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Inference and argument in informal logic

John Hoaglund
Christopher Newport University

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Title: Inference and Argument in Informal Logic
Author: John Hoaglund
Response to this paper by: Leo Groarke

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If logic isn't about inference and argument, there doesn't seem to be much for it to be about at all. So one expects logicians to distinguish the two, or if not, at least to explain why one creature goes by two different names. But they do neither. Formal logicians typically group one set of procedures together and refer to them indifferently as rules of inference or forms of argument. Informal logicians equate inference with the detachment rules of formal logic, which whisks it out of their field of interest. Only Walton[1] takes the distinction seriously, unpacking dictionary definitions of the terms and listing sub-varieties of each.

My focus here is on inference and argument in natural language, the approach that of informal logic, and my thesis is that the distinction is one of kind more than of degree. Given a set of statements exhibiting relations of logical dependency but bereft of context, it can be difficult to decide whether they constitute argument or inference. Such isolated examples are sometimes found in textbooks used in critical thinking courses, and are occasionally studied by informal logicians. But as Blair and Johnson have argued forcefully[2] for the case of argument, we will not get an adequate concept of argument by attending to such a product in isolation. We must take into account the process that produces the product. I concur, and add that attention to the process is similarly important for inference, as well as for the distinction of inference from argument.

Accordingly in Part I with an eye to process I draw the distinction of inference from argument as one of reasoning from giving reasons. I then flesh out "process" by examples of inference and argument situated in social practices that help define them as distinct. With this distinction in hand I next examine how it is not drawn in logic, both formal and informal.

In Part II the focus narrows to informal logic, within which I distinguish fallacy critics from argument analysts. No single matter has exercised the latter more than the distinction of linked from convergent arguments, which is described and illustrated briefly. Exploration of the distinction leads me to the conclusion that it closely resembles that of inference from argument. So striking is the resemblance that I contend informal logic has banished inference in name only - much of what it currently treats as linked argument is accurately described as inference. Finally I draw conclusions from this discovery for the vocabulary of the informal logician and her evaluation of argument.

Part I: Argument and Inference in Social Context and in Logic

1. <u>The Distinction of Reasoning from Giving Reasons.</u> In reasoning we begin with some given information, and then from this we logically deduce some result. The process is one of logically deducing, and the product is a new piece of information. The process may be called deducing or inferring, the product an inference. Carried out in formal logics, the process and product are sometimes called entailment. The goal of reasoning is knowledge. As C.S. Peirce puts it, "The object of reasoning is to find out, from the consideration of what we already know, something else which we do not know."[3] Reasoning of course may be sound (the new information actually

follows from the given) or unsound (the new information does not follow). Note that at least some given information is a necessary condition of reasoning. We cannot logically deduce something from nothing.

In giving reasons we start by advancing a claim or expressing a controversial opinion. In order to meet an actual or anticipated challenge, one or more reasons are given to support the claim or opinion. Writers on informal logic are generally agreed that the product — a claim backed up by reasons or evidence — is an

argument. The process of giving reasons can be conceived as one of responding to an actual or imagined critic, which may constitute a dialogue and is for this reason frequently called dialectical. The goal of argument is proof, to provide reasons sufficient to establish the conclusion. When this is the case the argument is strong, when not it is weak. The process of argument begins with a controversial claim, its sine qua non. Without the claim, we wouldn't know what to give reasons for. Without knowing how the claim was or might be challenged, we wouldn't know what would be good reasons to give.

Let us turn to social practices where inference and argument are embedded for information on the processes that engender them.

2. Reasoning Illustrated. In the Anglo-American justice system, juries in trial courts are basically triers of fact. Their task is to sift through physical evidence and testimony, oral and written, to determine what the facts of the case are. Eyewitnesses, as distinct from expert witnesses, are called to testify about what they saw, but not to draw inferences from their observations. For example, Dickenson was convicted of drunk driving by the testimony of two officers who observed his car weave in traffic, and then the driver stagger, stutter, and unable to talk on being told to get out of his halted vehicle. To a direct question (over defense counsel's objection) each officer testified that in his opinion the defendant was under the influence of intoxicants.

In reversing, the Virginia Supreme Court ruled that this question was unwarranted and elicited prejudicial testimony. The officers had presented details of the defendant's manner and behavior, and the "jury was as well qualified as were the officers to draw all reasonable and proper inferences and conclusions from the evidence."4 It is the prerogative as well as the duty of the jury to decide whether the facts presented license the inference that a defendant has committed a crime or has been negligent. The rule against inference by witnesses reserves that prerogative for them.

Distinguishing statements of fact from inferences based on facts in the legal setting confronts at least two problems. First is the confounding of opinion with inference. At one time opinion was equivalent to conjecture or guesswork - it did not have to be based on evidence at all. An inference, on the other hand, has always been a logical deduction or conclusion from given evidence - without the given evidence, there would be nothing to deduce or conclude from. Both opinion and inference differed from fact, the model of which was observation reports by eyewitnesses. However, as rulings over the years drew the line between admissible noninferential testimony and all other, inference became assimilated to opinion among the inadmissible. Today any statement arrived at by inference is classed as opinion and subject to the rule on opinion5. The merging of inference with opinion by jurists impedes communication with informal logicians who consider an opinion a claim that may need support, a creature of a different species from inference.

Second is the persistent problem of finding a language of fact sufficiently free of inference to satisfy the rule. Given the above sense of "opinion," S.L. Phipson urges that "Most language embodies inferences of some sort, it is not possible wholly to dissociate statements of opinion from statements of fact."6 This poses a considerable problem for judges, called on repeatedly to rule whether a statement is factual and hence admissible.7 The difficulty seems to approach the insuperable if, as J.B. Thayer claims, "in a sense, all testimony to matter of fact is opinion evidence, i.e. it is a conclusion formed from phenomena and mental impressions."8 At this point the law might be in a position to benefit from work by critical thinking theorists with an epistemological bent, who have shown interest in the fact-opinion distinction,9 and who, one suspects, would be sent scurrying by statements like Thayer's for senses in which at least some statements of fact are not readily construable as opinion. These two problems notwithstanding, the distinction of statement of fact from inference (opinion) is ruled on routinely in courts today. We note that it is not a distinction of fact from argument.

When we turn to the natural and social sciences, we find one favored method of investigating nature and society called inference to the best explanation, or reasoning to the best explanation. Typically there is a

society called inference to the best explanation, or reasoning to the best explanation. Typically there is a problem to solve or a phenomenon that puzzles and needs explaining (the favored explanation in the sciences is causal). For example, Ewald[10] grapples with the question whether the diarrhea associated with <u>Vibrio cholerae</u> infection is the body's defense against the toxin or "a manipulation of the host to facilitate transmission of the bacteria." He infers from the fact that fluid loss is what causes the death of patients that diarrhea is not the body's defense. (A defense that kills the defending host is not conducive to survival.) Knowledge that the fluid flow is caused by the toxin is important both for treating the patient and for reducing transmission of the disease to others. Here again we find the distinction between given facts and inferences drawn from these facts.

