# DO ALL RATIONAL FOLK REASON AS WE DO? FREGE'S THOUGHT EXPERIMENT RECONSIDERED

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OFTEN critique of thought experiments demands the fleshing out or concretizing of descriptions so that what would happen in a given situation becomes less a matter of guesswork or pontification. In thought experiments we tend to elaborate descriptions with the latest scientific models in mind. It seems, at least at first glance, that we aim at more than analysis of concepts in that the thought experiment seems to be a close relative of the scientist's laboratory experiment with the vital difference that observations may be made from perspectives which are in reality impossible, for example, from the perspective of moving at the speed of light. Despite the use sometimes of impossible vantage points, the notion that we are constructing a situation in imagination and then *observing* it in order to determine "what would be the case" seems basic to the thought experiment mode of inquiry. The thought experiment seems to discover facts about how things work within the laboratory of the mind.

Such mimicking of empirical experimentation might seem unnecessary in the philosophy of logic, since there is little empirical work to mimic anyway. Yet this does not turn out to be the case. Quine's classic thought experiment in chapter two of *Word and Object*, though the portrait of native culture and language is sketchy, purports to show us not only that translation of radically alien languages is indeterminate but that all folk, since they are rational, are logically like us. Quine does not wish to make this last claim on the basis of dogma but on the basis of standards for "fair translation." We must not make the natives come out sounding "absurd" or "silly," at least not very often. Our intuitions regarding the absurd and the silly would seem to be fixed by picturing situations, for example, in which the native affirms and denies the same proposition.[1] We judge any translation wanton which portrays the natives as reasoning generally oddly.

Another anthropological thought experiment which supports the view that there is a privileged logic is elaborated by Martin Hollis in "Reason and Ritual."[2] Hollis argues that native logic must be construed as a version of our own if the natives are to be understood as rational. In order to establish this claim, Hollis conducts a thought experiment in which we

picture ourselves in the midst of constructing a translation manual for an alien language. We know that a certain connective "*" is a conditional, but we do not yet know what sort of conditional it is. Can we conceive of the natives reasoning, yet not reasoning according to the scheme *modus ponens* where their conditional "star" behaves like "if...then" does in English? Hollis believes that it is inconceivable that one could reason either with a conditional unlike "if...then" or with a rule for the conditional unlike *modus ponens*.[3] On the basis of this experiment to test the bounds of the conceivable, Hollis concludes that if the natives reason at all, native logic must be a version of our own. The native language will possess connectives such as "and," "or," "if...then," and "not." The law of non-contradiction will hold. *Modus ponens* will be a valid argument inference rule. The natives will perform the speech acts of assent and dissent as we do, employing notions similar to our notions of truth and falsehood. Native logic may differ from ours with respect to the law of the excluded middle however, according to Hollis. The thought experiment establishes only that native logic must be a *version* of our own, not that everyone's logic is exactly like ours or that everyone's logic is classical.

If it is only slightly puzzling why Quine and Hollis would find the thought experiment such a useful tool in the philosophy of logic, it may be a surprise that Frege, given his aversion to psychologism, also employed an anthropological thought experiment to establish the privileged status of our logic. We find Frege in the introduction to *The Basic Laws of Arithmetic* experimenting with his own sense of the conceivable in order to determine whether he could recognize a logically non-standard tribe as rational. He judges that this situation is impossible.

Frege believed that a linguistic group logically unlike us was conceivable, but that such a group could be rational was inconceivable. This inconceivability lay in the impossibility of our acknowledging a system of rules for reasoning as both rational (in a theoretical and not merely practical sense) and at the same time not binding on us. The underlying intuition guiding Frege's argument is this: IF an inference rule is truly binding for me, then it is binding for all rational inference-makers.

In order to decide whether Frege is correct in his claim of inconceivability we must answer the following question: Can a justification be given for several distinct deductive systems so that these systems are all judged rational in a way that is satisfying to us given our presystematic intuitions concerning rationality?

If an affirmative answer is to be given to the question "Can more than one deductive system be justified and judged rational by us?," two requirements must be met. First, an account of the justification of deduction must be given so that the method of justifying does not identify "justified logic" with "privileged logic." And second, an account of the normativity of logical

rules must be given so that logical rules may be seen as binding even though not as universally binding.

