

On Fact and Fraud: Cautionary Tales from the Front Lines of Science
by David Goodstein
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BOOKS

On July 8 the third official U.K. report on what the press called “Climate-gate” was released. At issue were some 1,000 hacked emails from the Climatic Research Unit (CRU) at the University of East Anglia—a world leader in the field.

Among the stolen CRU emails one, by unit director Phil Jones, was identified as a smoking gun. In it Jones exulted over a “trick” by which proxy data had been eliminated to protect the upward swerve of his colleague Michael Mann’s “hockey-stick graph”—something taken by Al Gore to prophesy a Venusian future for planet earth.

The July report was delivered by a long-retired civil servant, Sir Muir Russell. The CRU scientists, Sir Muir opined, had conducted their research with exemplary “rigour” and “honesty.” Nonetheless, the tricky graph was “misleading.” It was baffling. You expected it, of course, from car salesmen (and most politicians), but how could a scientist be “honest” and “misleading” at the same time?

David Goodstein’s previous book, *Out of Gas*, went through many editions. When Princeton reprints *On Fact and Fraud* they should commission a supplementary chapter on East Anglia’s nightmare. It’s precisely the kind of case that fascinates Goodstein and that, as lawyers say, “makes good law.”

On Fact and Fraud is founded on 40 years’ research, 20 years’ senior administration, and 10 years that Goodstein, Gilloon Distinguished Teaching and Service Professor and Professor of Physics and Applied Physics, Emeritus, and Caltech’s vice provost from 1987 to 2007, has spent teaching a popular undergradu-

ate course on scientific ethics with Caltech philosopher James Woodward. As the subtitle “Cautionary Tales from the Front Lines of Science” implies, the book is leavened not merely by long thinking on the subject but by laconic wit. (Anyone who has served on a committee with him will testify to David Goodstein’s ability to enliven even the dreariest Friday afternoon.) It’s a short book, easy to read, highly entertaining, and profoundly thought provoking.

On Fact and Fraud comprises not quite a dozen exemplary stories from various labs, several of them at the place Goodstein knows best. *E&S* readers will be familiar with the first tale—that of Robert A. Millikan’s oil-drop experiments. Did Millikan, as has been alleged, cook the results that won him Caltech’s first Nobel? After subtle exegesis, Goodstein concludes that it’s a close call, but no, he did not. (Millikan, however, would have a harder time nowadays keeping his working materials under wraps for 50 years, with all those hackers poking their noses into his lab.)

Goodstein’s second tale dates from the late 1980s, when a young Caltech postdoc, Vipin Kumar, was accused of faking a crucial figure in one of his papers. Goodstein—by now a kind of fraudfinder general at Caltech—was directly involved in the Institute’s investigation, which “drew a distinction between research misconduct, which it concluded had occurred, and outright research fraud (involving deliberate intent to deceive), which Caltech believed had not happened.”

Goodstein next considers the so-called Baltimore Case—a sorry business that, if nothing else, dem-

onstrated the nonsense of federally appointed “swat teams” like the U.S. government’s short-lived Office of Scientific Integrity (OSI). The case, which turned into a high-profile congressional hearing, was ultimately thrown out on appeal to the Department of Health and Human Services, which found that the OSI and its successor agency “had made errors that rendered their verdicts meaningless.” (The name comes not from the Maryland city but from David Baltimore, Nobel laureate and then-president of Rockefeller University, where the fraud was alleged to have occurred. Baltimore himself was never accused of anything, but he leapt vigorously to the defense of his less-fortunate colleague.)


On the other hand, the saga of the cold fusion circus of 1989 might be called a success story for the scientific method. The extraordinary claims of several researchers to have achieved nuclear fusion in a tabletop apparatus were coolly taken apart by three Caltech scientists (Nate Lewis, Steve Koonin, and Charles Barnes) in a process that exemplified, as Goodstein shrewdly notes, how little rewarded, but vitally necessary, disproof is. Who ever got a Nobel Prize for showing it ain’t necessarily so?

Physics, Goodstein chauvinistically claims, has less fraud than any of the other sciences, but Victor Ninov’s 1999 “discovery” of a new element at Lawrence Berkeley National Laboratory (LBNL) is a shaming example from within Goodstein’s own discipline. The damning verdict on Ninov was delivered by an LBNL committee headed by Caltech’s own Rochus Vogt, whom Goodstein later invited as a guest lecturer to his ethics class.