Scientific reasoning gives priority to observations over inferences drawn from them. "Observation statements tend to be more reliable than inferences based on them."[11] This is illustrated in Question 29 of the <u>Test on Appraising Observations,</u>[12] where testees must decide which statement uttered by two different persons viewing the same scene at the same time is the more reliable.

A. Those mountains have several white streaks going from the top to the bottom.

B. Those streaks are small streams, I would say.

Here A is keyed as the more reliable statement, B being an inference based on it.

Common to these cases of reasoning or inference is the novelty of the result - we find out something we didn't know before. We have noted but not explored the difficulty of distinguishing observation statements from inferences. If the distinction cannot be upheld, then jurists and scientists are holding that inferences are more reliable than inferences, a position we might expect of Gertrude Stein but not of Anthony Scalia or Hans Reichenbach. None of the above examples of inference is inherently controversial - each result has been logically extracted from given information. But each is also potentially controversial. Any observation statement can be challenged by a conflicting observation statement, which occurs not infrequently in an adversarial judicial process.

3. <u>Giving Reasons Illustrated</u>. If inference is potentially controversial, argument is essentially so. People give reasons for their positions (or argue) on where society is heading and whether the trend is good or bad. Robert Putnam created a stir in "Bowling Alone"[13] with the thesis that local associations are the bedrock both of civic virtue and of economic well-being, yet are on the decline in the U.S. The implication is that virtue and prosperity will crumble along with the bedrock. Nicholas Lemann[14] does not dispute the bedrock thesis but he does reject Putnam's prognosis, giving these reasons for his opposed stand:

A. Putnam holds that civic virtue, once established, lasts for centuries, and that local associations, its bedrock, were in good shape in the U.S. as recently as 1960.

B. Some important local associations are on the rise, e.g. U.S. Youth Soccer, Little League, restaurants, small businesses.

C. Some association decline e.g. bowling leagues may be more indicative of socio-economic change

(declining urban blue-collar neighborhoods vs growth in the suburbs).

Reason A supports the opposed thesis that virtue will not crumble with its bedrock, and reason B the contrary thesis that not all associations are on the decline. Reason C together with B supports the thesis that what appears to be absolute decline may only be a change in kind of local associations. The controversy turns on whether local associations are on the decline, and if so whether civic virtue is dwindling along with them.

Clashing views on which direction America ought to be headed are certainly not new. The constitution

proposed in 1787 for the United States continued a fierce debate over what powers the federal government would have, with Thomas Jefferson and others arguing that a bill was needed to secure important rights for the citizens. In Federalist Paper No. 84 15Alexander Hamilton gives these among other reasons for the thesis that a bill of rights is not needed.

D. The Constitution specifically grants important rights (e.g. writ of habeas corpus, no ex post facto law, no granting of titles of nobility).

E. While the Constitution does adopt the common law and statute law of Great Britain, any of this can be repealed by ordinary legislative power.

F. Bills of rights (e.g. the Magna Carta) protect subjects from the sovereign. But here the people are sovereign and need no protection from themselves.

Here too we are in the arena of controversy, with Hamilton aware at the time he wrote that his thesis was disputed and in need of rational support. Both of these examples are cases of argument. Hamilton argues for a thesis as does Lemann.

To draw the balance of these illustrations, when we consider the distinction of argument from inference as both are embedded in social practices, its broad outline is clear. However exercised trial courts are with the fact-opinion distinction, they appear not to have similar difficulty with that between inference and argument. The closing arguments by counsel to the jury are not likely to be confused with an eyewitness inference that is ruled inadmissible. The scientist distinguishing an inference from the observation statement on which it is based isn't likely to confuse this process with arguing for the importance of her research in support of a grant proposal to the National Science Foundation. But note that in each of these cases we do have a meaty slice of process to aid in identifying the product.

4. Inference and Argument in Informal Logic. Logic seems little interested in the distinction. Since informal logic is more concerned with the giving of reasons in contexts similar to those cited above, it can serve as a starting point. We note two trends, neither favoring a clear distinction of reasoning from giving reasons.

i) The first trend, particularly in the writing of Johnson and Blair, is to consider inference a process and product of formal logic alone, and as such not a proper object of study for informal logicians. The informal logician must draw a line between formal logic and informal logic to demarcate informal logic as a field of study. In the draftmanship of Johnson and Blair16 the line between formal and informal logic follows a route between inference and argument. Informal logic is about argument or argumentation in the dialectical sense, while formal deductive logic concerns itself with implication or inference. Johnson and Blair do not favor use of the term "inference" in informal logic. Inference is not necessarily dialectical in that it does not depend on exchanges between two persons. It is not necessarily controversial, and it can progress linearly; argument on the other hand is essentially controversial, so it can progress only against

the background of diverse viewpoints. To some extent informal logicians have followed the recommendation of Johnson and Blair: "inference" appears quite infrequently in the titles of articles in the journal Informal Logic, and is little written about by informal logicians as a process of deducing a new result from given information.

ii) A second trend is to assimilate natural-language inference to argument, allowing the term "inference" to further dwindle in the logician's vocabulary. It is a signal advance of informal logic to

locate and study argument in the context of human projects and purposes. The leaders of this trend are fallacy theorists such as Ralph H. Johnson, J. Anthony Blair, and Douglas Walton, and linguistic pragmatists of the Amsterdam School of Argumentation under the leadership of Frans van Eemeren and Rob Grootendorst17. They agree on the importance of understanding argument by focusing on the

Rob Grootendorst[17]. They agree on the importance of understanding argument by focussing on the socially interactive process which produces it.

Many logical fallacies commonly classified as fallacies of relevance can be understood as violating rules of reasonable procedure in a dialogue.[18] One can always criticize an <u>ad hominem</u> by indicating that the premises are irrelevant to the conclusion, making the argument weak. But exploring the dialogue in which it occurs, the roles of the participants, which moves are open to them and which closed, and which moves they <u>ought</u> to make, gives us a richer and fuller awareness of why an <u>ad hominem</u> is a fallacy. An issue of substance is being debated and serious reasons or evidence occupies the field, to all of which personal circumstances and characteristics of the participants are at most of peripheral significance. The participants have a duty to stick to the point, which one of them violates by dragging some personal trivia about the other into the debate. Thus the <u>ad hominem</u> fallacy, and Walton[19] defines argument accordingly:

> Argument is a dynamic social interaction, in which participants engage in a dialogue exchange ... a social and verbal means that two parties can undertake together in order to resolve a conflict or difference between them.

