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## Teaching Thinking and Reasoning Skills More Effectively

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# **TEACHING THINKING AND REASONING SKILLS MORE EFFECTIVELY**

**BY**

**MARCUS R. MUMFORD**

Thesis submitted in partial fulfillment  
of the requirements for the degree

of

**UNIVERSITY HONORS  
WITH DEPARTMENT HONORS**

in

**PHILOSOPHY**

UTAH STATE UNIVERSITY  
Logan, Utah  
1996

## **Preface**

I hesitate to call my current work a thesis. Such carries a consummate notion of completeness. I am, in reality, only in the initial phase of a continuing pursuit.

My teaching experiences took place at West Side Junior High in Dayton, Idaho. I taught eighth grade American History and Current Events. Because I taught eighth-graders, I feel that my suggestions specifically target an age group from 11 to 14. I suspect, though, that with little judicious adaptation, the principles suggested here can be utilized universally.

In the interest of simplicity and brevity I intend the use of the pronouns "he" and "him" to refer to people of both genders.

When I use the word 'argument', I use it in the broader, logician's sense of giving reasons for or against some claim. Viewed in this way I see that arguments are a common feature of daily life.

I appreciate when teachers have taught me how to think instead of what to think. I have learned to trust many great teachers. I only wish I could pay them back.

Marcus Mumford  
Logan, Utah 1996

*"Sure he that made us . . . gave us not that . . . god-like reason to rust in us unus'd." - Hamlet Act IV, iii*

Political pundits whine that the world would be a better place if only more people thought like them. A clever engineer once told me that the world needs (his arms come together in a weight lifting pose, hands rounded together) more circles! Me? I want a world full of wise, thinking individuals. This is a world of minds that have an "inner balance wheel"; minds that protect themselves from extremes and under-use. Rudyard Kipling set up the model of a well-trained mind, "If you can keep your head while all around you are losing theirs and blaming it on you . . ." Thinking and reasoning aptitude can be built within a person like a physical muscle (Goodman and Goodman, 1991). Human beings can learn, develop, and enhance these capabilities as part of their maturity.

If we can teach thinking and reasoning skills more effectively, we can enhance a person's ability to understand the world around them, to sort out the conflicting ways to respond to challenges, opportunities, irritants and threats, and to help them learn how to tolerate dissent, complexity, frustration, and uncertainty. There might be some people who will not reach our 'inner balance wheel' goal, but we have something to shoot for (Goodman and Goodman). The God of the Old Testament bids us "come, let us reason together" (Isaiah, ch. 1 vs. 18).

People naturally emulate their initial learning environments. When I taught eighth grade American History courses last spring, I found that my students consistently deliberated along predominantly conservative lines. I don't mean, here, to single out

conservatism (an equally intolerable situation could be found in a liberal camp). I found that my students persisted often in irrational lines of reasoning for the sake of their ideology. Dr. Gordon Steinhoff, of the USU philosophy department, sighs, then brightens and exclaims, "That is intellectually dishonest."

Two major portions of the brain that play crucial roles in reasoning are interconnected. The cortex processes information received by the brain. It thinks and assigns meaning - in other words, it *interprets* what the sensory organs and the memory of prior experiences present to it. The limbic system - seat of emotions - controls the body's reaction to these interpretations. This is where feelings occur. When feelings are excessively strong, a causal chain begins which ultimately upsets the ability of the cortex to interpret the outside world accurately. This is the point at which a person may begin to "rationalize" a self-defeating or extreme course of action. Thus, a "vicious" circle has been set up and "*only superior forms of thinking* will be able to correct the situation" and set the individual straight on course (Goodman and Goodman).

Wisdom, good ol' *sapientiae* in Latin, hardly ever gets air time these days. Wisdom is the ability to make sound choices, good decisions. Wisdom is intelligence shaped by experience, information softened by understanding (Ortiz y Pino, 1996). Wisdom is not something innate, it is something which is acquired. David Hume writes that "even brute beasts improve by experience."