If an instrumentalist justification of deduction be accepted, one may then argue that there may be intellectual goals other than our own whose rationality nonetheless we can appreciate. For example, Intuitionistic logic may be understood as a deductive system designed to serve the *telos* of provability much as classical logic serves truth. Though we may not share the Intuitionist's epistemic values, his rationality is not called into question. Once the justification of deduction is understood instrumentally it becomes apparent that as many deductive systems may be justified as there are distinct rational goals which may be served efficiently by a deductive system.

By making plausible by means of thought experiments the conceivability of a linguistic group with epistemic goals unlike our own and hence with rules of reason unlike our own, we seek to make intelligible the notion of many deductive systems, where the norms embodied in the various systems have a non-arbitrary basis and yet are not universalizable. Frege could not imagine such a situation. But if we succeed in imagining only one way in which intellectual goals unlike our own are well-served by rules of reason unlike our own, then we will have shown that there is no privileged logic.

Here is the passage in which Frege conducted his own thought experiment, picturing an observer who comes upon a logically odd linguistic community. Frege says,[4]

> But what if beings were even found whose laws of thought flatly contradicted ours and therefore frequently led to contrary results even in practice? The psychological logician could only acknowledge the fact and say simply: those laws hold for them, these laws hold for us. I should say: we have here a hitherto unknown type of madness. Anyone who understands laws of logic to be laws that prescribe the way in which one ought to think—to be laws of truth, and not natural laws of human beings' taking a thing to be true—will ask, who is right? Whose laws of taking-to-be-true are in accord with the laws of truth?...Not only that: this impossibility of our rejecting the law in question hinders us not at all in supposing beings who do reject it; where it hinders us is in supposing that these beings are right in so doing, it hinders us in having doubts whether we or they are right. At least this is true of myself. If other persons presume to acknowledge and doubt a law in the same breath, it seems to me an attempt to jump out of one's skin against which I can do no more than urgently warn them.

When Frege himself conducts the thought experiment, he finds that he can picture a logically odd linguistic community, but he cannot picture himself judging their practice rational. This would seem to require "jumping out of one's skin."

But Frege does not take into consideration the possibility that an alien group might pursue intellectual ends that differ from our own and thus demand a logic unlike ours. The Intuitionist, for example, rejects some

classical inference rules, because these rules run counter to his epistemic commitments.

The Hollis experiment would also seem to be inconclusive since non-standard epistemic goals are not taken into account. The possibility of anthropological explanations in terms of deviant logic goes unexplored despite the plausibility of Hollis' claim that *modus ponens*, a conditional like "if...then," assent and dissent as we understand these speech acts, and the law of non-contradiction are all essential to rational inferential practice. Resolution of the issue seems to require empirical evidence. The anthropologist David Cooper has argued not only that a logically deviant linguistic group is conceivable, but that two instances of such tribes are already well-documented.[5]

In "Alternative Logic in 'Primitive Thought,'" Cooper argues that the Azande and Nuer groups, studied over fifty years ago by Evans-Pritchard, can be best understood as logically non-classical.[6] The Azande hold a set of beliefs which seem to imply a contradiction. Cooper suggests that the tribe employs a three-valued logic, since if this were the case, the alleged contradictory sentence would not be deducible from the Zande premisses. Here is the situation as summarized by Merrilee Salmon in her critique of Cooper:[7]

> Azande apparently hold the following set of beliefs: there is a reliable post-mortem test for determining whether a person is a witch. This test has been applied to Zande men, sometimes with negative and sometimes with positive results. Witchhood is an organic property inherited by males from their fathers and females from their mothers. All Azande are related through the male line. If we apply the standard logic to this set of beliefs, the contradictory conclusion 'All male Azande are witches and not all male Azande are witches' can be derived.

Salmon argues that diagnosis of logical deviance is not justified at this stage because it is likely further research would resolve the apparent contradiction in a simple manner. In case a more detailed account of the Zande theory of witchcraft showed the influence of inherited characteristics weakening as familial relationship becomes more distant, then a standard two-valued logic would fit the "enriched data." Salmon believes that diagnosis of logical deviance cannot be ruled out for *a priori* reasons. But she believes that only in cases of recalcitrant data can such explanations be justified.

But what sort of data would force us to explain the inferential practice of some community as non-standard? Hollis believes that such data are inconceivable. Salmon takes it that though no actual anthropological research has presented sufficiently recalcitrant data, someday someone might do so. Frege believes that, though we could judge a community to be logically unlike us, we could not judge a logically non-standard community to be rational. How could we resolve this debate between the privileged-

logic advocates and the logical pluralists? How can we demonstrate that a logically deviant community is conceivable? Or, inconceivable?

