Religious commitment and its interaction with scientific professions: a low-church real-science, critique of "science" and "spirituality"

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Abstract

After a brief autobiographical background, as an activist scientist and engineer, the author offers a broad critique of the attempt to relate science and religion at the theoretical level. The important level at which to seek a relation, both scientifically and religiously, is one of practice, not theory. Indeed, because science as theory is itself in the process of reaching its own internal limits, because of the manifest failures of reductionist science and technology, it is time for scientists and engineers to return to Einstein's commitment to pursue science for the common good. The rising popularity of alternative medicine is also cited as a contemporary historical phenomenon that points toward an emerging, fundamental realignment of the science–technology–society relationship. © 1999 Elsevier Science Ltd. All rights reserved.

As a professional working scientist (on the faculty of a major research university for over 50 years) in the mainstream "real" science of materials, and at the same time an activist member of a religious community, I evaluate the present flurry of media interest in the subject of "science, technology and the spiritual quest", from a rather different perspective. My background prejudices me toward the exoteric rather than the esoteric, and also toward the "spirituality" of the average citizen, not the academic. My activism prejudices me to believe in the supreme value of the experiment, the experience, and the praxis. Because I believe that any alleged interactions of x and y in humans can best be judged in the incarnation, the experiment itself, in the person of the scientist or technologist, I start with my personal history,

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which may explain my perspective to the reader. In fact it is an integral (albeit usually hidden) part of this as any text.

1. A personal memoir: spirituality

I was born a genetic 33rd generation Brahmin and by culture, high church. Schooled in the Bengali idea of intellectual aristocracy, with a superimposed Anglican upbringing in the most exclusive schools and proper churches, it may be surprising that I quite easily slid into a very low-church ecclesiology, theology, and "scienceology". It happened at age 21 when, fresh from those refuges of privilege in India, I landed in the US at a modest university in a rural setting — Pennsylvania State University.

Both my father and my school principal had exposed me to the idea of radical churchmanship. They, by a striking coincidence, had each come under the influence of the Oxford Group, in England, in the mid-1930s. This movement had been started in the US by Frank Buchman, who had developed some 40 years earlier the fundamental concepts which were to shape 20th century culture in many intriguing ways, on the same university campus — Penn State.

Some of Buchman’s original ideas have been unbelievably powerful for millions on their spiritual quests: the emphasis on small groups (the 12, the cell group) as the fundamental unit of both church and society. The emphasis on ortho-praxis (his four absolutes of behavior: love, unselfishness, purity, and honesty). The concept of confession to the group for psychological health. His early turn to cross-religious interaction and involvement. Penn State and later Princeton (to which Buchman moved) alumni fanned out across the world as missionaries, especially to China.

The story, possibly apocryphal, is told that Mao was a helper in the library of the YMCA, where he learned from H.S. Leiper about not only baseball, but also cell groups, group confessions, disciplined cadres. (Do those not ring any bells in the history of communism?) In the US, Buchman’s friend, Sam Schoemaker, translated the cell protocol and discipline into Alcoholics Anonymous. O. Hobart Mowrer, research professor of psychiatry at the University of Illinois, credited the Oxford Group ideas with the beginnings of group therapy, not for upper middle-class housewives but in prisons.

An early book about the movement was by the English journalist Peter Howard [1]. It was entitled Ideas have legs — which they certainly did for the millions affected on their very different spiritual quests. They sure did, in my case, from Penn State to India and back.

I recount this background because it is essential to the position I take on the interaction of religion and technology, of which science and theology (spirituality?) is a subset. On landing in the US I was immediately immersed into the most advanced frontiers of the church. The first service I attended was in Sam Shoemaker’s famous Trinity Church in New York City; 1 week later I was in a Presbyterian student study group led by Don Carruthers, another close friend and follower of Buchman. Six months later I was in the nation’s first (then budding) Protestant retreat center under
John Oliver Nelson, another person deeply influenced by these same radical ideas. Fifty years later, I can only report that my life in the church has been consistently involved with its cutting edge, not only in the theology but also in practice — in activism.

An American physicist in the 1930s really interested in the world of physics had to head to Germany. To not hang around as postdoc or visitor at Oslo, Göttingen, Heidelberg, Zurich, and Berlin would disqualify one from writing about the “scientific quest” in the formative years of modern physics. In a like manner I recognize that I was enormously privileged by sheer providence to associate with so many on the frontier of the spiritual quest.