But while the facts and information available in our current system of education are necessary for the reasoning process, they are insufficient in themselves. How those facts and knowledge are applied is called either wisdom or foolishness (Roy, 1990). Despite the fact that many of the elements of sound reasoning are defined by

common sense, experience demonstrates that common sense is not very common (Goodman and Goodman). Thinking skills bring theory and application together.

*The beauty of teaching reasoning is that it does not conflict or compete with religion, government, society, education, law, moral behavior or individual freedom. In fact, its purpose is to help us sort out our thoughts and thus harmonize the different "notes" played by these many influences, which, like instruments, make up the orchestra of life. - Goodman and Goodman*

I've often questioned myself. What do I know? How do I use facts, figures, and learning? There seems to be something more important about what I know than the formulas or names in history that I've assigned to memory. The aim of John Dewey's experimental school (University of Chicago, 1896 to 1904) was to provide "control of the intellectual methods required for personal and independent mastery of practical skill, rather than turning out at once masters of the craft." He wanted to teach principles and abilities that the students could then utilize independently. John Stuart Mill describes this same phenomena in the education he received at the hand of his father:

*Most boys or youths who have had much knowledge drilled into them, have their mental capacities not strengthened, but overlaid by it. They are crammed with mere facts, and with the opinions or phrases of other people, and these are accepted as a substitute for the power to form opinions of their own (Peterson, 1946).*

How do students best learn to form legitimate opinions for themselves? Do they need reasoning skills? What does a teacher need in order to teach his students to think? How can he effectively yield great thinkers from his classroom? There are many approaches that I have considered for this issue.

I have considered adapting a college level introductory logic course to the

secondary education classroom. In fact, I tried this. One day, I told my students that if they would hurry and finish their test I would give them a "special treat." They dutifully completed their test and waited with anticipation. I imagine they were expecting either to get to listen to a Credence Clearwater Revival CD or that I would throw them a pizza party. I taught them the structure of *Modus Ponens*. . . . They never begged for a treat again. "Presenting logical thinking in the abstract to students will bore them and go over their heads" (Goodman and Goodman).

I want, first, to cover the pedagogical skills that educators can utilize to teach reasoning. Unfortunately, I cannot comment on everything I would like. Ink is scarce, my time is hurried and paper is limited. The topics I have chosen to address are those which remain most poignant after my own experiences in an eighth-grade classroom. I will then present my approach to a thinking skills curriculum. Lastly, I will provide actual course work and ideas in the form of a sample lesson manual.

#### I

*True scholars are so full of the spirit of inquiry, so sensitive to every sign of its presence and absence, that no matter what they do, nor how they do it, they succeed in awakening and inspiring like alert and intense mental activity in those with whom they come in contact. - John Dewey*

a. Presence. A teacher needs to provide his students with an assurance that he knows what he is talking about. He masters the subject matter. But he need not put on intellectual pretense. Gordon Steinhoff points out that a professor or teacher should feel that he can "let his students in" on his personal process of inquiry. Steinhoff often uses phrases in class like, "I'm still considering this argument," or "I'm still thinking about . . ." An effective teacher does not need to establish superiority or dominate the

reasoning process in his classroom. Students should learn that knowledge "wrestling matches" are often longer than "a season."

b. Partiality. In our present system the teacher assumes the role of impartial mediator. He does not attempt to sway the class to his personal opinion, rather he must present the merits of both sides and often only leaves students with "something to think about."

Bertrand Russell presented an interesting idea in his plan for ideal education. To make his students realize both sides of an issue, he scorns the present dispassionate approach. He writes that, "The best teachers are not impartial, they are men of strong enthusiasms, to which they wish to give expression in their teaching. The impartiality of the learner is best secured by exposing him to teachers with opposite prejudices" (Hendley, 1986). Unfortunately, proponents of opposite sides are not always available. For my history classroom I would be hard-pressed to find a serious pre-1860's southerner who resisted abolition. I worry too, that students might become cynical. This approach might lead to a skepticism of all strong opinions; the students might become wary of any position that is violently defended. Russell responds, "So much the better; that is the very attitude of mind that the modern world most needs in the mass of mankind."