Blair and Johnson[20] also stress the dialectical aspect of argument:

> To say that argument is dialectical ... is to identify it as a human practice, an exchange between two or more individuals in which the process of interaction shapes the product.

These four features are prominent in argument as dialectical:

i) As product, an argument must be understood against the background of the process that produced it, i.e. background beliefs shared, or debated by the community.

ii) The process of argumentation presupposes at least two roles - one a questioner of a proposition, the other the answerer of these questions.

iii) The process of argumentation is initiated by a question or doubt of a proposition.

iv) Argumentation is purposive - the questioner challenges the proposition, the answerer defends it.

But as James B. Freeman points out[21], any inference can be challenged and hence brought into the sphere of controversy. The result of this has been a tendency in informal logic to assimilate inference to argument by stressing what it has in common with argument and ignoring what is distinctive to it.

The result of these trends has been to banish the term "inference" from informal logic, and assimilate some natural-language inference to argument by ignoring features distinctive of it.

5. <u>Inference and Argument in Formal Logic</u>. Nor does formal logic provide appreciably more help with the distinction. Better said, what help it does provide is indirect. Formal logics are not concerned with actual statements in natural language but with what are claimed to be forms of such statements. For example the universal affirmative categorical statement "All S are P" is said to be the logical form of numerous actual natural-language statements resulting from substituting a count noun for "S" and a quality word for "P". An example would be "All dogs are hairy." Or "p.q" is said to be the logical form of many natural-language statements resulting from substituting statements determined to be simple in certain respects for "p" and "q" and joining them with "and". Here an example is "Summer has arrived and pork bellies are moving higher." Formal logics are also concerned with forms of inference like modus ponens, into which different contents can be substituted.

In the 20th century formal logicians became increasingly occupied with entire formal languages. Initially this was motivated by a desire to clarify the foundations of mathematics, but recently such languages appear to be studied for their own sake. Such a formal language might contain placemarkers like p and q for statements from natural languages that satisfy certain criteria, some primitive logical operators or connectives like "v", (sometimes called syncategorematic terms), rules of syntax for creating well-formed formulae, rules of equivalence, and rules of inference or detachment. Formal logicians occupy themselves with challenges like showing such a language to be consistent (you cannot prove from its rules both a proposition and its contradictory opposite). I have expanded here my conception of the distinction of formal from informal logic (as concerned with logical relations of statements in natural language) because it has been commented on differently by different writers, and I lack the space to deal here with these differences[22].

From this it appears clear that formal logic is not concerned with argument in our sense. People may heatedly dispute whether smoking should be banned in certain places (e.g. transatlantic flights), or whether American manufacturers should transfer jobs to low-wage countries. But a propositional function like

$(x)(\exists y)[Fx \supset Rxy]$ stirs no passions and arouses no debate. It does not need shoring up with reasons because it makes no claim that anyone doubts or disputes.

There is more of a case for formal logic being concerned with inference. Given certain formulae and rules, it is possible to generate or detach other formulae. But this process seems only marginally less distant from inference as reasoning (illustrated in our above examples) than from argument. A witness inferring such a formula from observed facts would presumably be ruled irrelevant. Scientists do not infer well-formed formulae from observed facts. If formal logic has something to offer the study of reasoning in natural language it must be indirect.

Might formal logic not be in some way the logical structure of such reasoning? This claim may underlie the work of some formal logicians, but there is scant evidence to support it. The logical system developed by Russell and Whitehead in Principia Mathematica[23] is the most influential of the 20th century. These formal logicians take as their basic materials five axioms (in which certain logical constants or operators are implicitly defined) and two rules of derivation. They then proceed by repeated application of the rules to derive their theorems. The problem with the claim that the axiomatic method gives the structure of reasoning is, as Barth and Krabbe put it[24], "axiomatic deductions bear hardly any resemblance to actual processes of human reasoning."

The claim to be the logical form of inference in natural language might be considered by some more plausible for subsequent innovations in first order predicate calculus where the inference schemata of the German logician Gerhard Gentzen[25] replace the axioms. But the claim for this "calculus of natural deduction" of a "close affinity to natural reasoning" misleads easily. There isn't anything natural about natural deduction if by "natural" you mean reasoning about something substantial in a natural language. So long as formal logic remains truth functional, and purists countenance no other, while most natural-language inference remains decidedly non-truth functional, the gulf dividing the two will be very difficult to negotiate. The paradoxes of material implication are only the most widely noted stark departure from inference in natural language. Disjunctive addition, which Fang, with uncharacteristic restraint, calls "nonsensically arbitrary,"[26] is equally contrary to natural-language inference.

Summing up the result of Part I, we have viewed evidence that inference and argument are two distinct entities when studied in the social practices where they are imbedded. But logic offers little help clarifying the distinction between them. Most informal logic focuses on argument and ignores inference. Formal logics become formal by abstracting from the social practices and even the natural language of argument and inference, and at this distance the distinction is of no consequence.

Part II: Informal Logic and the Linked-Convergent Distinction

6. <u>Fallacy Critics and Argument Analysts</u>. My result so far has been positive in distinguishing inference from argument, but negative in surveying what logic does <u>not</u> do to clarify the distinction. I want now to attend more closely to one development in informal logic that holds some promise to illuminate it. My contention is that the distinction of linked from convergent arguments captures some features of the inference-argument distinction.

A preparatory remark on developments within informal logic is needed. Informal logicians differ from formal in assigning central importance to argument in natural language, and in the conviction that most such argument is little amenable to analysis and evaluation by formal techniques. Of course it's one thing to jettison formal techniques, but quite another to come up with more promising ones. Any logician — formal or informal — who claims the applicability of her tools to natural-language argument confronts first the problem of separating off the argument she will work with from all other non-argumentative discourse. It is generally agreed that logicians will deal with cases of reasons advanced in support of a claim. But separating out such cases for analysis and evaluation can leave one with huge swatches of argumentative prose, a staggering amount of material. The next step — bringing the analytical technique to bear on this material — divides the schools. The formal logician at this point looks for what corresponds to the materials of her logic — quantified subjects, simple statements conjoined or disjoined, conditional statements and the like. Most complex argumentation in natural language scans poorly with this instrument.

