AMERICAN PHILOSOPHICAL QUARTERLY
Volume 22, Number 4, October 1985, 263-274

Winning Entry in the 1985 APQ Prize Essay Competition

ARE CIRCULAR ARGUMENTS NECESSARILY VICIOUS?

Douglas N. Walton

WHEN asked why the economy in a certain state is in a slump, an economist replies: "A lot of people are leaving the state. Things are very poor in the building industry, for example, because there is no need for new housing." Next question: "Why are people leaving the state?" The economist's answer: "Well, the state of the economy is poor. People just don't seem to be able to get jobs, with the economy being so slow at the moment."' This sequence of questions and answers has taken us in a circle: the economy is depressed because people are leaving, and people are leaving because the economy is depressed. Isn't this just the sort of argument that might be cited in a logic text as an instance of petitio principii, the fallacy of arguing in a circle? If so, it seems that the economist's argument must be fallacious. 1

On the other hand, perhaps the circularity in his argument could be due to the feedback loops inherent in human behavior. If people leave, things get worse. But if things get worse, people leave in even greater numbers. An analogy could be to the following case. The more overweight the diabetic gets, the more insulin there is in his blood. The more insulin there is in his blood, the more he tends to eat and thereby store up more fat. Here the process is circular, but there seems to be no fallacy.2 At least, from one point of view the circle is not vicious, since the diabetic gets fatter and fatter. Similarly, in the previous case, the state could become more and more economically depressed, as the cycle progresses.

In mathematics, it is common practice to start at proposition A and then prove *B*, then start again at *B* and prove that A follows. An equivalence proof in mathematics, of the if and only if type, often takes this form. Although the form of proof is circular, in many instances such a proof is rightly thought non-fallacious. And some notions that are circular, like Russell's "set of all sets that are not members of themselves," were found troublesome not altogether because of the circularity involved, but because they contain a contradiction.

These examples may suggest that circular reasoning is not always fallacious or vicious. Some philosophers have even carried this further to argue that scientific reasoning itself may be inherently circular. Hull (1967) examines the questioning of their own methodology by evolutionary tax onomists. The taxa, or categories of organisms used by biologists are applied to the study of particular organisms to represent evolutionary descent. But as more is learned about the principles of descent with modification by such studies, the taxa are refined and improved. This process has seemed circular to some scientists, and it has been called "groping" and "reciprocal illumination" to indicate the suspicion of circularity. According to Hull (1967) the process is circular only to the extent that scientific verification of hypotheses is always circular.

Perhaps what Hull is suggesting is something like the following sort of process. First, a hypothesis is formulated on the basis of some initial evidence. As new evidence comes in, the hypothesis is clarified and refined. However, once stated more clearly and precisely, the hypothesis points to new evidence that has thereby become "relevant" or "significant." This new evidence improves the hypothesis once again.

This suggestion that the process of inductive confirmation is circular would have disquieted J. S. Mill, who argued that all deductive reasoning was circular, and that therefore inductive reasoning is more reliable. Mill, like Sextus before him, observed that in a deductively valid inference like "All' men are mortal, Socrates is a man; therefore Socrates is mortal" it looks like the conclusion is part of, or an instance of, the major premiss. Consequently, since the major premiss must depend evidentially on the conclusion, Mill reasoned, the deductive argument must be circular.[3]

Both Hull's and Mill's approaches may seem a little extreme to most of us. But at any rate, taken together with the previous examples, they may give some philosophical depth to the view that there can be circularity in an argument that is not necessarily vicious or fallacious.

On the other hand, if you were to ask me to prove to you that Auckland is in New Zealand, and I replied "Auckland is in New Zealand, therefore Auckland is in New Zealand," you might quite justifiably take a dim view of my circular argument. Granted, a proposition can be taken as a deductive consequence of itself (if any proposition is), but sometimes we expect, with reason, that the premisses be more acceptable, or better established, for the person to whom the argument is directed, than the conclusion to be proven. Where this expectation is reasonable and appropriate, circularity in an argument can seem if not vicious, at least highly suspicious.

Whether an argument is suspicious or open to fair and justifiable criticism are two quite different questions. To get at the latter question in regard to circularity, we must clarify some aspects of the nature of reasonable argument.