I have appreciated when teachers let me in on their individual positions. My High School civics teacher, Neil Fuller, was a Democrat in a strong Republican district. I appreciated when he questioned the representation we could expect from a Republican State Representative who continually ran unopposed. When students realize the principles of reasoning, they can be trusted to take their teacher's personal opinion for



what it is worth. I encourage teachers to present their views when they can legitimately support them. I do not encourage Russell's cynicism, but I fear that when we restrain our educator's personal expression we encourage apathy. Such opportunities also provide students with the proper circumstances for mental exercise.

c. Language. A formal language encourages precision and clarity in the classroom environment. These lend themselves well to reasoning. By formal language I refer to a style characterized by its form and structure. John Lackstrom, of the USU linguistics department, argues that such a style begins with an explicit definition of terms. The line of discourse need not be dry, but target words indicate a process of deduction: now, if, then, and, or, but, and therefore.

There is no such thing as absolute clarity. Aristotle taught that it is the mark of an educated person not to expect more rigor than the subject matter will allow. Clarity and rigor are context-dependent. A teacher needs to use good judgment to determine the right degree of clarity and precision (Fogelin and Sinnott-Armstrong, 1991).

Searching, carefully worded questions and statements should be designed to elicit thought and encourage clear reasoning. It is important to remember here that clear reasoning does not guarantee valid reasoning. Precise language will not become a cure-all, but will make it easier to detect faulty conclusions. Usually, unclear language is a sign of unclear thought.

We should not make our language sterile from over-analysis or distant from vital context of words and ideas. But Richard Rorty explains that we should all be open to the possibility of finding, "new, better, more interesting, more fruitful ways of speaking." John Smith writes that teachers should be "reflective thinkers seeking to describe,

interpret, and illuminate lived experience by making more precise the vague expression of ordinary communication" (Hendley). I found that when I carefully phrased my lectures, my students carefully digested and thought about them.

d. Emphasis. Emphasis cues increase informational redundancy and signal students to focus intently on information necessary for proper reasoning (Bame, 1995). In addition, emphasis allows students to "follow along." Repetition in the classroom is crucial to retention. I spoke with James Bame, a USU linguistics professor, and he advised me of his study of lectures at Utah State. His research was originally designed to improve the classroom experience for foreign students at USU. His suggestions can improve the learning experience for all students.

Bame categorizes a number of useful linguistic "signals" in teaching that catch and accurately direct a student's attention. These include repetition by restatement, "Security, this is much more secure," and by paraphrasing, "You're RS 232 sends information bit by bit. One bit at a time" (Bame, 1992). There are specific phrases that make students 'hone in' on what is being taught: "The *real problem* . . .," "The *whole idea* here . . .," "The *key thing* is . . ." (Olsen and Huckin, 1990), or "There are advantages and disadvantages to each" (Young, 1994).

There are "markers of information organization" that help students recognize the larger picture and synthesize information. Topic Markers introduce new topics and allow students to follow transitions. These include: "Let's talk about some problems, okay?", "... we're working with transfer of heat. . .", and "We have sales taxes. Sales and excise taxes" (Bame, 1992). These topics end with Summary Statements: "... what I'm trying to say is . . .", "... to make a long story short . . ." (Nattinger and

Decarrico, 1992). It is also well-understood that examples make it easier to apply the information we receive. These help because students have a tendency to get caught up in relevancy objections when they study reasoning skills. "Visible" language sign posts will not give them a full view of the final product in reasoning, but it will make the trip applicable.

e. Logic. Teachers need to understand, for themselves, the basics of logical structure. Note that I do not recommend a formal discussion of logic in class with students. I indicated above my own failures trying to teach logic to my students. I recommend the brief second chapter in Jay F. Rosenberg's The Practice of Philosophy: a Handbook for Beginners. He includes various argumentative structures: 1) IF . . . THEN, 2) NOT with IF . . . THEN, 3) BOTH . . . AND with NOT, 4) EITHER . . . OR with NOT, and 5) EVERY and SOME. He also covers three common logical argument forms: Dilemma, Conditional Proof, and Indirect Proof.

