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## Ignorance as the Driving Force

In the sense of unaware and as yet unlearned, our ignorance and our recognition of that ignorance may be the best motivation both for problem-solving and for creative activity. Instead of patting ourselves on the back for our firm grasp of nature, while at the same time condemning ourselves for being too smart for our own good, we ought to recognize what we do not know. We have heard the paeans for the great capabilities we have developed and we have heard the criticisms for these same capabilities at the same time.

"Information explosion" is a well-recognized phrase, but what should be at least as noticeable is that it is accompanied by an information compression. The latter stems from numerous imaginative hypotheses and well-developed theories and models that could only have resulted from continually clearer insights. The compression permits previously scattered facts and observations to be retained, not as a great number of individual items but as part of a larger picture capable of acceptance of additional facts and observations. But all viable theories have led to other shadowy or dark areas of understanding—in fact, to an ignorance explosion.

Why not inventory the gaps in our factual knowledge and general understanding in every field susceptible to such a listing? This would permit a more rational basis for debate of such things as the true nature of our current energy problem, or the indistinctness of the basis for criminal behavior, or the vagaries of market indicators of economic health. Perhaps the mere acknowledgement of the still-pervasive ignorance in all human activities would make progress more likely than does shouting about our vast knowledge.

Further, it would be therapeutic to recognize that there is ignorance beyond that which is identifiable—that is, "pure" ignorance, the ignorance of which we are not yet even aware. This is nibbled at by those who have the gift of being able to perceive and hazily define the vast stockpile of the not-known. These gifts are equivalent, whether they result in literature, art, music, or fuller understanding of the physical world or of human behavior. They can be lumped under the heading of creativity. This is a vital if not critical force in society. If it is not a critical force, that is only because of the time scale of usability. Creative activity (research) involves a stochastic approach to the totally unknown, and this comes from individual interest in a way not too susceptible to management.

It seems likely that our ignorance is as great as it ever was, to judge by the number of questions that can still be asked. Maybe ignorance should be treated as a constant of nature. Or maybe it appears to be constant and continuous up to some critical point beyond which everything starts over. In any event, ignorance seems to be the driving force impelling us to refine truth constantly.

It may be noted that this approach to truth seems to be of concern to some people, and it may be one basis for anti-intellectual stirring. For those to whom truth is an invariant, that is, something engraved in stone, it must be unsettling to be told that even long-standing natural "laws" are subject to alteration in light of fuller understanding. This must be especially unsettling when the same proposition is applied to human "truths."

Thus, for the reasons stated and probably for others not recognized here, it might be helpful to remind ourselves regularly of the sizable incompleteness of our understanding, not only of ourselves as individuals and as a group, but also of nature and the world around us.—NORMAN HACKERMAN, *President, Rice University, Houston, Texas 77001*