1. GRAPHS OF ARGUMENTS

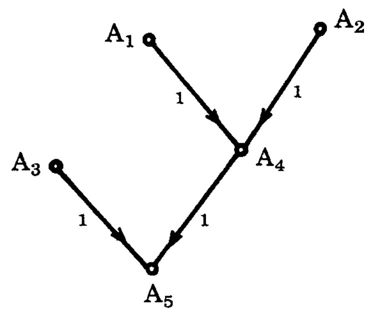
It has been recognized by Hamblin (1970) that informal arguments and fallacies often require consideration of a chain of argument-stages instead of a single set of premisses and conclusion. To be sure, circular arguments are more significant, as potential fallacies, where an argument is more complex, in the sense of being a longer sequence of steps. Shoesmith and Smiley (1980) adopt a logical framework in which an argument can have several conclusions at different stages, and developments in linguistics have also studied the pragmatics of argumentation as an extended discourse. We will use a method of Walton and Batten (1984) that models a sequence of argumentation as a directed graph.

A *formal system* is a triple $F = (P, \Delta, R)$ where P is a set of atoms, Δ a set of n_i-ary operations and R a set of arguments called *rules*. An *argument* is a non-empty finite set of wffs with one distinguished from the others. Notation: $A = A_1, A_2, \ldots; A_{n+1}$, where A_{n+1} is the wff distinguished from the others, called the conclusion. The basic idea of the system is that you start out with a set of wffs designated as "initial premisses," and the rules determine all the possible ways of deriving the conclusion from those premisses. This process generates the "argument" which is associated with a graph.

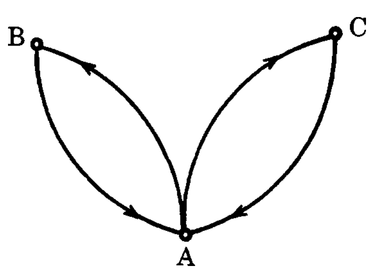
A graph is a set of pairs of points called *vertices*. Each pair of vertices is called an arc. In a digraph (directed graph), each pair of vertices is an ordered pair.[4] The following terminology will be useful. A *digraph* is a triple $D = (V, \mathcal{A})$ where V is a non-empty set of elements called *vertices* and $\mathcal{A}$ a family of ordered pairs of elements of V, called *arcs*. A *diwalk* of a digraph from vertex v to vertex w is a finite sequence of distinct arcs (v_0, v_1), (v_1, v_2), $\ldots (v_n, v_{n+1})$ where $v_0 = v$ and $v_{n+1} = w$. A *dipath* from v to w is a diwalk in which $v_i \neq v_j$ if $i \neq j$. A *dicycle* from v to w is a dipath except that $v = w$.

The basic idea here is that the vertices represent wffs in an argument, the arcs (drawn as "arrows") represent an application of a single rule to one or more wffs (labelled with a number that represents that rule), and consequently the graph can represent an overall network of complex argumentation. For example, if *modus ponens* is a rule (Rule 1), then the graph below could represent an argument with the following initial premisses: A_1 = If Socrates is a man, Socrates is mortal; A_2 = Socrates is a man; A_3 If Socrates is mortal, Socrates will die. An implicit premiss is also "produced" by the argument: A_4 = Socrates is mortal. The conclusion is A_5 = Socrates will die. The usefulness of this method of representing argument will no doubt be apparent to those interested in informal logic as a field of study, but one feature of it bears remarking upon here.

If a conclusion happens to be on a dicycle, the argument may be said to be circular. But two cases



need to be distinguished. If every available evidential route to a conclusion lies on a dicycle, the argument is called *inevitably circular* in Walton and Batten (1984, p. 150). For example, in the argument on the left, below, no matter which way an argument for A is given, it falls on a dicycle also including A. Whereas in the argument on the right, there is an argument for A that is not on a dicycle. The argument on the right is not inevitably circular, even if it is circular.

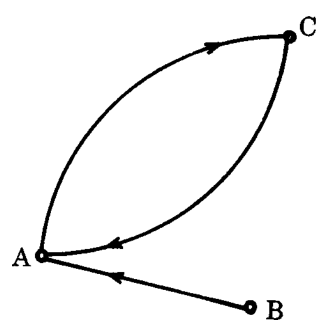


The remarks above suggest that we need to take some care in suggesting, in a particular case, that a circular argument must be "fallacious" or "vicious." In a case like the graph above on the right, it could be that there is indeed a circle in the argument for the conclusion A. But that might not necessarily indicate a fallacious argument. for the arguer has available an evidential route for his conclusion A that does not contain a cycle. In such a case, the circle could be harmless.