Teachers should realize that fallacious arguments can be picked apart by their structure. They should be trained to "skeletalize" data, findings, and claims. This includes the ability to separate the conclusion and order the premises. Teachers should be aware of the many unstated premises most arguments contain. These premises are often suppressed, not for deceit, but to encourage efficiency of language. Pulling them out can either make an argument clear or make it long, cumbersome, and disinteresting.

When they make an argument clearer, red flags begin to wave. Suppressed premises cannot be controversial. If they are, then (though the argument may be valid), its soundness can be called into question. Teachers should point out the instability of

these assumptions. An example: The politician claims, "My opponent is opposed to the death penalty, so he must be soft on crime." The politician assumes that anyone who is opposed to the death penalty is soft on crime. It can be shown that a person can oppose the death penalty while supporting other severe punishments for criminals. Thus the politician has led us astray with his argument. Some of the more common assumptions that I picked out of arguments in a conservative Idaho classroom are: less government is always more desirable, lower taxes are always better, anything that is good for dairy farmers is good for everyone.

## II

Mill believes that an effective curriculum of reasoning skills will pick apart fallacies. We will examine the most common forms of unreasonable thinking. The errors in reasoning are subtle, visible only upon careful inspection and when put to the tests of logic (Goodman and Goodman). In effect, we learn to appreciate proper reasoning when we become familiar with improper reasoning. Mill writes:

*The first intellectual operation, in which I arrived at any proficiency, was dissecting a bad argument, and finding in what part the fallacy lay: . . . I am persuaded that nothing, in modern education, tends so much, when properly used, to form exact thinkers, who attach a precise meaning to words and propositions, and are not imposed on by vague, loose, or ambiguous terms (Peterson).*

David and Phyllis Goodman, in their book Teaching Reasoning Skills in Schools and Homes, list 17 of the most common forms of unreasonable thinking. These errors come quite naturally to all human beings, in that we are fallible life forms, but they are correctable. Students need to understand these forms and how they are commonly applied, or how reasoning is commonly defective. This list is especially relevant for

primary and secondary schools; it is by no means exhaustive. While the list belongs to the Goodmans, the examples are my own observations and may contain literary embellishment.

### 1. Inconsistency

One may claim that politics are frequently (continually?) inconsistent. The simplest inconsistency is a contradiction within a single speech, article, or news conference (Kahane, 1984). Congressman Jim Hansen favors large increases in government services, especially defense while also favoring important tax reductions. Since government services cost money; Jim Hansen's "package" can be regarded as inconsistent in the absence of a plausible explanation.

The person expects high standards from himself or others at some times and not at other times. He wants to own things but not to earn the money to buy them. Maybe he wants high grades but will not study.

### 2. The Non-Sequitur

Consider the following Doonesbury cartoon (G.B. Trudeau, 1975):

Duke, Secretary of State: Quite a view, MacArthur, quite a view! Is the volcano still active?

MacArthur: Semi-active, sir. But you needn't worry - we've got it on a steady diet of sacrificial virgins!

Duke: Sacrificial virgins! You're kidding!

Mac: No, sir - it's a time-honored custom! I hope you don't disapprove, sir.

Duke: Disapprove? We're appalled! How long has this been going on, Mac?

Mac: 2,000 years! But we haven't had a single eruption!

Duke: Can't argue with that.