We need not locate an actual tribe exhibiting conversational peculiarities in order to show that not all rational folk must reason as we do. It is enough to present in a thought experiment the *sort* of data which *would* lend convincing support to a diagnosis of logical deviance. But this procedure is not straightforward. The painting of a detailed picture at best can make plausible: (1) that such a queer linguistic group could exist even if they happen not to and (2) that conversational oddities will not be easily explained away by further fleshing out of the description. Salmon's criticism of Cooper focussed on the *possibility* of an enriched description resolving apparent oddities in native conversation. By supplying the missing details the thought experimenter strives to avoid this vulnerability. In any case, we cannot *prove* that a logically deviant tribe is conceivable. Only through plausible story-telling can one give the audience confidence that they themselves have conceived of a tribe that reasons but not as we do.

The success of such a thought experiment will remain a matter of opinion. Still, the more detailed and coherent the story, the more confidence we will have that the logically deviant tribe is conceivable. Surprisingly, the question of what is conceivable or what has been conceived successfully in this case does not admit of as certain and as clear an answer as one would expect if analysis of concepts or deductions of consequences were at the heart of the thought experiment.

In the following pages I will reconstruct and reconduct Frege's thought experiment, picturing a hypothetical tribe in detail and providing a sufficiently complex narrative so that the motivation for logical deviance is intelligible. I will argue that Frege did not get correct results because he failed to imagine a convincing intellectual motivation for logical deviance. I will argue that alternative epistemic interests, for example, the Intuitionist's special interest in provability, will make clear the need for non-standard rules of inference. What Frege found inconceivable, indeed a sort of madness, I will show to be at least plausibly conceivable by fleshing out the hypothetical anthropological data and by explaining the role of epistemic goals in constraining choice of logic. The fictional group, called the Xenophobes, will be diagnosed as logically deviant. Whoever agrees that the Xenophobes as described are conceivable must also agree that there is no privileged logic. It is the conceivability claim itself that is problematic.

For ease of exposition, I will set out first the non-standard logic which will be employed in the sample argument. Then I will present the hypothetical anthropological data and argue that the proposed non-standard logic provides the best explanation for the postulated conversational oddities.

The most familiar three-valued logics are Lukasiewicz-style logics, but I will employ a less familiar system: the Bochvar three-valued system. For

Bochvar, the intermediate value has as its interpretation not "something between truth and falsity" but rather a notion more like "paradoxical." Whenever the third value appears as an input, that is, when any sentential component receives the "I" value, the sentential compound will also have value "I" whether it be a disjunction, a conjunction, a conditional, a biconditional or a negation. If we consider the rows on any truth table where only "T" and "F" appear, ignoring for the time being the rows which contain "I"s, we find that the results agree with the standard two-valued logic. As a result of the "over-powering strength" of the third value, the notion of a tautology does not apply in Bochvarian systems.[8] This is so because no compound can receive a value of "T" for every possible assignment of values to its sentential components.

The non-standard logic which I attribute to the Xenophobes is fashioned after the Bochvar three-valued system. Xenophobic Logic, XL for short, differs from the Bochvarian system, most importantly, in the interpretation of the intermediate value but also in the construal of the designated and anti-designated values. For XL, the designated value is not to be thought of as "true" but as "assertible," for many sentences judged "true" on normal observational and logical grounds are not assertible by Xenophobic standards. The anti-designated value is not "false" but is to be understood this way: IF "p" has the anti-designated value, then "it is not the case that p" is assertible. Not all sentences which we would judge false on the usual observational or logical grounds will receive the XL anti-designated value. The intermediate value does not mean "paradoxical" or "meaningless." Rather, if a sentence has the value "I," then the sentence is "Out-of-Bounds." The "Out-of-Bounds" sentence can be neither asserted nor denied. To understand why the Xenophobes have such an odd semantics, we must know more of their culture and their commitments.

The sense of the intermediate value is evoked by the word "bizarre" rather than some notion suggesting meaninglessness. For example, an ungrammatical string of symbols such as,

<p style="text-align:center">Cat mat on is that</p>

does not receive the intermediate value any more than it receives the designated or anti-designated value.