This insight could suggest a reply to Mill's puzzler that all deductively valid arguments are circular. Could there be alternative routes of verification for the major premiss of the syllogism mentioned earlier in this connection? It would seem possible that the answer is "yes" because the proposition "All men are mortal" need not be verified or justified exclusively by a process of checking each one of its instances- including "Socrates is mortal.".There could be general genetic or physiological justification of this generalization, not necessarily including the specific statement "Socrates is mortal." Similar insight might apply to some of the other cases we looked at. Dialogue with the proponent of an argument could reveal that the argument is not inevitably circular. In such a case, the criticism that on argument is circular may be not so much a knock-down refutation or "fallacy" as a kind of attack or challenge that can be met or rebutted in some cases.5

2. CIRCULARITY AND REASONABLE DIALOGUE

One perspective that has strong ties with the historical development of doctrines of the fallacies-as documented by Hamblin (1970)-is the



framework of games of dialectic or formal dialogues. A game of dialogue is a two-person (in the simplest case) sequence of questions and answers, according to certain rules. The rules define permissible moves and order of play. There are also logical rules defining "consequence," and usually criteria for "win" and "loss" according to certain objectives or strategies set for the players. There are many reasonable possibilities here for different kinds of games for different contexts of argument.

According to one type of structure outlined by

Hintikka (1981), there are two players α and β, each of whom has a designated thesis—respectively T_α and T_β set as his or her *conclusion* or *thesis*, to be argued for. Each player also has certain propositions called *initial concessions* (Rescher (1977) and Hamblin (1970) call these propositions *commitments*). The game proceeds with each player trying to extract new concessions (commitments) from the other player by means of asking questions or drawing implications from the other's previous commitments, according to the logical rules. According to Hintikka's criterion, the player wins who first deduces his own thesis exclusively from the commitment-set of the other player.

In this type of structure of dialogue, it is possible to have circular arguments. Our problem is to determine whether or why such circles are, or can be fallacious.

Hamblin's basic game (*H*) contains classical propositional calculus as its logical element. Unlike the Hintikka game, there is no definite win-loss rule, except that the purpose of the game, according to Hamblin, is for the players to "exchange information." The following forms of circular dialogue-sequence may occur in (*H*), where *A*, *B*, *A*,..., are atomic propositions.

	WHITE	BLACK
I	(1) Why A?	Statements B, $B \supset A$
	(2) Why B?	Statements A, $A \supset B$

	WHITE	BLACK
II	(1) Why A?	Statements $A_1, A_1 \supset A$
	(2) Why A_1?	Statements $A_2, A_2 \supset A_1$
	. . .	. . .
	. . .	. . .
	. . .	. . .
	(k) Why A_{n-1}?	Statements $A_n, A_n \supset A_{n-1}$
	(k+1) Why A_n?	Statements $A, A \supset A_n$

Hamblin (1970, p. 268) proposes two rules that block *petitio* in (*H*). The first is a rule for when the "Why?" proposer is regarded as inviting his opponent to *convince* him:

> (*W*) "Why *S*?' may not be used unless *S* is a commitment of the hearer and not of the speaker.

Otherwise "Why?" is academic. The second rule is specifically designed to block circular reasoning:

> (RI) The answer to "Why *S*?', if it is not "Statement-*S*" or "No commitment *S*," must be by way of statements that are already commitments of both speaker and hearer.

How then do (W) and (R1) block *petitio* in (H)? To see how, consider the circle game, I. When Black responds "B, $B \supset A$" at (1), it is required by (R1) that both statements B and $B \supset A$ be commitments of both Black and White. Thus at (2). White's move "Why *B*?" is illegitimate by (*W*). So we can see that, given (*W*) plus (*R1*), circle games can never be played in (*H*).

Nonetheless, it is shown by Woods and Walton (1978) how sequences that may be circular can be constructed even in (*H*) + (*W*) + (*Rl*). Part of the problem may stem from the fact that (*H*) is not even partially closed under logical consequence, and therefore there are unresolved problems about retraction of commitments in (*H*).

The dialectical structure proposed by Rescher (1977) is less symmetrical in that the proponent adduces arguments in favor or his thesis *T*, whereas the opponent has the role of challenging these moves. In this framework, the burden of proof lies with the proponent. Hence Rescher's approach is more attuned to the subleties of plausible reasoning where the linkage between atomic propositions, *P*, *Q*, ..., is something weaker than deductive closure.