Goodstein ends each story with a brief “where are they now” that perhaps illuminates the role of contribution. For example, Kumar, whose claims that he “had just been trying to prepare a more compelling figure” and was “green and naive” were met with considerable skepticism, was nevertheless given the benefit of the doubt. After being dismissed from Caltech, “he served out a three-year banishment from National Institutes of Health funding” and has since resumed his career in science. The unrepentant Ninov, however, after dismissal from LBNL, “found a job as an adjunct professor of physics at the University of the Pacific, which apparently was unaware of his recent history. He is no longer listed on the faculty of that institution.”

Above all, Goodstein is pragmatic. He rejects romantic (“inductivist,” he calls them) myths that see the scientist as insulated from the real world. Scientists want to make careers for themselves; they want to be first with discoveries.

In the last analysis Goodstein, the consummate scientist, comes across as an advocate of humanism—odd as the term may seem. It’s no accident that he cross-listed his immensely successful course with Caltech’s humanities and social sciences division and has cotaught it with a philosopher. Goodstein’s humanism expresses itself as a fundamental belief that scientific honesty is, ultimately, an ethical issue. Scientists, like Caltech’s undergraduates, must live by an internalized honor code. It’s a noble idea.

This, then, is the moral of David Goodstein’s cautionary tales: be good; and if you can’t be good, you’d better be very, very cautious.—JS 

A MINE FOR DARK MATTER

In “A Mine for Dark Matter” in the Spring 2010 issue of E&S, we described the late Caltech astrophysicist Fritz Zwicky using a choice of words to which the Zwicky family strongly objected. They sent us this letter, which we publish exactly as received.

Dear Editor:

My grandfather, Fritz Zwicky, was a brilliant cosmologist and visionary who courageously forged into the unknown universe and discovered Dark Matter. His morphological methodology, Zwicky Box, allowed him to envision as yet unseen phenomena and realize those in this dimension. *Directed Intuition in Astronomy* - “We shall be concerned here mainly with the prediction and visualization of the existence of as yet unknown bodies in cosmic space.” (Zwicky xi). I can appreciate the attention his historical accomplishments have garnered, Dark Matter, Supernovae, Gravitational Lensing, Sky Survey, and inventor of numerous jet propulsion prototypes holding patents in SQUID Solid Propellant, Thrust Motors with High Impulse, Two Piece Jet Thrust Motor, and Device and Method Jet Propulsion Through a Water Medium, that remain without parallel. The entire scientific intelligentsia, the renowned institutions in the world are spending enormous sums of money, including the greatest minds in science, have all thus far failed to explain Dark Matter 80 years after it was first identified.

My grandfather identified an extravaganza of precedent-setting observations that were not understood by many benighted ignoramus of his time. Therefore, he no doubt invoked

great animosity by telling his colleagues that they were missing 99% of the universe, and that they were only looking at the dustbunnies in front of the door. No conductor wants to be told he has lost his caboose. Hence, there arose great resentment against his genius, and a resulting incessant campaign to suppress his work, extinguish the rightful credit due and transgress his memory upon his passing. Their voices remained remarkably silent during his lifetime.

It is becoming more clear to me that his shining superstar will always illuminate the heavens, and will never be surpassed by those of dimmer luminosity. As a scientific prophet, he will continue to suffer the literary assaults by self-serving authors, propelled by an embittered scientific establishment that continues the siege commensurate with their failure. His memory and work will be respected and accepted by a new generation that is not bound by fossilized paradigms no longer relevant in the sciences. He will be recognized and honored for his professional accomplishments on the world stage.

My grandfather’s words identify the corrosive elements that he encountered on a continuum in the the scientific establishment.

“I first presented the possibility of neutron stars in my lectures on astrophysics at California Institute of Technology in spring of 1933, suggesting that they are formed by implosions from ordinary stars, with resulting liberation of tremendous energy. In November 1933 I present the theory of the origin of supernovae and of cosmic rays as being caused by the implosion of stars in to neutron stars.” (xiv Zwicky).

This review was written by John Sutherland, who was on the faculty from 1984 to 1992 and was a visiting professor of literature, and then of English, until 2007. He is now a professor emeritus at University College London.