A sample sentence in English which many regard as "bizarre" may provide some insight. The following sentence and its negation are alike (oftentimes) treated by members of our community, not as either true or false, but as embarrassing to the degree of calling forth a "shunning" or avoidance response:

> The Virgin Mary passed through the ion belt during her Assumption into Heaven.

The sentence is bizarre in much the same way that a category mistake is bizarre. Yet the mixing here is not a mixing of categories but of narrative

genres: Religious narrative is mixed with scientific narrative. Though the sentence is meaningful, the religious person hesitates either to affirm or to deny it. And the non-religious person is none too comfortable in denial.

In our linguistic community there is no practice of shunning bizarre sentences as there is in the hypothetical Xenophobic culture. We notice the queerness of a sentence which reaches out-of-bounds by mixing narrative genres, but we lack a policy for reasoning about and with such sentences. They do not occur often enough in our discourse to require a policy. The Xenophobe, on the other hand, is confronted with "alien narrative genres" at every turn from the Western culture that surrounds him. He attempts, systematically as part of social policy, to retain a coherent and characteristically Xenophobic tradition. Elements of the Western tradition are bizarre in the context of Xenophobic narrative.

For example, in early stages of the research project, the anthropologist of our thought experiment wanted to know if the chief god of the Xenophobic people was a vegetarian. He asked the local priest whether the god ate hamburgers, a reasonable question given Xenophobic traditions concerning the tree-dwelling ancient divinity. The response was a "bizarreness-reaction" as if the anthropologist had uttered something queer and distressing.

The Xenophobe would neither assert nor deny any of the following sentences:

1. The god ate hamburgers.

2. The god did not eat hamburgers.

3. The god ate hamburgers, or the god did not eat hamburgers.

The priest refused to assert sentence #3 even though he would assert such sentences as "The tree is tall, or the tree is not tall." The form of sentence #3 was inadequate to motivate assertion.

The Xenophobic informants assented readily to some tautological (by our standards) sentences but treated others as out-of-bounds. Some tautological sentences were asserted and others shunned, even when the sentences instantiated the same tautological pattern. The determining factor was subject matter. Sentences of the form (if p then p) were asserted only when the topics mentioned in the sentence p were coherent with the Xenophobic tradition. Mention of Western concepts or inventions was avoided. If someone spoke of alien things, the utterance was treated as bizarre and shunned.

The natives' seeming failure to treat any sentences as tautologies was only one among three recalcitrant logical oddities noted by the anthropologist. Perhaps the most serious oddity was the failure to treat simple valid arguments such as *modus ponens* in the standard way. The anthropologist constructed seemingly acceptable arguments in the *modus ponens* form to

see if when conclusions of such arguments were denied the conjunction of the premisses would also be denied. If natives tended to assent to the negation of the conjunction of the premisses when they refused to assent to the conclusion, then the anthropologist would conclude that the natives treated the argument as we would. Strangely, the anthropologist found some cases where this expected standard treatment did not occur. Though natives tended to respond as we would to most simple arguments, some arguments called forth bizarre responses. Here is a sample argument which the Xenophobes treated non-standardly:

If this is a Jeep, then snakes have four legs.

This is a Jeep.

Hence, snakes have four legs.

The Xenophobes asserted the negation of the conclusion. So the anthropologist asked them these two questions;

Is it not that if this is a Jeep, then snakes have four legs, and this is a Jeep?

The Xenophobes would not assert this conjunction. But if asked in a separate context they would assert the sentence "Snakes do not have four legs." Natives treated arguments which did not mention Western inventions or employ distinctively Western concepts much as we would. For example, most natives judged the following argument reasonable but suggested that the author of the argument needed to learn some zoology.

If birds have two legs, then snakes have four.

Birds have two legs.

Hence, snakes have four legs.

They denied the conclusion and also denied the conjunction of the premisses. But the observation that some arguments elicited a different response puzzled the anthropologist.

This odd treatment of some *modus ponens* arguments suggested that Xenophobes might be illogical or non-logical much as Lewis Carroll's tortoise might be labelled illogical or better non-logical in his refusal to apply inference rules once he accepted premises. But unlike the tortoise the Xenophobes did employ *modus ponens* in the normal way so long as the subject matter of the argument seemed normal to them. For this reason the anthropologist rejected the hypothesis of illogicality.