Three types of move are allowed to the proponent in a Rescher game: (i) *Categorical assertion: !P,* for "*P* is the case" or "*P* is maintained by the assertor," (ii) *Cautious assertion: +P,* for "*P* is compatible with everything you (the adversary) have said," (iii) *Provisoed assertion: P/Q,* for "*P* generally (usually, or ordinarily) obtains provided that *Q*." (Other readings of *P/Q* are "*P* obtains in all (most) ordinary circumstances (possible worlds) where *Q* does", or "*Q* constitutes *prima facie* evidence for *P*." It is clear that this slash-relation is the key element in applying Rescher's dialectical framework to any study of argumentation.

Can types of circular argument similar to those in (*H*) also arise in a Rescher game? It seems that they can, and in fact the following two examples are given (p. 20) of sequences where the proponent reasserts something he has "effectively" asserted before.

Proponent	Opponent
!*P*	†∼*P*
!*P*	

Proponent	Opponent
!*P*	†∼*P*
!∼∼*P*=!*P*	

The second would appear to be an *equivalence petitio. A* third sequence given by Rescher (p. 20) would appear to constitute a *dependency petitio.*

(C)

Proponent	Opponent
!*P*	†∼*P*
P/*Q* & !*Q*	†∼*Q*
Q/*P* & !*P*	

The question for us here is whether there is a need for "blockage rules" to outlaw sequences like (*A*), (*B*) and (*C*). Rescher does not try to formulate such a rule. Thus for both Rescher and Hamblin, the question of how best to deal with *petitio* remains open. Perhaps blockage rules are not needed, but if not, we need to know why not if the thesis that all circles are not necessarily vicious is to be vindicated.

Perhaps the most trenchant comment on the relationship between dialogue and circularity arises from consideration of a circle game like I above in relation to Hintikka's framework. If you and I are engaged in a Hintikka-dialogue, my objective is to prove *my* thesis from premisses that are *your* commitments. What is the fault then if I argue "T_α, therefore T_α" according to the rules of deduction, where my thesis is T_α? The fault of my move is simply that I have asked you to accept a proposition, T_α, that you can only accept at the cost of immediately losing the game. If you are an even minimally "rational" player, you would never accept such an argument. My circular argument, therefore, is simply bad strategy on my part. It could hardly be called a "fallacy," in the sense of being an "unfair" move that you could have some reasonable grounds for complaining about as a deceitful or illicit move in the Hintikka game. It is like my argument in response to your challenge to prove that God is benevolent, where I argue, "God has all the morally good qualities, therefore God is benevolent." If you do not accept the conclusion, because you are agnostic or skeptical about religion generally, you are certainly not going to accept the premiss if you are moderately rational and attentive. On these presumptions, the argument is a bad one on my part, simply because it is a failure to present you with a premiss you are likely to accept as plausible. In a word, it is bad strategy on my part.

In the context of the Hintikka game, the strategy of "begging for the question that is at issue" (alternatively-asking your opponent to directly accept your own thesis, or some set of premisses that directly implies that thesis, by the rules) is not so much a "fallacy" as simply an inept move. From the opponent's point of view, it is harmless enough. Indeed, it might be a kind of move on the part of the proponent that he would hope for.

So in the Hintikka games, like the Hamblin and Rescher games of dialogue, it remains unclear whether arguing in a circle is wrong (vicious, fallacious). Or if it is a wrong type of move or strategy in argument, it remains unclear why, or exactly when, if ever, it is wrong. The most reasonable conclusion generally seems to be that circular argumentation may be quite permissible in dialogue, for it appears to violate no general rule of reasonable dialogue, nor would it seem to frustrate the objectives or strategies of good dialogue.

But the direction we are taking seems badly at odds with the tradition that *petitio principii* is a logical fallacy. Our next step must be to look at some detailed case studies of arguments that have been perceived as fallacious because they are circular.

3. Two case studies

Although the following argument has been constructed for the purpose of discussion, it could fairly be said to be a kind of example of an argument that students would be directed to classify as a (fallacious) *petitio principii* in the Standard Treatment of fallacies in current logic texts.[6]

> Our team is the outstanding team in the conference, because it has the best players and the best coach. We know it has the best players and the best coach because it will continue to win games and will win the conference title. It will continue to win games and will win the conference title because the players have a justifiable confidence in their ability to win. Of course the players have a justifiable confidence in their ability to win, for our team is the outstanding team in the conference.