Informal logic developed two different approaches: fallacy criticism and argument analysis.27 Each fallacy critic has a longer or shorter list of informal fallacies, though attention gravitates toward what John Woods affectionately terms the "gang of eighteen."28. The basic working method of the fallacy critic is to check an argument against the list of fallacies. If it commits none of them, it is presumed strong. Only presumed, because an argument might escape all the fallacies on the list yet still be weak because of an inadequate premise, or because the premises are irrelevant to the conclusion in a way not captured by any listed fallacy. The argument that passes this additional muster is strong. A traditional division of informal fallacies into those of relevance and those of equivocation or ambiguity still exerts influence in textbooks.29 Fallacy theorists have recently divided argument into a semantic core and a pragmatic structure (Walton) or a dialectical tier (Johnson), where fallacies of equivocation tend to occur in the semantic core and those of relevance in the pragmatic structure/dialectical tier.30

The distinction between formal and informal fallacies calls for brief comment. By axiomatic, natural deduction, or some other (e.g. truth-table) technique the formal logician distinguishes valid from invalid argument forms. What makes an argument in natural language valid is its instantiating a valid argument form such as <u>modus ponens</u>. An invalid instantiates an invalid form, such as affirming the consequent in a conditional argument. One would like to illustrate formal fallacies with an example from one of the more developed logical calculi. But fallacy charges typically arise in the dialectical context of charge and counter-charge when matters of substance are being debated. There has been no sustained application of logical calculi to matters of substance in the arena of public debate, or even in academic disciplines other than the theoretical foundations of mathematics, the development of artificial languages, and artificial intelligence. So to my knowledge there are no common, named fallacies associated with these calculi.

Argument analysts agree with formal logicians in putting more emphasis on the structural aspect of reasons advanced in support of a claim, and indeed one pioneering analyst textbook employs no more31. Most analysts are guided in part by words or phrases often used to introduce conclusions e.g. "thus," "therefore," or premises e.g. "because," "since." Such indicator words are employed in almost all textbooks dealing with natural-language argument today. But in the new wave textbooks of the 1970s, one finds them in the argument analyst texts of Thomas (1971) and Scriven (1977), and not in the fallacy critic

texts of Kahane (1971) or Johnson and Blair (1977).[32]

With no accepted fallacy types to assist them, argument analysts came to identify four different types of argument based upon how premises can combine to support a conclusion: serial, convergent, divergent, and linked.[33] The four types were first clearly distinguished with this terminology by Stephen Thomas.[34] It is important to note that these distinctions are primarily descriptive, used to classify arguments in natural language. This is so because they are commonly represented in teaching material as well as theoretical discussions by arrow diagrams sometimes called argument patterns. The unsuspecting may confuse these argument types with the argument forms of formal logic, which they are not. A valid argument form in formal logic has probative force - substitute in true premises and you have established a conclusion. The arguments types of the analysts have no probative force. There is no distinction of valid from invalid serial arguments based on form. To identify an argument as one of a certain type is to note that evidence is being deployed in a certain way to support a conclusion.

7. Linked and Convergent Arguments. In this argument typology, it is the distinction of linked from convergent arguments that has attracted most attention. In arguments of these basic types, two or more premises are advanced as providing direct support for one conclusion.[35] In linked argument, the premises depend on each other for whatever support they provide the conclusion; in the convergent, each premise provides a measure of separate, independent support. Diagrams depict how the premises are differently advanced in support of the conclusion:
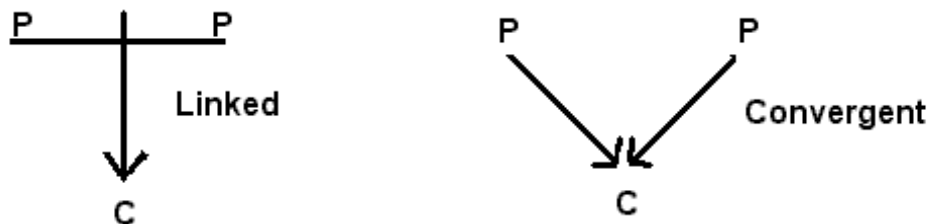
For the not-so-few cases in which one may encounter difficulty deciding of a given argument whether it is linked or convergent, there is a practical test. One can mentally cancel or block out each premise and inquire how that affects the strength of the argument. In the linked argument there is usually at least one premise the loss of which greatly diminishes the strength of the argument. In the convergent there is often at least one premise the loss of which little affects the strength of the argument. Further we may note that the strength of each type calculates differently. In assessing the strength of the convergent argument, we calculate what each premise contributes separately, then add this up, and this sum constitutes the strength of the argument. If a linked argument is to be strong, there is a leap of support (the terminology is Yanal's[36]): the argument is appreciably stronger than the sum total of what each premise contributes individually. Yanal illustrates this by arbitrarily assigning a numerical probability to each premise: in the convergent argument the probability of the conclusion calculates as probability ordinarily does; in the linked, the support of the conclusion leaps beyond the calculation of numerical probability.

The following example of a linked argument is from a collection gathered for teaching purposes, while the convergent is from a lawyer making a case that certain uses of the law are ill-advised.

(1)

<Macro lenses are misnamed.>

(2)

<When used alone most will produce only a half-life-size image>
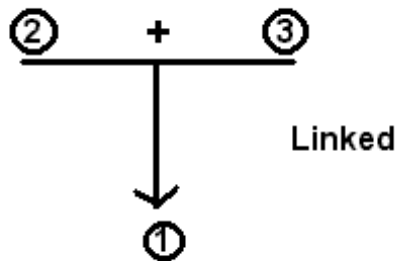
(3)

<which is not in the photomacrography range.>

Linked

Here the facts in (2) and (3) license the conclusion (1). (2) by itself provides quite weak support for (1). Linked with (3), (1) can be inferred.

(A)

<Precision that makes the law the same for everyone does not

ensure fairness.> <Uniform sentencing guidelines (by weight of

(B)

drug) yield the same sentence for a seller of 1.5 grams of LSD

impregnated in 100 grams of blotter paper as for the supplier

apprehended with 20,000 doses on his person.> <Fire codes

(C)

requiring enclosed fire escapes in transient lodging threaten to

close many bed and breakfasts in old Upper New York State farm-

houses.> <EPA rules requiring scrubbers in all coal-burning

(D)

power plants cost $4 billion and leave eastern plants that burn

dirty black coal with higher pollution levels than western plants

using clean brown coal had <u>before</u> they installed scrubbers.>
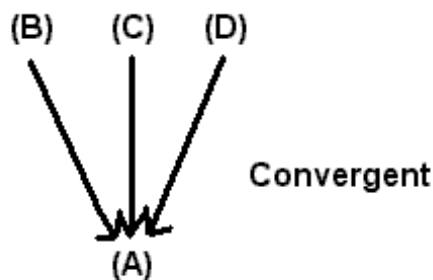
(B), (C), and (D) are separate, independent reasons given in support of (A). The loss of any one of the three premises does weaken this argument, but not nearly as much as the loss of either premise weakens the above linked one.