The third logical oddity involved simple observation sentences. The anthropologist noted much refusal to assent to sentences which were obviously true such as "Here is a big thing" uttered while standing next to an airplane. The sentence, "The big thing is not here," also failed to be assented to or dissented from under similar circumstances. Often native conversation seemed normal to Western ears. But the introduction of

subject matter alien to the Xenophobic tradition even by way of indexicals called forth odd inferential and assertional practices.

The three logical oddities characteristic of the Xenophobic tribe are: (1) apparent absence of tautologies; (2) occasional odd treatment of *modus ponens* arguments; and (3) failure to assent to some observational sentences which are clearly true.

The success of the thought experiment depends first on making plausible that these logical oddities do justify the diagnosis of non-standard logic and, second, on making plausible that the Xenophobes as described are actually conceivable in the sense that their description is not like the description of a square circle or a two-sided triangle. To start, I will examine a multi-faceted objection that comes immediately to mind.

The Xenophobes are not logically deviant. They are simply stubborn and eccentric. A people might be judged rational in a pragmatic sense if they systematically follow fallacious inferential schemes provided such systematic epistemic irrationality has survival value. For example, slaves may find it beneficial to appear to be stupid. But such a group is not logically deviant, despite their practical rationale for reasoning oddly. Furthermore, the bizarreness reaction is not a speech act like assent or dissent and cannot be regarded as the expression of a semantic value. Xenophobic conversations do not seem to be interrupted or terminated for logical reasons, but because the rules of politeness or practices of prejudice are violated. Perhaps Western inventions are felt to be obscene.

Why not say that the Xenophobes are simply stubborn and eccentric? The difficulty with this explanation is that it fails both to codify Xenophobic inferential practice and to describe the epistemic goals which motivate their characteristic use of declarative sentences. Some may regard Xenophobic usage of declarative sentences as irrational because the preservation and development of the Xenophobic cultural heritage is not a suitable epistemic project. But as anthropologists we need not judge the native epistemic interests ideal in order to say that they employ rules of reason (rather than rules of politeness) which can be codified. Any deductive system which serves confusion, absurdity or some other theoretical non-desideratum must be judged irrational rather than deviant. But the Xenophobic goal of preservation of their own scientific and literary heritage is not perverse. For this reason it is plausible that they are logically deviant rather than illogical.

Still one might object that systematization itself, even coupled with practical ends, is not sufficient to show that inferential practices are deviant rather than theoretically defective, that is, irrational. Preservation of culture may be seen as a practical end. The Xenophobes may be like slaves who pretend to be stupid because it is beneficial to do so.

But provided that the intellectual heritage of the Xenophobes possesses

methodological merit, their preservation project must be seen as rational in a theoretical and not merely a practical sense. If their traditions were flawed from an epistemological point of view, the diagnosis of deviant logic would lose plausibility. Let us therefore imagine that the Xenophobes are sophisticated scientists in their own way. The quarantining of Western topics would then be theoretically motivated and not merely guided by intransigence or devotion to ancestors. (The thought experiment might well have portrayed extra-terrestrials with intellectual traditions superior to our own.)

But is the description of the logically non-standard Xenophobes as flawed as a description of a two-sided triangle, albeit more long-winded and therefore more beguiling? Have we been fooled into supposing that we have conceived what is actually inconceivable? How could we tell if this is the case? The following considerations might increase our confidence in the *plausibility* of logically deviant rational communities.

Epistemic interests constrain inferential practice to a large degree insofar as epistemic interests determine the fundamental use to which sentences may be put. If "truth" be the epistemic goal of a community, then it will be the truth of sentences which is of primary interest. Utterance of a sentence will convey under normal circumstances the claim that the sentence is true. The force of assertion is then determined by the epistemic goals of the community in that the use of the sentence is determined by their interests. The Xenophobes, for example, are not interested in truth but in preservation of the Xenophobic intellectual heritage. Thus, many true claims are for them non-assertible.

If a community takes provability to be the criterion for assertability, then in asserting a given sentence the speaker undertakes justificatory responsibilities unlike those undertaken by speakers in our community. If challenged, this speaker must give an account to show not that his claim is true but that it can be proven, given culturally determined standards for what constitutes proof.