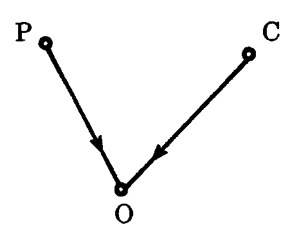
One's initial observation of this argument is that, as a whole, it is circular. It starts out with a proposition (Our team is the outstanding team in the conference) and then, at the end of the argument, comes back to this same proposition. The proposition in question appears to be the conclusion of the argument at its first occurrence, the very beginning of the argument-it appears before the word "because." But when we get to the end of the argument, the very same proposition appears again as a premiss. Hence we seem to have here a clear case of the *petitio principii.*

While it may be clear that there is a circle in the argument, what is less clear is that the circle necessarily means that the argument has to be fallacious. The person who advanced this argument in the first place might reply to the allegation of fallaciousness with the following defence: "A team can only be an outstanding team if it has a justifiable confidence in its own ability to win. But it can have such a justifiable confidence only if it is an outstanding team. This feedback relationship is like a self-fulfilling prophecy, but it is by no means a fallacious process in this instance, for the team must in fact reason this way in order to be successful." Can this defence be justified? It seems hard to rule decisively, but there does seem to be a point in it worth considering. Let us look at the original argument more carefully.

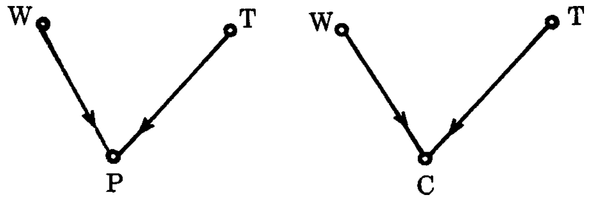
To grasp the structure of the argument, we begin with the following atomic propositions.

O = Our team is the outstanding team in the conference.
P = Our team has the best players.
C = Our team has the best coach.
W = Our team *will* continue to win games.
T = Our team *will* win the conference title.
J = The players have a justifiable confidence in their ability to win.

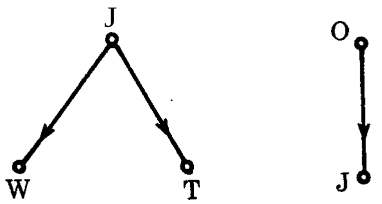
In fairly reconstructing the relationships among the premisses and conclusions of this argument, several questions are raised. It seems fair to the plausible intentions of the arguer to presume that *P* and *C* are meant to be separate premisses that go together to support *O*, rather than individually sufficient grounds for the conclusion *O*. The graph of this part of the argument if represented as follows.



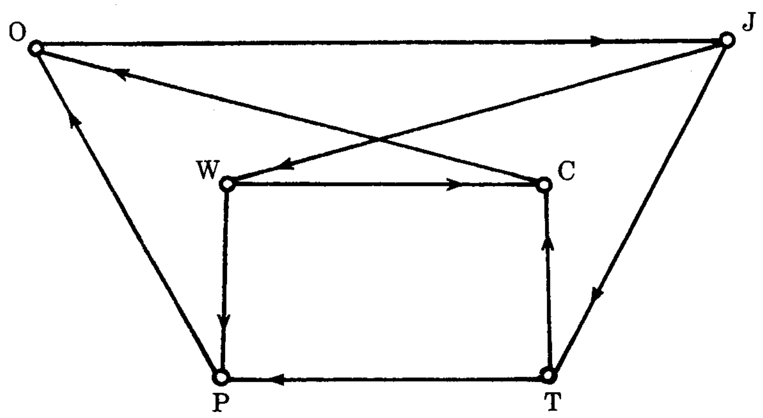
The next stage ofthe argument is subject to interpretation, but it could be that the arguer means that *W* and *T* are separate premisses that go together to support *P*, and that *W* and *T* are separate premisses that go together to support *C*.



Let's presume that the arguer is queried, and agrees that this interpretation fits what he wants to say. Then the subsequent two stages of the argument could be represented as follows.



Putting all these stages together results in the following non-planar digraph that represents the overall structure of the argument.



This digraph contains quite a few dicycles, and the reader may care to check the following ones: <J, T, C, O, J>, <P, O, J, W, P>, <W, C, O, J, W>, <W, C, O, J, T, C, O, J, W>. To say that a digraph is non-planar means that it cannot be drawn in two-dimensional space without at least one pair of arcs intersecting, e.g. <J, W> and <C, O> above. That the graph above is non-planar is evident from the fact that it is one of the digraphs on $K_{3,3}$.[7]

This argument shows a fairly complex circular structure, and one could well appreciate the possibilities of going wrong in interpreting it, or of getting mixed up about it in various ways. But as far as decisively pinning the criticism of "fallacy" on it, we are not better off than we were with the economist's argument we started with. Both arguments are circular, but both deal with feedback processes of "justifiable confidence" where circular argumentation may not be inappropriate in the context. Let us turn to a second case study.