The linked-convergent distinction is widely acknowledged in informal logic, though it is not easily drawn in practice and there are troublesome borderline cases. It is not surprising that some

writers have called for it to be abandoned. In his initial analysis Yanal(36) collapses linked arguments into convergent. Yet he changed his mind (assuming that publisher pressure was not a factor) because the distinction plays a prominent role in his 1988 textbook.[38] No such waffling for Conway[39], who finds certain ways of putting the distinction somewhere between "puzzling and incoherent." He urges, "For centuries we got along well enough without the notion of 'convergence.' And we can very well do without it now."

Yet the distinction lives on, it thrives, and even persists in the work of those who like Yanal would like to

get along without it. Why is this? My contention is that a very important reason for the vitality of the distinction is that it marks a dividing line between two different intellectual processes, and that part of the difficulty drawing the distinction is that the products differ typically much less than the processes. Most cases of inference will scan as linked arguments, while many cases of shoring up a challenged contention will scan as convergent. So the distinction of linked from convergent marks a rough line between reasoning (inference) and giving or backing up with reasons (argument). The linked harbors those attempts to enlighten us by drawing some novel conclusion from what we already know - the goal here is discovery, to replace ignorance with knowledge. Cases that argue from what is conceded to what is doubted or disputed find their home in convergent. The goal of the convergent argument is to supplant doubt with acceptance, to wrest the sceptic to acceptance or even conviction.

In an extensive survey of ways the distinction is drawn, Walton40 finds it implicit in a work published in 1965, several years before Thomas' textbook appeared in 1973. The 1965 work is not mentioned by any of the early writers on informal logic or practical reasoning, yet with Thomas the distinction became established. This suggests that the way in which the distinction is drawn and the manner in which it is conveyed may be of considerable importance. To me, given the proximity of this distinction to that between inference and argument, what puzzles is that the distinction was not drawn and its importance recognized far sooner. From the turn of the 20th century philosophical logicians were preoccupied with mathematical logic, and it wasn't until Wittgenstein's shift of attention in his lectures and discussions of the 1930s that much interest was shown in a logic of natural-language discourse.

A philosopher influenced by Wittgenstein writes in 1945 of a court case where the facts are agreed on yet opposing attorneys "are concerned with whether Mr. A who admittedly handed his long-trusted clerk signed blank cheques did or did not exercise reasonable care."

> In such cases we notice the process of argument is not a chain of demonstrative reasoning. It is a presenting and representing of those features of the case which severally co-operate in favor of the conclusion, ... in favor of calling the situation by the name which [the reasoner] wishes to call it. The reasons are like the legs of a chair, not the links of a chain. ... the reasoning is not vertically extensive but horizontally extensive - it is a matter of the cumulative effect of several independent premises, not of the repeated transformation of one or two. And because the premises are severally inconclusive the process of deciding the issue becomes a matter of weighing up the cumulative effect...

Wisdom41 could be describing the distinction between linked and convergent arguments as drawn by many informal logicians today.

8. The Distinction Explored. As I view it, despite the tendency of some informal logicians to shun inference, informal logic, at least the argument analyst school, has imported some natural-language inference into its field of study and called it linked argument. That the import took place is a good thing - a century of mathematical logic has shown little or no interest in natural-language argument or reasoning. That the import took place under the "linked argument" label is a mixed blessing. It is a blessing because it marks a difference from convergent arguments, but the blessing is mixed because the "argument" label tends to obscure features peculiar to inference.

I want here to explore briefly two such features: inferences tend to be stronger than arguments, and inferences are more self-contained than arguments.

i) Tend to be stronger. "Inference" is a success word; "argument" is not. Discourse rightly termed "inference" has been evaluated in a way that discourse called "argument" has not. Referring to our above case of inference posing as linked argument, to infer (1) from (2) and (3) is to succeed in drawing (1) as a logical conclusion from given facts (2) and (3). If (1) cannot be concluded from (2) and (3), there is no inference. To argue that claim (A) is supported by reasons (B), (C), and (D) is to advance a claim of

inference. To argue that claim (A) is supported by reasons (B), (C), and (D) is to advance a claim of support. (B), (C), and (D) may actually provide no support for (A); this does not, however, prevent the discourse from being argument.

In J.L. Austin's terms42, arguing involves a perlocutionary force which inferring does not. My speech act of claiming that evidence supports a conclusion constitutes an argument; my analogous speech act of claiming that a conclusion can be deduced from given facts does not similarly constitute an inference. Austin terms inference "verdictive" (we judge it successful), argument "expositive" (does not involve value judgment). To say "I infer (1) from (2) and (3) but (2) and (3) actually provide no (or inadequate) support for (1)" is to say "I infer (1) from (2) and (3) but I do not infer (1) from (2) and (3)." On the other hand I can say "I argued that (A) was established by (B), (C), and (D), but later someone pointed out my glaring oversight and I realized that (A) received no support at all." My earlier discourse doesn't cease being an argument. It becomes a fatally flawed one. A necessary and sufficient condition of discourse being inference is that a conclusion is deduced from given data. It is a sufficient condition of discourse being argument that given evidence support a conclusion, but it is not a necessary one.

Inference in natural language, coming to the gate of informal logic, was refused admission as a matter of official policy. But it occurs so frequently and widely that informal logicians could not avoid it, so they have

dealt with it by assimilating it to argument. Ensuing pressure on the concept "argument" may be partly responsible for the linked-convergent distinction, and has at least almost certainly contributed to it. Yanal's "leap of support," for example, as characteristic of linked argument, actually identifies inference posing as argument. Either the support "leaps" due to the linking,

and we have a quite strong argument, or it doesn't, which leaves a quite weak one. This is similar to inference, where a conclusion is either inferred or it is not.

If a significant number of linked arguments are actually inferences, then on a scale from very strong to very weak, linked arguments should tend more than convergent to cluster at the extremes. To test this hypothesis - since I interpret the linked-convergent distinction to be descriptive of ways premises are advanced in support of conclusions in natural-language argument - I want to turn to studies of a good number - say 30 to 40 - of linked and convergent arguments to examine how they are evaluated by the scholar analyzing them. Yet I have searched for such studies in vain. Not even in textbooks and their solution manuals do we encounter any extensive collection with contrasting analyses and evaluations of examples of these two basic argument types. So the data that would confirm or disconfirm remains to be gathered.43

ii) More self-contained. Linked arguments seem also to borrow from inference the feature of being more self-contained than convergent ones. In the model inference, some facts are given and by reasoning a conclusion is drawn from them. In many cases, most of the facts must be in before the notion of inferring something from them even arises. Convergent arguments, by contrast, have a tendency to open out into the dialectical tier noticed by writers like Walton and Johnson(30). We know that we are dealing with one whole argument, but the process of analyzing it leads to testing the reasons, shoring them up or abandoning them for others just turned up under the pressure of the external critic.

