

# IGNORANCE AND SCIENTIFIC PROGRESS

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"The philosophies of one age become the absurdities of the next, and the foolishness of yesterday becomes the wisdom of tomorrow." Sir William Osler (1)

"The greatest single achievement of science in this most scientifically productive of centuries is the discovery that we are profoundly ignorant; we know very little about nature and understand even less." Lewis Thomas, M.D. (2)

Socrates was the last eminent philosopher to research ignorance and praise it as the source of all inquiry and understanding. Were he to return, Socrates would no doubt relish this era of spectacular scientific advance, full of questions and funded questioners. As a committed gadfly, he would probably challenge the prevailing opinion that knowledge is the revered end of science, ignorance its presumed foe. For it could not escape his notice that, in practice, today's scientists are too sophisticated to settle for "knowledge;" that, in fact, the precepts of modern science which best promotes discovery reflect principles of "Socratic ignorance."

It is easier to recognize ignorance than to define it. The Oxford English Dictionary characterizes ignorance as "the want of knowledge." But what is knowledge? Philosophers have disputed this very question for millennia, agreeing only to disagree about nearly everything. Still the great majority hold that knowledge is truth; truth is timeless; and pretenders to knowledge must justify all claims rigorously. From these premises follow two humbling propositions:

- (1) Since we finite human beings have at best time and means to demonstrate

the truth of only a few of the infinitely many true propositions about the universe, and these only tentatively, there will always be infinitely more true things than we can be said to know.

- (2) Because all propositions are potentially corrigible— subject to revision, refinement, or rejection over the course of human study of the universe — we must admit the possibility (however bare) of being wrong about any or all items of current knowledge.

In other words, because the universe so far surpasses our potential to comprehend it, fallibility, incompleteness and infinite revisibility will always characterize the best of human hypotheses and the whole of science. Thus, even as we debate the nature and extent of human knowledge, we see that the domain of non-knowledge—ignorance— contains all the things we know we don't know; all the things we don't know we don't know; and all the things we think we know but don't. It is in fact, the very domain of science.

Seen from this perspective, ignorance is not a void. It is a plenum: a vast and fertile terrain whose domain shifts with inquiry. In this realm dwell known, unknown and unknowable unknowns; imperfect, incomplete and erroneously accepted "knowns;" a continuum of highly dubious through highly corroborated hypotheses; and every possibility as yet unthought, unsought or incompletely explored. Ignorance is the true terra incognita of inquiry.

Further, awareness of ignorance, either in general or of specifics, provides both impetus and materials for inquiry. In fact, and by definition, learning presupposes ignorance. Inventiveness, problem-solving and effective questioning depend on refined abilities to identify and examine what we don't, but want, to understand. As the French philosopher Stefan Lupasco points out (3), the activity of "knowing" (coming to understand) is tied inextricably to less prestigious processes of "unknowing" and "not-knowing." And research on creativity suggests that highly refined capacities to "not know"—such as abilities to suppress preconceptions, embrace serendipity, selectively "forget" irrelevancies, see and create new patterns of possibility—distinguish highly creative individuals from less inventive types. Understanding, often identified with knowledge, might be better described as a productive relationship between *unknowers* and the *unknown* in which old "knowns" topple as new insights uncover fresh areas of ignorance to be explored.

While modern scientists increasingly acknowledge the pervasive uncertainty which underlies the processes and objects of their investigations, only tacitly do they recognize the scope and power of ignorance. Nevertheless, their best theory and practice reflects "Socratic ignorance." After all, science itself rests on the unknown. And today's practitioners freely acknowledge the unavoidable fallibility and incompleteness of their best attempts to understand the world. Rejecting certitude as anathema to scrupulous inquiry, they treat all claims, however entrenched or meticulously corroborated, as hypothetical: subject to doubt and revisable on the basis of future evidence. In contrast to glib media experts on health and science who appear to "know everything about everything," reflective working scientists reckon daily with transient "knowns," rapidly decaying "facts," and shifting fron-

tiers of observation, interpretation, and conjecture. As Miguel de Unamuno, Spanish physician and philosopher observed: "True science teaches, above all, to doubt and be ignorant." (4)

Is ignorance bliss? No. That which we ill understand can and does harm us. Still needed understanding comes from disciplined inquiry: a process which at least tacitly entails admitting ignorance. And certitude impedes inquiry far more effectively than nescience. After all one who "knows" need not seek; not seeking, not keeping eyes open, one rarely discovers. Fully satisfied with the "knowledge of the day," one rarely revises, ceding discovery to the curious, the wary, the restive, the bold, the "outsider," the uncommon reader.

Whatever our epistemic allegiance, we humans are, as Lewis Thomas observes, just beginning to learn how to learn. (5) And, as we strive to better relations with a universe which is meliorable yet beyond our comprehension and control, we neophyte learners need to remain restlessly ignorant, hopefully skeptical, refusing on principle to assent to certitudes beyond revision. Setting our eyes on some wisdom beyond knowledge, we need to promote curiosity, inventiveness, imagination, ingenuity, inquiry, optimism, humility, and other Socratic virtues essential to scientific progress.

## REFERENCES

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2. Bulger, R: Notes of Lewis Thomas Watcher. Pharos, Spring (1984), 25.
3. Lupasco, S: *L'univers Psychique*. Paris, 1979.
4. deUnamuno, M: *The Tragic Sense of Life*, 1913.
5. A theme in many of Thomas' essays including "How Should Humans Pay Their Way?" *The New York Times*, August 24, 1981, p. 19.