A most interesting controversy about circular argumentation is currently a point of basic methodology in geology and paleontology. Stratigraphy, the study of layers of rock strata, is aided in its temporal inferences by the study of the order of the fossil remains of organisms that are contained in the rock strata. On the other hand, the science of dating the fossil remains seems to partly rely on a finding of the order in which the fossils were found in the order of layers of the rock strata. Several scientists have observed that there seems to be a circle implicit in this methodology, but the problem is whether the circle could be a vicious one, or a sign of fallacious reasoning.

O'Rourke (1976, p. 47) concedes the problem: "The intelligent layman has long suspected circular reasoning in the use of rocks to date fossils and fossils to date rocks." And Rastall (1956, p. 168) has given a pungent statement of the problem.

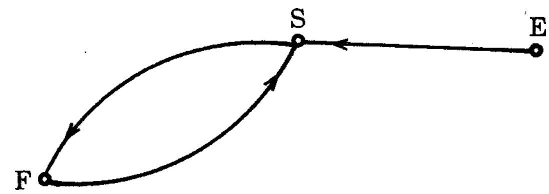
> It cannot be denied that from a strictly philosophical standpoint geologists are here arguing in a circle. The succession of organisms has been determined by a study of their remains embedded in the rocks, and the relative ages of the rocks are determined by the remains of organisms that they contain.

If this is a reasonable account of the way geologists have argued, how could it be defended against the suspicion of fallacious circularity which seems to be involved? There seem to be different approaches.

Rastall's defence against the charge of vicious circularity takes the form of the following response (p. 168).

> It is possible to a very large extent to determine the order of superposition and succession of the strata without any reference at all to their fossils. When the fossils in their turn are correlated with this succession they are found to occur in a certain definite order, and no other. Consequently, when the purely physical evidence of superposition cannot be applied as for example to the strata of two widely separated regions, it is safe to take the fossils as a guide; this follows from the fact that when both kinds of evidence are available there is never any contradiction between them; consequently, in the limited number of cases where only one line of evidence is available, it alone may be taken as proof.

Rastall's statements above suggest that there can be some external evidence (E) which can determine the order of the strata (S) without reference to the order of the fossils (F). This might suggest that in a given case, even if S and F are determined by a mutual evidentiary correlation, E can be brought to bear on S without depending on F. The following graph is suggested. This would allow us to conclude that at least the conclusion S is not inevitably circular, even if F is. By this reconstruction of the argument, a case could be made that there is an argument involved that is not necessarily fallacious or vicious, even

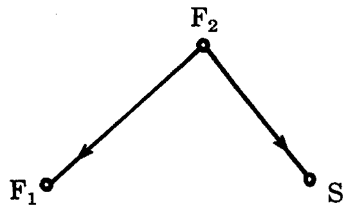


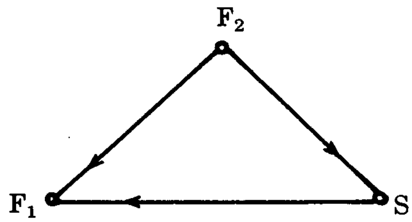
if it is circular. Rastall claims that in a case where E is not available, it is "safe" to take F as a guide to S. Because there is "never any contradiction" between F and S, in the limited type of case where F is the only available line of evidence for S, it may be taken alone as "proof."

However, Harper (1980, p. 247) argues that this justification of the use of fossils for time correlation of strata by Rastall is "singularly unconvincing." To see what really goes on, according to Harper (p. 246), we must look at how the stratigraphic paleontologist actually uses fossils to correlate strata.

> A physical property of strata, namely superposition, is used to infer relative ages of fossils, but only relative, ages at each individual local section. Taken by itself, the latter is not even a basis for inferring succession in time of fossils, let alone strata. Secondly, fossils are not dated apart from the strata that contain them; when we infer a relative age for a particular local fossil or fossil assemblage, we simultaneously infer the same age for the local strata which contain it, and vice versa.

We need to distinguish between working out local succession of fossil taxa (F_1) and determining orderly patterns of successions of fossils over a region (F_2). Then F_2 is used to determine both F_1 and S, according to Harper, as represented by the digraph on the left, below. But what about the relationship between S and F_1? Harper concedes (p. 246) that superposition of strata is used by the paleontologist to infer relative age of fossils, but only at each local section. This means that there is an arc from S to F_1 Hence the digraph of the whole structure of the paleontologist's argument is the one on the right, below, which adds an arc from S to F, to the digraph on the left.