We find interesting evidence for this feature in the phenomenon of unstated premises. The unstated premise we seek for a given argument provides a piece of information important for establishing the conclusion. In his study of unstated assumptions Ennis44 distinguishes between backups and gap-fillers. Of any substantial argument (as opposed to an argument form) one may ask what is assumed in asserting a premise to be true, and the response can count as a background assumption. Of the above convergent argument we may ask whether fire codes are written with mainly highrise or multi-story city hotels in mind. If so, then this clarification counts as a background assumption of that premise. Some writers suggest45 labeling background assumptions "assumptions" rather than "assumed premises." The

point of the search, in this and other cases, is to uncover any important assumption that bears on the strength of the argument, as this one appears to do. The premise that rests on a false assumption will be itself false or at least weakened, and the argument may be correspondingly weaker.

Once the background-gap filler distinction is drawn, however, our attention goes to the gap-filler. Arguments where a gap between premises and conclusion can be filled with one or more unstated premises tend nearly always to be linked. Before there existed any considerable amount of research literature in informal logic46 problems like that of the unstated premise were addressed in textbooks. Scriven47 presents one gap-filler example which he himself diagrams as linked. Of three problems later posed for students to work, no. 2 is clearly a gap-filler and linked, no. 3 a background assumption, and no. 4 difficult to decide. Nosich48 speaks of supplying missing premises as filling gaps. His diagrams are of no help to us in deciding whether his examples are convergent or linked, since he diagrams all convergent arguments the same as linked. The examples he presents and discusses where the supplied premise is clearly a gap-filler are all linked.

As theoretical literature on unstated premises came on the scene, Burke49 followed the Ennis distinction of gap-fillers and backups, restricting his attention to the former. He discusses how other writers treat their examples but provides none of his own, so we are unable to judge whether they would be linked or convergent. Grennan50 restricts his attention to syllogistic enthymemes. These would have linked diagrams, of course, but as formal rather than informal arguments they are not relevant to the above claim. Gough and Tindale51 present three examples of gap-fillers: the first is clearly linked, and the remaining two are arguments by analogy. Arguments by analogy are linked because if either the statement of the subject (focus) or that of the analogue is lacking, there is no analogy.

Gap-filler terminology is particularly appropriate for inference because of what inference implicitly claims. The claim is that we have a certain amount of information given as premises, and that the conclusion can be inferred from them. The argument analyst then discovers a gap between the stated premises and the conclusion, which she fills in with one or more unstated premises. At this point the argument is evaluated as weak or strong. The linked argument stands by itself, "a coherent whole"52 purporting to establish its conclusion. The linked argument missing a premise is a gestalt in need of something to fill its gap and produce closure.

By contrast the convergent argument emerges from an on-going dialectical process of positions taken, disputed, defended, modified and so on. It tends more to have a history than the linked. One needs a fuller knowledge of the process that produced it in order to grasp and evaluate it. We need to know how it relates to surrounding or adjacent considerations. The convergent argument is in more need of the pragmatic structures of Walton or dialectical tier of Johnson, while the linked is more easily handled at the level of the semantic core.

9. <u>Consequences for Informal Logic</u>. If inference is indeed, as I maintain, being treated as linked argument in informal logic, then (i) we need to re-assess the scope of informal logic, and (ii) a specific approach to evaluating arguments may need revising.

i. <u>Reassessing scope</u>. It is generally agreed that informal logic comprises the theory and critique of informal logical fallacies as well as the analysis and evaluation of argument in natural language. The most influential writing to date on the scope of informal logic places inference beyond its border.(16) But that is because inference is considered only as the application of detachment rules in formal logics. Certainly inference as a reasoning process - deducing some novel conclusion from given facts or information in natural language - is widely used. I suspect this is one reason why argument analysts captured it in their broad net.

Does inference belong in the scope of informal logic? If my analysis is correct, it is already there, having

been treated by

argument analysts from the start as linked argument. For philosophical logicians, at any rate, who are by profession supposed to be reflective, it may be advantageous simply to realize that in informal logic we are already dealing with inference under another name. Earlier attempts to do away with all or most linked arguments have not met with success. So presumably informal logicians are convinced that their techniques apply to linked arguments. If this is correct, the same techniques should apply to inference to the degree that inference is co-extensive with linked argument.

Is there anything to be said for calling at least some inference "inference"? In addition to the benefit of improved self-understanding just noted, we would be in a better position to communicate beyond the border of the discipline to the general educated public, which today knows inference as "inference," not

"linked argument." Jurists and scientists, to advert to examples cited above, may be better served by more clarity on inference in their endeavor to distinguish it from fact or observation. So it appears advisable to accept at least some natural-language inference into informal logic, and to recognize it as inference.

ii) <u>Evaluating arguments as inferences</u>. There is a persistent and puzzling tendency in informal logic to analyze arguments and evaluate inferences, even in some of the best writers in the field. For example, David Hitchcock in his textbook[53] portrays argument structure yet checks inferences. If we are analyzing argument, shouldn't we also evaluate argument? Or if we are evaluating inference, shouldn't we also analyze inference? If inference and argument are one and the same, why refer to it by two different names? This is almost certain to confuse the reader, and perhaps even the writer as well. The practice becomes less puzzling if the analysis is of the way the claim is made (argument structure) and the evaluation addresses whether the claim is actually sustained (inference). But this raises the important question whether a convergent argument can be strong only if its conclusion can be deduced or inferred from its premises.

For another example, we can take the notion of warrant introduced by Toulmin[54] in one of the foundational works of informal logic. A warrant, license, or justification is needed to substantiate the claim that the conclusion of an argument follows from its premises. Toulmin's focus in this work and in the co-authored textbook based on it is clearly on argument and its analysis. Yet the warrant is never an argument warrant, again a puzzling turn. Toulmin introduces warrants as "inference-licenses," contrasts them with items of information, and cites Gilbert Ryle as the source of the notion.[55] Given the appropriate warrant, the inference from the data to the conclusion is justified; absent this warrant, no conclusion can be inferred. So again, to decide that we have an inference is to decide that there is enough support to assert the conclusion. Evaluating an inference is evaluating an argument.

This method too seems inadequate for evaluating convergent arguments: the requirement of inferential strength is too stringent. A given convergent argument is strong when it is initially plausible, its premises survive scrutiny for reliability and relevance, and placing it in the dialectical tier produces no unacceptable consequences following from its premises or conclusion and no

counter-arguments to weaken it considerably.