The Xenophobic thought experiment was designed to show that there is no privileged logic because there is no privileged use of sentences. If the codifier assumes that the natives are playing an informational language game similar to our own when they are not, the codifier will take it that certain inference licenses are issued when in fact they are not. For example, in Xenophobic conversation the two sentences "If airplanes can fly, then airplanes can stay aloft," and "Airplanes can fly" do not in conjunction license "Airplanes can stay aloft." In fact, these two sentences license assertion of no sentences whatsoever. The wise codifier realizes that any sentence which mentions a "forbidden object" has neither the value Truth nor the value Falsehood but rather a value which we might call "Undefined." The codifier in this hypothetical case would do well to employ a

Bochvar three-valued logic to formalize the "epistemic shunning" practiced by the Xenophobic tribe.

The successful understanding of the "sense" of the Xenophobic epistemic project of preserving tradition requires that the thought-experimenter recognize how Xenophobes use sentences in a manner unlike our own. What sort of force the utterance of a declarative sentence in normal circumstances has for a people is a fundamental question. In the Xenophobic system of social practices, the assertor will be held responsible by his audience for an account of how his sentence may be understood as coherent with tradition and also for an account of how the sentence is substantiated by the sorts of empirical evidence that Xenophobes traditionally recognize. It is *as if* the Xenophobe assertor must justify not only the truth of his claim but also its coherence with tradition. Because the fundamental speech act differs from ours, a deviant logic is required to preserve in inference that semantic property of sentences which is of most interest to Xenophobes: coherence with tradition.

Translational difficulties have been cited by Quine, Hollis, and others in order to defend the view that all rational inference makers must be logically like us. Quine believed that grave difficulties faced anyone who attempted to describe how our verbal dispositions would differ if we accepted tautologies unlike the classical ones. He postulated that any success would prove illusory in that any inference attributed to the natives would have to be sayable and understandable in our language, and therefore, would not be truly non-standard.

But it is not necessary that Xenophobic sentences be constructible in English. So long as we can describe Xenophobic inferential practice, we understand it, though we may not say in English what the Xenophobe has said in his own language. Our understanding of their practice in so way requires that their practice resembles ours.

If we learn a logic unlike our own, we learn to play a new language game, picking up the "sense" of it as we become accustomed to it. The logically deviant community does in a sense "change the subject" from our point of view. The language game of the logically deviant group has not only changed rules from our point of view but changed goals. In *Philosophy of Logic*, Quine took note of this phenomenon of "changing the subject."[9] But Quine took this to mean that the logically deviant person was in some uncomfortable position in that criticism of classical logic was thereby precluded.

The deviance logician does "change the subject." Or, to put it more precisely, he plays a different game with different conceptions of success and rules for attaining it. To codify his game, we seek not to reduce it to our home inferential game, but to formulate precisely how his game is to be played. The Xenophobic thought experiment provides an example of a

language game where truth-preservation is not the goal and assent does not have the force of assertion. This language game is intelligible to us, even though it cannot be played in English. For this reason, translational arguments which seek to defend the notion of our logic as privileged are not convincing.

Frege could not imagine a logically odd group who would nonetheless seem rational to him. He felt one would have to jump out of one's skin to affirm the rationality of a logical rule which one regarded as not binding on oneself. But here Frege was lacking in imagination, for he did not consider that alternative epistemic commitments would demand alternative rules of reason. In the laboratory of the mind no less than in the scientist's laboratory, one's findings are fallible and subject to reconsideration from unimagined perspectives.

## NOTES

1. W.V.O. Quine, *Word and Object* (Cambridge, Massachusetts: M.I.T. Press, 1960), p. 58-59.

2. Martin Hollis, "Reason and Ritual," in *Rationality*, ed. by Bryan Wilson (Worcester: Basil Blackwell, 1984).

3. *Ibid.*, pp. 231-32.

4. Gottlob Frege, *The Basic Laws of Arithmetic*, trans. by Montgomery Furth (Berkeley: University of California Press, 1967), pp. 14-15.

5. David Cooper, "Alternative Logic in 'Primitive Thought,'" *Man*, vol. 10 (1975), pp. 238-56.

6. E. E. Evans-Pritchard, *Witchcraft, Oracles and Magic among the Azande* (Oxford: Oxford University Press, 1937).

7. Merrilee Salmon, "Do Azande and Nuer Use a Non-Standard Logic?," *Man*, vol. 13 (1978), pp. 444-54.

8. Nicholas Rescher, *Many-Valued Logic* (New York: McGraw-Hill, 1969), p. 23.

9. W.V.O. Quine, *Philosophy of Logic* (Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1970), p. 70.