What is clearly brought about by the digraph, however, is that there is no dicycle. The argument structure on the right is not circular! This fact would seem to be the basis of Harper's claim that, contrary to Rastall's interpretation, there is not circular reasoning in the methodology of stratigraphic paleontology.

O'Rourke (1976,p. 54) proposes that there are four ways of handling the charge of circular reasoning in stratigraphy: it can be ignored, denied, admitted, or avoided. Rastall's defence involved admission, but then-at least partially-avoidance. Harper's defence is to a small extent one of admission. He admits that the relative ages, at the local level, of strata and fossils are mutually inferred. But as long as it is only relative age so determined, there is no vicious circle. And moreover, when one looks at the larger picture, as outlined above, there is not circularity. Therefore, to a larger extent, Harper's defence is one of denial of circularity.

It seems then that circularity, as a criticism of an argument, can be rebutted, or at least defended against in various ways. It seems we are now driven even further against the wall to say if there is ever any clear situation where circularity is a clear and justifiable basis for criticizing an argument.

4. WHY CIRCLES CAN BE VICIOUS

A good theory of argument should do justice to the realities that (a) there are different contexts and objectives for argument, and (b) very often the objective of an argument is not so much a matter of deductive closure of a conclusion as of a shift in the burden of proof from one party's conclusion to the other's. Factor (a) means that different games of dialogue with different procedural rules should be recognized as legitimate, and factor (b) means that dialectical argument is often a matter of plausible reasoning, rather than deductive or inductive inferences.

Taken together, these two requirement suggest the following approach to circular argumentation. First, it seems reasonable to concede that in many contexts of argument, there may be nothing impermissible (fallacious, vicious) *per se* about an argument that goes in a circle of contains a cycle. Perhaps the circle could be bad dialogue strategy, redundant, or whatever, but that may be no reason for the person to whom the argument is directed to complain, "Fallacy!" On the other hand, there may be one special kind of context where a circular argument can be seen to violate a reasonable procedural requirement of good dialogue. This context occurs where it is acknowledged by both players that each must prove or argue from premisses that the other accepts as *more plausible* than the conclusion each prover is supposed to establish. If I am supposed to prove my thesis T_α to you, β, by this requirement I must only utilize as premisses propositions that are more plausible to you, β, than T_α is for you. The root notion here is akin to reasonably persuading or convincing as the dialogue objective. In its epistemological guise, this notion means establishing a conclusion by working from "better known" premisses.[8]

This special context of dialogue is historically mirrored in the famous passage of the *Prior Analytics* (64 b 30 ff.) where Aristotle required of a demonstration that the premisses be better known or established than the conclusion to be proven from them. Following this tradition, William of Sherwood (Kretzmann, 1966, p. 158) required that an acceptable argument can only be accomplished on the basis of "prior and better known premisses." William concluded that a circular argument can be formally valid (proceed from necessity), yet still fail to be a "useful inference" if the premisses are as doubtful as the conclusion.[9]

Of course we need to be careful here to distinguish between two faults of argument: (a) lack of premisses better established than the conclusion to be proven, and (b) circular argument. But the idea that (b) as a fallacious move is a special case of fault (a) can be brought out by seeing that adopting (a) rules out (b). Let the expression "*A* is more plausible than (better established than) *B*" be represented as: plaus (A) > plaus (B). Then for there to be a good argument from A to B, represented as $A \rightarrow B$, it is required that plaus (A) > plaus (B). But this requirement immediately rules out the possibility of having plaus (B) > plaus (A), and thereby also rules out $B \rightarrow A$. Hence a strong requirement of evidential (or plausibility in the context of dialogue) priority, will exclude any instance of circular argument.

What makes circularity unacceptable in this context is that priority is no longer only a strategic objective for a player. Priority has become a procedural requirement of a player's move to prove anything in the game. If a player fails to meet it at any move, he violates a legislated requirement of acceptable dialogue, and loses the game.

The basic problem with this strong approach however, is that in many contexts of reasonable dialogue, an arguer cannot always demand more plausible premisses from his opponent immediately. The opponent must often be given "room to argue," to proceed by way of premisses "not better known" in the hope of eventually arriving at some premisses the other party will accept as plausible. While requirement (a) may be appropriate for some contexts of argument, e.g. an account of experimental verification in scientific investigation, it is hardly appropriate to all reasonable contexts of dialogue.