Conclusion

In I evidence was presented that, considered in some social practices where they are carried out, inference and argument differ as reasoning from giving reasons. My finding is that logic - both formal and informal - has shown little interest in carefully distinguishing the two, with informal taking inference solely as a formal procedure and relegating it to formal logic.

In II a distinction is drawn (in informal logic) between fallacy critics and argument analysts. Both focus on argument in natural language, the former evaluating it against informal fallacies, the latter employing for analysis a typology based on ways premises relate to conclusions in such natural-language arguments. Of these ways, the linked and convergent have attracted most attention. Controversy persists over whether and if so, how, their distinction is to be drawn, and it does so at least in part, I contend, because this distinction also roughly marks the distinction between inference and argument, reasoning and giving reasons.

Inference more than argument tends to be an all-or-nothing affair - the reasoning either attains its goal or it

doesn't. The conclusion of an argument may receive different degrees of support depending on the quality and the number of reasons advanced. Here linked argument, with its "leap of support," resembles inference while convergent argument, with its separate, independent premises, resembles argument as giving reasons. Linked argument also resembles inference in being more self-contained, which means more readily evaluated at the semantic core, less dependent on the dialectic tier. An argument analyzed as missing a premise - needing a gap filled - will usually be a linked argument. The convergent argument, rather than having a gap, tends to open out to an entire dialectical tier.

Informal logicians should acknowledge that they are already treating some natural-language inference (reasoning) under the "linked argument" label. It is appropriate to assess inference by the standard of whether the conclusion follows logically (can be deduced from) the premises. The same standard is not in general appropriate for convergent arguments. A convergent argument may be sound in that the conclusion is supported by the preponderance of the evidence after attending to the dialectical tier, yet we may hesitate to say that the conclusion is logically deduced from the premises.

We should also use "inference" in informal logic. It fits most strong linked arguments, though to preserve Austin's verdictive sense we cannot apply it to the weak ones. Welcoming the term into our working vocabulary would enable us to better understand our own work, to communicate more effectively with colleagues in other disciplines, or with those in the professions, as well as in matters of daily life.

Endnotes

1Douglas N. Walton, 'What Is Reasoning? What is an Argument?' Journal of Philosophy, Vol. LXXXVII (1990), pp.399-419.

2Ralph H. Johnson, The Rise of Informal Logic (Newport News: Vale Press, 1996), p. 91f.

3'The Fixation of Belief' in The Essential Peirce, ed. by Nathan Houser & Christian Kloesel, Vol.I (Bloomington & Indianapolis: Indiana University Press, 1992), p.111.

4Dickenson. v Town of Christiansburg (201 Va. 342). I am indebted to Patrick Grace III for this reference and that in note 7 below.

5George Teschner, 'Semiotic Contrasts between Trial and Discovery,' p. 3. I am grateful to the author for supplying a copy of this paper.

6S.L. Phipson, On Evidence, 13th ed., ed. by MN. Howard, R. May, and J. Huxley Buzzard (London: Sweet & Maxwell, 1982); quoted in Carol A.G. Jones, Expert Witnesses (Oxford: Clarendon, 1994), p. 102.

7'...determining whether a particular statement should be classified as an opinion or as a fact is often an extremely difficult task, as many a trial judge who has been forced to spend hours wading through a stack of medical records sorting out fact from opinion will testify' Charles E. Friend, The Law of Evidence in

Virginia, 4th ed., Vol.II (Charlottesville: The Michie Co., c. 1993), p 4.

8J.B. Thayer, <u>A Preliminary Treatise on Evidence at the Common Law</u> (Boston; Little Brown, 1898; reprinted New York: Rothman Reprints, 1969), p.524. See also Jones, <u>Expert Witnesses</u>, who quotes this source (p.103).

9For useful distinctions, e.g. Perry Weddle 'Fact from Opinion,' in Trudy Govier, ed., <u>Selected Issues in Logic and Communication</u> (Belmont: Wadsworth, 1988)) pp.55-64.

10Paul W. Ewa1d <u>Evolution of Infectious Diseases</u> (Oxford: Oxford University Press, 1994)

pp.23-37.

11Stephen P. Norris & Ruth King, <u>The Design of a Critical Thinking Test on Appraising Observations</u> (St. Johns, Newfoundland: Institute for Educational Research and Development, Memorial University of Newfoundland, 1984), p. 14; <u>cf.</u> Robert H. Ennis, <u>Critical Thinking</u> Upper Saddle River NJ: Prentice-Hall, 1996), pp.74-76.

12In Norris & King, <u>op. cit.</u>, pp 127-150.

13Robert Putnam, 'Bowling Alone,' <u>Journal of Democracy</u>, Vol. VI No.1 (1995), pp.65-78.

14Nicholas Lemann, 'Kicking in Groups,' <u>Atlantic Monthly</u> (April 1996)) pp 22-26.

15Alexander Hamilton <u>et al.</u>, <u>The Federalist Papers</u>, ed. by Clinton Rossiter (New York: New American Library [Mentor], 1969), p.510-520.

16Johnson, <u>op cit.</u>, pp.92-94.

17Eemeren, Frans H. van, Rob Grootendorst, & Tjark Kruiger, <u>Handbook of Argumentation Theory</u> (Dordrecht: Foris, 1987): 'Argumentation is a social, intellectual, verbal activity servingto justify or refute an opinion, consisting of a constellation of statements and directed towards obtaining the approbation of an audience.' (p. 7)

18I borrow a paragraph here from my 'Informal Logic: The Two Schools,' see below, note 27.

19Douglas Walton, <u>Argument Structure</u>: A Pragmatic Theory (Toronto: University of TorontoPress, 1996), p.32

20Johnson, <u>op. cit.</u>, pp. 90-92.

21James B. Freeman, <u>Dialectics and the Macrostructure of Argument</u> (Berlin: Foris, 1991), p.30f.

22E.g. E.M. Barth and E.C.W. Krabbe, <u>From Axiom to Dialogue</u> (Berlin: de Gruyter, 1982), pp 14-19; Trudy Govier, <u>Problems in Argument Analysis and Evaluation</u> (Dordrecht: Foris, 1987), pp.1-10.

23A.N. Whitehead and Bertrand Russell, <u>Principia Mathematica</u>, 2nd ed., (Cambridge: Cambridge University Press, 1927); the basic materials are treated in Vol.1, pp.91-97, where the axioms are called 'primitive propositions.'

24Op cit., p.213.

25Gerhard Gentzen, 'Investigations into Logical Deduction,' in <u>The Collected Papers of</u>

Gerhard Gentzen, ed. by M.E. Szabo (Amsterdam: North Holland, 1969)) pp 63-131; quotes from pp.68, 80.