One's reasoning has gaps in it. In other words, "it doesn't follow." One may not believe what a person says because that person has long hair, for example.

### 3. Generalizing from a Few Particulars

I have met two or three people who come from Michigan in my life. All of these people have been ultra-kind. I conclude that all Michiganders, that is what they are called, are nice.

The person makes general conclusions based on a few isolated facts, as is the case of

deciding that all people belonging to a certain group have qualities that he has found in one or two members of that group (i.e. all Latinos are hyper-excitable, or all tall people are born leaders).

#### 4. Exaggerating

*The News Reader: grades 4-6* reads that because of the Greenhouse effect, North America will dry up. On the last page they have an illustration suggesting what North America will look like in 25 years. The United States is brown and cracked in its sun-baked state, there is one faucet where the state of California should be. One last drop of water drips out.

The person describes a moderate failure as a catastrophe, or an inconvenience as a terrible problem. The above illustration exaggerates the impact of the Greenhouse effect.

#### 5. Building a Case Against Others or Oneself

Consider this quote from Guicciardi:  
How happy are the astrologers, who are believed if they tell one truth to a hundred lies, while other people lose all credit if they tell one lie to a hundred truths (Kahane).

The person selects only those observations about someone or himself that fit his preconceived conclusion - favorable or unfavorable.

#### 6. Predetermining Responsibility

Justin, a USU student, opposes nuclear testing on the Nevada Yucca Mountain site. He is suspicious of the U.S. Government. There are miners and government workers who depend upon the site for their livelihood. When the police bust Justin and his friends for trespassing (they parked their Volkswagen bus off the road to sleep the night), he accuses the nuclear testing site employees of "narking" on him. The workers did it just to "get us."

Instead of assigning responsibility for a given situation to one or more possible causes, the person arbitrarily assigns it to a person he has selected or a condition he has decided, in advance, is the cause.

## 7. Viewing Feelings as Facts

Brad, an eighth grader, wants the underdog team to win the playoff game. He picks them to win and guarantees his friends that this team will play "inspired" ball.

The person believes that because he reacts to something or someone in a certain way that is emotional, this means that something or someone actually *is* the way he "feels" they are.

## 8. Viewing Memories as Present-Day Realities

A car manufacturing executive, also a World War II veteran, believes that Japanese auto manufacturers want to dominate the auto industry market as part of a larger conspiracy to take over the United States. Every property purchase by Japanese businessmen confirms his suspicions.

The person persists in thinking, feeling and acting today as if certain past events or conditions were still in effect and still governing his behavior.

## 9. Perceiving Remote Possibilities as Imminent Probabilities

Congress lifts the ban on assault weapons. The debate becomes heated. One congressman from upstate, rural New York argues that his wife "needs" automatic weapon resources to defend herself at home while he is working in Washington. He cites statistics of rising rural "crime."

The person fails to distinguish between these two very different situations. He cannot see the difference between "could" and "is likely to."

## 10. Trying to Reconstruct Reality

In a letter to the editor, a citizen complains about rising property taxes. She notes that the raise went to an increase in funding education. She does not have any more children attending school. She opposed the raise with some of her friends in a mailing to their congressman. She writes, "Government should be more responsive to the needs of the people."

The person thinks in the "command" mode, declaring that a person or situation "should" or "must" be different than it is, simply because he wants it to be that way. He fails to

recognize the antecedents that explain why something is the way it is.

#### 11. Expecting Immediate or Rapid Change

Brock, an eighth grade student, comes out for the wrestling team. He is an excellent athlete and learns well in practice. Unfortunately, he loses in his first two matches. He quits the team. When the coach approaches him, he states that he'll "never be any good, so why keep going?"

Impatience, in itself, can lead to irrational conclusions about the speed of changes in situations or others' or one's own behavior. The emotional desire for change interferes with clear perception as to its feasibility and its speed.