An alternative approach based on the conception of plausible reasoning due to Rescher (1977) is advocated by Walton and Batten (1984). By this approach, we look at all the arguments for a given conclusion, and in each one, select out the least plausible proposition-its "weakest link." Then, looking over all the arguments again, pick out the one that has the greatest plausibility value proposition for its weakest link. Essentially, this is a max-min principle of selection. Let *p* be the conclusion at issue, *A* be the set of all arguments for *p*, and *q* be any proposition in the argument. Then the required condition, as stated by Walton and Batten (1984, p. 158) in its general form, is the following:

$$\text{(C5)}\quad \text{plaus}\,(p) = \max_{A \in A_p} \{\min_{q \in A} \{\text{plaus}\,(q)\}\}$$

Whatever precise form this plausibility condition on reasonable argument in dialogue should take-see Walton and Batten (1984) for a discussion of several alternative conditions-the bottom line is that in some contexts of dialogue it can be reasonable to require that some or all of the premisses be more plausible than (prior to) the conclusion. This relation of evidential priority gives a charge of circularity bite in contexts where priority is an appropriate requirement of reasonable dialogue.

Sometimes priority conditions like (C5) do seem appropriate, and it is a reasonable conjecture that in just such cases, and only such cases, arguing in a circle is an appropriate criticism to advance. It is in just this context that the language of "vicious" or "fallacious" circles makes sense. In our initial example about "Auckland is in New Zealand," it could be said that the circular reply violated our perception of reasonable argument because of the blatant failure of evidential priority. When arguing in a circle is wrong, it is a reasonable conjecture that the failure of a requirement of evidential priority is what is wrong with it.

However, in the majority of circular arguments we looked at, the circularity cannot be condemned as wrong or fallacious precisely because the context of dialogue fails to indicate decisively that a priority condition is a procedural requirement. The economist's argument we began with, for example, should not be declared fallacious or viciously circular by a reasonable critic unless the critic can cite evidence of an agreement, or at least a clearly agreed upon context or background requirement to argue only in one direction or the other. Similarly for the mathematician. If the objective (the problem) is to prove from *A* to *B*, and also from *B* to *A*, there need be no fallacy in solving the problem by arguing in a circle. However, if the problem were to take the well-established *A* and prove the dubious *B*, then of course sneaking *B* in as a premiss would be subject to reasonable criticism. It is a question of the objective of the argument, as agreed upon by the participants in argument, or as the context of argument suggests.

And so it is with the remaining circular arguments we examined. Even if the argument can be shown to be circular, many more steps of careful analysis may have to be taken by the critic, in order to show fairly and with reasonable justification that the argument is open to justifiable criticism because of its circularity. Talk of vicious circles or *petitio principii* fallacies can be decidedly premature in various ways. Nailing down a criticism of *petitio principii* is by no means the straightforward process that the tradition of the fallacies seemed to suggest.

University of Winnipeg

Received January 15, 1985

NOTES

1. For a more elaborate version of this example, see Walton (1984).

2. Hull (1967, p. 179) is the source of this example.

3. See John Woods and Douglas Walton, *"Petitio* and Relevant Many-Premissed Arguments," *Logique et Analyse,* vol. 20 (1977), pp. 97-110, for an account of Mill's argument and an interesting reply by Augustus DeMorgan. DeMorgan printed out that the dependency of the major premiss upon the conclusion depends in turn on the presumption that the minor premiss is true.

4. See, for example, Harary (1969).

5. This conception of "fallacy" is developed in Walton (1984).

6. This argument is based on an example used as an exercise in Irving M. Copi, *Introduction to Logic,* 4th ed. (New York, MacMillan, 1972), p. 91, to illustrate a fallacious *petitio principii.* In the Copi version, several of the argument-steps are weak, and I have tried to improve these *lacunae* to highlight the circularity as a focus of discussion. However, the argument above should be analyzed on its own merits, apart from Copi's argument that inspired it.

7. See Harary (1969).

8. Some might want to draw a strong distinction here between knowledge and belief. But from the perspective of reasonable dialogue this distinction can be seen as less critical than the point that there be some relation of priority, whether it be doxastic or epistemic in different contexts.

9. For discussion of this tradition stemming from Aristotle, see John Woods and Douglas Walton, "The *Petitio:* Aristotle's Five Ways," *Canadian Journal of Philosophy, vol. 12 (1982), pp. 77-100.*

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