26J. Fang, Logic Today. Basics and Beyond (Memphis: Paideia, 1979), p 210.

27On this distinction see John Hoaglund, 'Informal Logic: The Two Schools,' forthcoming in Frans H. van Eemeren et al., eds., Proceedings of the Fourth International Conference on Argumentation, Amsterdam, June 15-18, 1996.

28John Woods, 'Who Cares about the Fallacies?' in Frans H. van Eemeren et al., eds.,

Argumentation Illuminated (Amsterdam: International Society for the Study of Argumentation [Sicsat]: 1992), p.26.

29E.g. S. Morris Engel, With Good Reason, 5th ed. (New York: St. Martin's Press, 1994).

30Douglas Walton, Informal Logic. A Handbook for Critical Argumentation (Cambridge:

Cambridge University Press, 1989), p.114f.; Johnson, op. cit., pp. 263-265 and 'The Principle of Vulnerabilyy,' paper read at Conference 95 on Critical Thinking and Informal Logic, George Mason University, June 13, 1995. Johnson's distinction is illative core/dialectical tier. For reasons I cannot explore here I prefer semantic core/dialectical tier.

31Stephen Toulmin et al., An Introduction to Reasoning, 2nd ed. (New York: Macmillan, 1984).

32Stephen N. Thomas, Practical Reasoning in Natural Language (Inglewood Cliffs: Prentice-Hall, 1973); Michael Scriven, Reasoning (New York: McGraw-Hill, 1976); Howard Kahane, Logic and Contemporary Rhetoric (Belmont: Wadsworth, 1971): Ralph H. Johnson and J. Anthony Blair, Logical Self-Defense (Toronto: McGraw-Hill-Ryerson, 1977). 'New wave' was introduced by Johnson and Blair; see Johnson, op cit., p.14.

33I side with the Amsterdam School (Frans H. van Eemeren and Rob Grootendorst, Speech Acts in Argumentative Discussions [Dordrecht: Foris, 1984], p. 93) in classifying the argument with one premise and one conclusion as a separate type.

34Op. cit.

35In serial arguments the support of at least one premise is mediate, and in divergent there is only one premise with two or more conclusions.

36Robert J. Yanal, ''Convergent' and 'Linked' Reasons,' American Philosophical Association Newsletter on Teaching Pbilosophy (Summer 1984), pp. 1-3.

37Linked: Malcolm Acock, Informal Logic Examples and Exercises (Belmont: Wadsworth, 1985), p.89. Convergent: Philip K. Howard, The Death of Common Sense (New York: Random House, 1994)) pp.34-38.

38Basic Logic (St. Paul: West Publishing, 1988).

39David A. Conway) 'On the Distinction between Convergent and Linked Arguments,'

Informal Logic, Vol XIII (1991), pp.145-148.

40Argument Structure, pp.116-118.

41John Wisdom, 'Gods,' in Anthony Flew, ed., <u>Logic and Language</u>, First and Second Series

(Garden City, NY: Doubleday [Anchor], 1965), p.203.

42J.L. Austin, <u>How to Do Things with Words</u>, 2nd ed., ed. by J.O. Urmson and Marina Sbisa

(Cambridge MA: Harvard University Press, 1962), p. 150f.

43But let me report briefly what I do find. In Thomas, <u>Instructor's Manual for Practical Reasoning in Natural Language, 2nd ed</u> , 2 vols. (Englewood Cliffs: Prentice-Hall) 1986),

Exercises 2-1 and 2-2 contain 20 arguments diagramed as linked. Of these I classify four as compound, i.e., containing arguments of more than one basic type such as linked and serial. This leaves 16 basic linked arguments. Thomas evaluates arguments on a scale from strongest to weakest as deductively valid, strong, moderate, weak, and nil. Of the sixteen, 6 classify as deductively valid or strong to deductively valid, and 6 classify as weak or nil-to-weak. No basic linked argument falls entirely in the moderate range, the remaining four being nil to moderate, weak to moderate, and moderate to strong. One would of course like to compare these with the evaluations of basic convergent arguments. Unfortunately I find not a single basic convergent argument diagramed and evaluated in the Thomas <u>Solutions Manual</u>.

Acock (see note 37 above), diagrams and evaluates only occasionally. He has seven arguments I would diagram as basic linked, ten as basic convergent. But I cannot evaluate these or use them as evidence. I seek evidence to address a hypothesis here, and this is too close to manufacturing my own evidence. This also rules out my own <u>Instructor's Manual to Accompany Critical Thinking</u>) 2nd ed. (Newport News: Vale Press, 1997), in which 29 arguments are diagramed basic linked or basic convergent. Yanal, in the <u>Instructor' Manual for Basic Logic</u> (St. Paul: West Publishing, 1988), makes extensive use of diagraming. But nearly all the basic arguments of interest to us are linked, and most are assessed as deductively valid or not based on formal features. So this is really not informal logic. Irving M. Copi and Keith Burgess-Jackson, in <u>Informal Logic</u>, 2nd ed. (New York: Macmillan, 1992), pp.332-341, employ some diagraming but seem never to evaluate these arguments as weak or strong. One would have taken facilitating evaluation to be the main point of diagraming.

44Robert H. Ennis, 'Identifying Implicit Assumptions,' <u>Synthese</u>, LI (l982), pp. 61-68.

45Govier, <u>Problems inl Argument Analysis and Evaluation</u>, p.81f.

46Hans V. Hansen, 'An Informal Logic Bibliography,' <u>Informal Logic</u> XII. (1990), pp. 155-184, the fullest I know of, contains over 900 items.

47<u>Reasoning</u>; the gap-filler example is on p. 81f.; the three problems pp.188-194.

48Gerald M. Nosich, <u>Reasons and Arguments</u> (Belmont: Wadwortb, 1982), pp. 211-217; the linked gap-fillers are nos.1, 2, and 3 (turns on a subtlety), and the one on p. 217.

49Michael Burke, 'Unstated Premises,' <u>Informal Logic</u> VII (1985), pp.107-118.

50Wayne Grennan, 'Are 'Gap-Fillers' Missing Premises?' <u>Informal Logic</u> XVI (1994), pp.185-196.

51James Gough and Christopher Tindale, 'Hidden' or 'Missing' Premises,' <u>Informal Logic</u> VII (1985), pp.99-106.

52 Gough and Tindale, p.100.

53David Hitchcock, Critical Thinking (Toronto: Methuen, 1983).

54Stephen Toulmin, The Uses of Argument (Cambridge: Cambridge University Press, 1958).

55Op. cit., pp. 98, 260.