#### 12. Following Established Habit Patterns

When the classroom is quiet and his classmates are busily working, Phillip gets up to clear his stuffy nose. He blows noisily and the class laughs at him. He enjoys the attention. When Phillip returns to his seat and the class quiets down, he burps. His disturbances get old, but he persists. He annoys his classmates and faces frequent disciplinary action from school administrators.

The satisfaction derived from repeating a behavior interferes with clear perception as to whether the behavior is personally or socially desirable. The person reasons that because a behavior was gratifying in the past, it therefore deserves to be repeated in the future, regardless of consequences. These gratifications may include: excitement, attention, risk, a feeling of catharsis.

#### 13. Assuming One's Behavior is Externally Caused

A teenage killer stands trial. His defense counsel claims that he is only "a product of society."

This assumes a direct relationship between outside events and one's own feelings, thoughts or actions, ignoring *one's own role* in creating behavior (e.g. "He makes me angry"). In a deterministic framework, the person misses the role of personal identity.



#### 14. Assuming One is Responsible for Whatever Happens

In a letter to the editor, a woman accuses the court system of injustice, calling them "a bunch of weak-kneed males." The judge gave a man accused of date rape a light sentence. She argues that since the court admits that the defendant is guilty, he should get "the book."

This is the opposite of Item No. 13 above and is based on the arbitrary concept of self-blame rather than an objective weighing of various causes. This is also the opposite of Item No. 6, wherein one attributes responsibility to others arbitrarily, resulting in "other-blame" and ultimately to paranoia.

#### 15. Perfectionism

The student complains to another teacher that Mr. Haderly "never" explains the assignment clearly. Another student might make the statement after failing a history exam on the Monroe Doctrine, "I can't do anything right."

The person thinks in terms of "always," "never," "have to" and "must not" with respect to his own behavior and that of others. He does not recognize fallibility as an inescapable quality of human beings.

#### 16. Magical Thinking

Nancy Reagan consults her astrologer about White House policy. An infomercial on TV advertises someone who lives a happier life because he regularly consults with his "personal" spiritual advisor. He encourages, "You can call now!"

The person believes that something will or might happen because he dreams, feels or thinks that it should, according to some preconceived "system" of ideas he has adopted. Astrology, numerology, superstition, witchcraft, dreams and other arbitrary ideologies are classic examples of the magical way of perceiving and interpreting the world.

## 17. Mind Reading

The story goes: Dan needed to borrow a hammer from his neighbor Jack. But as Dan starts for Jack's house, he begins to predict how Jack will respond to his request. Dan envisions how Jack will begin to complain and ultimately deny him the use of his hammer. Dan becomes so convinced that when Jack comes to the door, Dan only tells him, "Well Jack, you can keep your damn hammer."

The person believes he can "feel" what other people are thinking or that they can feel what he is thinking. He thus imagines many reactions that may be totally at variance with reality.

The absurdities involved in these reasoning errors are universally apparent. By pointing them out and going over them explicitly, students can become familiar with them. They become sensitive of their own reasoning. Their own thinking becomes toned.

Humans have a great resource in themselves and their own behavior to develop proper reasoning skills. These resources are often overlooked. I have concentrated my efforts in this proposal to self-questioning. When one can note reasoning error and become honest with oneself, the ability to identify and explain reasoning errors in others naturally follows.

### III

The Goodmans propose a "Self-Challenge Game" to build these "mental muscles." The students write their thoughts down into sentences. This is done because sentences are more easily analyzed than thoughts. I find, personally, that my thoughts shock me by their starkness when I write them down. Unwritten thoughts have an ephemeral identity, but I cannot deny my thoughts when I see them before me on paper.

There are four steps to this self-challenge game. Its purpose is to challenge the thoughts behind our feelings. The game: Follow the appropriate steps and respond completely to the questions.

Step A. What's bothering me? What is the problem?

Step B. How do I feel about all of this?

Step C. What am I thinking to myself when I feel that way?

