

SYSTEMS OF BELIEF

Epistemologists divide all beliefs into four systems, depending upon the source of the belief:

INTUITION

I believe because I know in my soul that it is so. The difficulty with this basis of belief is that it is essentially incommunicable. We can never really know what some other person believes. We have only their word on it. Moreover, even when such statements are sincere, A's intuitive belief may well contradict B's intuitive belief. This makes it impossible for a rational observer who intuits nothing of the sort to determine which should be believed—if any. Intuition should not be confused with:

REVELATION

I believe because God told me it was so. Again, the basis of the belief is essentially incommunicable. Judging from the tremendous variety of religious beliefs now and in the past, it appears that God has told quite a lot of people quite a lot of contradictory things. Many of the inmates of our mental institutions are absolutely convinced that God has told them what to do. If God has spoken to you personally, then that's the end of the argument. Usually, however, God has spoken to someone else, and you are relying on that person's statements. This leads us to:

AUTHORITY

I believe because X says that it is so, and I respect the opinion of X in these matters. Once again, because the various authorities state various contradictory things, and each insists that his own version is true, the rational observer is left with little other than personal liking or upbringing as a basis for choice between them.

When we are children, of course, we are expected to bow to the authority of our parents and teachers. Adults, however, are expected to make up their own minds. In fact, the questioning of authority is a vital and necessary requirement for

a child to become an adult. Teaching young people to question authority and think for themselves is something that all universities are supposed to do, but many do not.

EVIDENCE

I believe (temporarily) because the results of observation or experiment support the belief. I am willing to change my belief when the evidence supports this change. This belief system is the basis of all of the sciences—including the atmospheric sciences. In the opinion of the scientific community, this is the only **rational** basis for belief.

You may argue, of course, that pure reason based solely on scientific evidence produces a philosophy that is emotionally and spiritually unsatisfying. You have a perfect right to do so, and you will find many scientists who will agree with you.

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SCIENTIFIC BELIEF

Science is a system of knowledge and belief based solely upon evidence. It denies intuition, revelation, or authority as acceptable bases for belief. A scientist, however, may temporarily accept the statements of a scientific authority in some field other than his own, but he is unlikely to accept such statements in his own field. He is far more likely to question authority, because scientific reputations are made by such successful skepticism based on solid observation, experiment, or logic.

Science progresses by destroying current hypotheses with new observations and experiments, and forging new hypotheses based on both the old evidence and the new evidence. The only thing a scientist loves better than formulating a new hypothesis is gleefully poking holes in the hypotheses of his colleagues. This is the way science progresses toward a better understanding of the universe.

It should be noted that this means that all textbooks and all scientific teachings contain errors. If this were not so, then no scientific progress would be possible. Einstein once remarked that within a hundred years of his death, all of his scientific beliefs would be outmoded. It didn't take that long.

SCIENTIFIC EVIDENCE

Neither observation nor experiment are considered to be scientifically valid evidence unless corroborated by a minimum of two independent scientists (or teams of scientists) who performed their observations or experiments following rigid protocols acceptable to the scientific community whose field this is.

Statements by scientists, no matter how renowned, are not scientific evidence. Nor is intuition, revelation, or any other kind of authority. As Sgt. Friday used to say on *Dragnet*, “Just the facts, ma’am, just the facts”.

As a point of information, the results and conclusions of mathematical (computer) models are not considered scientific evidence. Such models are considered a form of hypothesis generation, and not a form of evidence generation.

It should also be noted, that scientific evidence is not at all anything like legal evidence. The standards are completely different.

Any claim not based upon scientific evidence is subject to attack in the world of science. It is, in fact, considered the duty of every scientist to attack such claims with the full arsenal of arguments that is his or hers to command. However, since scientists live in the real world along with everybody else, lack of interest, lack of time, or simply prudence may dictate otherwise.