe an evening visit will cheer him up.

By contrast, the diagnosis in (F) derives from medical facts. If Coriscus has a temperature of 38.5°, then the conclusion that he has a fever will account for this symptom. In certain circumstances, such as those of the time of writing, the minor premise might lead us to suppose that he has been infected with Covid-19 and, at least in line with a principle of precaution, to treat him as such and quarantine him; but, at other times, a more generic and less alarming conclusion might be all that we feel entitled to.

In (W*) and (A*), the practical consequence drawn in each case, regarding footwear and an evening visit respectively, comes without undue strain, and

while (F) might induce us to prescribe at least an antipyretic, in (F*), the absence of fever doesn't indicate any particular course of action. This is because health, being a normal state, does not call for treatment, while disease does. The asymmetry here is a material matter rather than a formal one, and if we allow ourselves to be guided only by formal logic, we might miss it. For formal logic has nothing much to say about what is or is not out of the normal.

Not only do the notions of being normal or a matter of course and being surprising or alarming resist formalisation, the relations among them are problematic. As Peirce says, they are "very little hampered by logical rules" (*CP*, 5.188). Nevertheless, the following scheme of inference looks as if it captures what makes inferences like (W), (A) and (F) attractive, morning, noon and night:

(P)     The surprising fact, C, is observed;

        But if A were true, C would be a matter of course,

        Hence, there is reason to suspect that A is true (*CP*, 5.189)

If we apply Gaul's abstract description of affirming the consequent, we have the major (second) premise, which is general or a conditional, of which the consequent is affirmed in the minor (first) premise (as in (W), (A) and (F)), and the conclusion is the antecedent of the major.

Thus, at least formally, (P) is a case of mistake or confusion. But there are at least three points to be considered to make clearer how much or how little our "defence of a fallacy" amounts to. One is how to regard the presence of "surprising" and "a matter of course" in (P). A second is whether the use of the subjunctive in the major premise of (P) undermines the assimilation we are suggesting. And a third is what we are to make of the relation between the premises and the conclusion, given that there is no clear sense in which the conclusion "follows of necessity" (*ex anankes symbainei*, *Top.*, I, i, 100a26, and *AnPr.*, I, i, 24b20, cited above) from them.

If we can illustrate, albeit in a preliminary way, that plausible responses to these points do not go against what we are suggesting, then inferences like (W), (A) and (F) and (W*), (A*) and (F*) may not be in such a bad condition as those who call them mistakes or confusions would have us believe, because they are what Peirce calls abductions. Though the assessment of individual abductions is not formalisable, the thesis that none are in good logical shape is so paradoxical as to be a betrayal of mere ignorance on the part of anyone who suggests it. To insist that only deductively valid inferences are in good logical shape (van Eemeren's Validity rule) is to fall into the trap of Maslow's hammer: because we have accounts of some good deductions, such as those that are formed with "if… then—" sentences, it is easy to suppose that every inference in good logical shape will conform to that pattern (and so will be a nail for the hammer we happen to have). This easy supposition is itself an affirmation of the consequent, and should shame those who think that this sort of inference is to be "avoided at all costs".

As to the first point, we have already adverted to some differences between the surprise of water on the ground in the Atacama, the spectacle of idle Coriscus suddenly out and about, and the alarm caused by a temperature of 38.5° as against the usual damp in Manchester, snappy Coriscus strutting his stuff and there being no need even to take out the thermometer if there is no perceived deviation from normal temperature. But these differences do not make a difference to whether the inferences are attractive or not, nor to whether particular actions are called for. The presence or absence of water on the ground is something observed: its presence is not a surprise in Manchester but very much so in the Atacama; but the supposition of rain makes this a matter of course in both places and makes sense of this or that choice of footwear. And likewise in the other cases. If what we have reason to suspect explains or makes sense of what we have observed, then the inference is, as Peirce says, "the only logical operation that introduces any new idea" (*CP*, 5.171–2).

Second, the use of the subjunctive in Peirce's formulation does not seem to be essential to understanding what an abduction is, and (P) could as well be re-written as:

(P*)      The surprising fact, C, is observed;

          But if A is true, C is a matter of course,

          Hence, there is reason to suspect that A is true

In Gaul's terminology, the major (second) premise is, in both (P) and (P*), a conditional and general. One might even say that, with the subjunctive formulation, the invocation of the link that Gaul refers to is stronger, but this is to stray into the tormented field of the analysis of conditionals. Even if the second premise of (P*) does not express any link that is lawlike in any strong sense, the idea is that terms that take the place of "A" should be in one way or another explanatory of those that take the place of "C", as we seem to have in (A), where the idea of a lawlike generalisation would surely be out of place. Episodic personal behaviours do not lend themselves to lawlikeness. Coriscus' having an affair makes his dapperness understandable because he is trying to make a good impression on the person he is courting. Perhaps this is a second level of explanation, but surprises sometimes need to be multiply contextualised. Nevertheless, each of (W), (A) and (F) could equally well be re-written with a subjunctive in the major premise: "if Coriscus were having an affair, then his being out and about at night would be a matter of course", and so on.

And third, as to the question of "following", if this depends on logical form or structure, conformity to (P) or (P*) will not, as Gaul puts it, "guarantee" the conclusion. After all, the point of departure with (Y) was that this could be yellow, and yet not honey but bile or a lemon. In this respect, having a false conclusion is a reason for deprecating a given abduction; but having a conclusion that might be false even though the premises are true is neither here nor there in assessing such an inference. In the cases of (W), (A) and (F), and despite Aristo-

tle's deployment of them to illustrate *epomenon*, the commentators' collusion in thinking they are logical errors or paralogisms and Gaul's allegation of mistakes and confusions, we have inferences in which, indeed, the conclusion does not follow (*symbainein*) from the premises, but absent which we would be in the dark about the water on the ground, Coriscus' nocturnal behaviour and the temperature he is running.

Peirce himself characterises the status of the conclusions of abductions in terms of the cyclical nature of investgations, where the upshot of an abduction provides a "hypothesis" (*CP*, 2.619–44, 5.599–600, 6.466–70) or a "conjecture" (*CP*, 2.755, 5.189, 6.469, 8.209) that calls for further testing. For this reason, he sometimes says that it is "in the interrogative mood" (*CP*, 2.758, 6.469) or even a "guess" (*CP*, 2.121, 2.753, 6.491, 7.219).

This is not the place to go further into the roles that abductions play both in day-to-day reasoning and in the more formal business of testing conjectures by seeking refutations of them, but we have already seen some surprising facts to do with how often and how stoutly everybody commits affirming the consequent and denying the antecedent. If the ancients and moderns who tell us that arguments that can have true premises and false conclusion are bad things to be avoided at all costs were telling the whole story, then we would have to attribute massive logical ineptitude to everybody. If, in some cases, such inferences are more or less decent abductions, the facts in the case would be a matter of course and we would not have to attribute massive logical ineptitude to everybody. Hence, there is reason to suspect that they are more or less decent abductions. This is the guess, hypothesis or conjecture that my defence of affirming the consequent invites the reader to interrogate. And I arrive at it by affirming the consequent or, as I prefer to say, by an abductive inference.

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