Step D. Now, is there some other way that I could think about this problem and solve it?

The student will become aware of what is happening to his thinking and why (Goodman and Goodman). The Goodmans note that under Step D we encourage a new element in our thinking process: *Reason*. They provide a sample format of the game. This example seems juvenile, but the this is not because of the game's structure. The level of difficulty and depth of thought will be relative to the maturity of the students.

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A: I only got a C on my term paper

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B: I feel pretty lousy and angry

---

C: (1) I worked so hard. I deserve an A.  
(2) Other kids saw my paper and said I should have gotten an A.  
(3) Schools and teachers are all unfair.

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(Sentence-by-Sentence Challenge)

D: (1) A person can work hard on something and not necessarily have a top-notch result. Also, a C is not failing; it just means I have room for improvement.  
(2) What other kids say doesn't prove anything. They are not trained to be teachers.  
(3) I can't really condemn all schools and teachers just because of my not getting the grade I expected.

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When students become aware of correct reasoning by these principles above, they will understand the connection between their thoughts and emotions. As the mind

searches for mental balance, it will attempt to imagine what other people are thinking. In the process the mind will gain empathy. Together, balance and empathy create "mental depth perception" (Goodman and Goodman).

Students can then begin to identify the structure of more formal claims and arguments. I encourage students to skelatalize these arguments in order to detect their order, strengths and weaknesses. Philosophy is full of difficult problems and arguments with which students can practice. The wise student will realize that these problems don't have an easy answer. They should be encouraged to wrestle and come up with their best proposal. These activities should not turn into a debate. While debates are excellent forms of mental exercise they do not encourage empathy. They often promote "hostile attitudes" and confrontational skills at the expense of reason and a problem-solving attitude (Goodman and Goodman). I borrow from Jay F. Rosenberg a few examples of these philosophical exercises.

1. Giving a poor man a penny does not alter the fact of his poverty: If he was poor before you gave him a penny, he's poor after you gave him the penny. A man with one penny to his name is certainly poor. Give a poor man a penny and he's still poor. So, a man with two pennies is poor. The same with three pennies. And four pennies. But if one keeps on long enough, the fellow has billions and billions of dollars. An a man with billions and billions of dollars certainly isn't poor. Sure, something's gone wrong with our reasoning here - but where and what?

2. "If you don't believe that there is a God who created and designed the universe, then you must believe that everything that happens and that ever has happened is one vast *accident*." Is that right?

3. The Greek Sophist Protagoras was so convinced of his effectiveness as a teacher of law that he once trained a pupil at no charge, on the condition that the student would pay his fee from the proceeds of the first court case the student won. After he was trained, however, the pupil refused to begin legal practice, so Protagoras sued to recover his fee. In court, Protagoras argued that, win or lose, the student must pay - by terms of their agreement if the student won the

case, and by the verdict of the court if the student lost it. The clever pupil, however, replied that the payment was forfeit in either case - by the terms of their agreement if he lost the case, and by the verdict of the court if he won it. Does Protagoras get his fee or not?

#### IV

What is the effect of a teacher? Students appreciate thoughtful teachers.

Humans have a natural disposition to become what they appreciate. A recent experience of my own "thought appreciation" comes to mind.

I'm a "hayseed" from a small southeastern Idaho town built underneath the West Side mountains. Driving out from those mountains one evening last summer, I stopped to help an old cowboy fix his fence. In our conversation, I told him about my educational accomplishments and future plans. He told me about the first person on the West Side to earn a doctorate degree and become a professor. One Swedish farmer approached this professor not long after and said, "Well, I hear you got your edification."

The professor replied, "Why yes, Sven, I guess I've progressed as far as I can in my field."

The farmer responded, "Yeah, but what the hell do you know?"

Since then, I've pondered the message of that wise cowboy. Reasoning individuals understand the nature of the larger picture. I still ask myself, What do I know?

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