2. A personal memoir: science

But this is an unbalanced tale so far. I was, after all, also a budding scientist. Albeit I had won the Classics prize in prep school, winning the Science and Mathematics prizes opened the door toward science. Having graduated with a Chemistry Honors degree in India as the Japanese flirted with the idea of an overland thrust toward India in 1942, I narrowly escaped my own volunteering to enter Air Force Officer Training and fly Spitfires, because the British psychologists on the examining board found that I was only 17 1/2 years old. By 1945 with a Master’s degree and some research I was selected (80 among 18,000) to be sent abroad to bring advanced training to bear on India’s traditional industries — among them the mineral, mica, essential to all electronics in those days.

By 1949, with my Ph.D. and postdoc year and a new American wife, I returned to India to help in a small way the cause of Indian industrial advance. But even with the personal intervention of Prime Minister Nehru, to get his government to utilize my talents, it became clear to me in less than a year that the offers from America to enter a career in science made sense. My career in science was thus a pragmatic choice not a burning vocational call.

Fifty years later, I am an international leader in the field of materials science, and shaper of the new field itself. Materials are, in a precise sense, the closest to humans of all the real sciences — the truly fundamental sciences. Materials literally enable day-to-day human existence, and equally every advance in science from the silicon in every chip to the magnets in the supercollider. Penn State’s Materials Research Laboratory, which I founded and directed for a quarter of a century, is by universal acknowledgement the most influential in the field.

One could make a case — which is extremely difficult to make for the abstract sciences, that our research itself serves the higher aspirations of humankind. Some of our research can be associated with noble goals. We were the first in the world to seek the optimum material to contain radioactive waste. We are working to minimize industrial CO₂ production by radically redesigning the materials used in cement. We make synthetic bones, and more.

Although I find this line of justification of one’s work, spurious and ex-post facto, still “materials” as a scientific field — albeit eclipsed in the PR world by the biologi-
cal fields — represents the new champion (David), of the real sciences (together with agriculture, health, earth, and engineering) which can be directly perceived by the five human senses to tackle the establishment (Goliath) dominated by abstract-scientists.

Real sciences explain the world of human experience, they provide millions of jobs, they make myriads of useful (and useless) things, and shape our human-made world in every detail. Their future is bright because their ability to tinker with and modify reality often (unfortunately) produces saleable “products”, for good or ill! These real sciences, in which vast numbers of chemists and physicists participate, are what the public vote to spend money on. They can be contrasted to the abstract (increasingly indeed, virtual) sciences of abstract physics and astronomy and parts of chemistry that have no possible tangible value to 99.9% of humans, and which only a minuscule fraction can comprehend. The abstract sciences have — in my view — a bleak future, because they have finished their work of explaining at the abstract level everything that other citizens, and indeed other scientists, need from them.

Let me summarize this very personal introduction to this topic and explain why it was necessary. In the last few — very few — years there has been an outburst of conferences and writing, and courses under the general rubric of science and religion, but often using the vaguer title, “science and spirituality”. In addition, of course, there have been even more proposals for getting money to do something, since commitment was not enough to get one started.

The fact of the matter is that much of this activity — as in much of science today — is largely determined by extrinsic grant money, not personal dedication. In this case a very large proportion of it comes from one source — the Templeton Foundation. Many similar efforts all appear to encourage the rubbing off of the prestige of science on to spirituality. This is a rather odd reasoning, when one considers that perhaps some 1% or less of the population have any feeling for science, whereas a large majority have some spiritual experience and knowledge. In fact the common bond between such esoteric science and esoteric spirituality is the vague sense of awe and wonder, indeed a warm fuzziness about the esotericness itself.

3. A plea for precision: a critique of some “science and spirituality efforts”

Mahatma Gandhi compiled his own list of “The Seven Deadly Sins” some decades ago. I am very taken with their relevance to our contemporary culture, where virtually all of them are manifest in the fabric of society. In the present context, I am taken with the relevance (as I paraphrase it) of his sixth deadly sin: “spirituality” (or religion) “without sacrifice”. I believe discussions of “science and the spiritual quest” which do not refer to the “sacrifice” component in both, are inauthentic. In the world of science, what do the experimental data show? One good experiment is worth a thousand expert opinions.

Equally problematic is exactly what one refers to by the words “science” and “spirituality”. Dag Hammarskjöld in Markings [2], has a stricture for all of us who write for the public, which is also relevant to my text:
Respect for the word is the first commandment in the discipline by which a man can be educated to maturity — intellectual, emotional, and moral.

Respect for the word — to employ it with scrupulous care and an incorruptible heart felt love of truth — is essential if there is to be any growth in a society or in the human race.

To misuse the word is to show contempt for man. It undermines the bridges and poisons the wells. It causes man to regress down the long path of his evolution.

“But I say unto you, that every idle word that men speak…” ([2] p. 112).

I believe that as scientists we have not been sufficiently precise when we use words such as “science” and “spirituality”. As one who has been involved at the cutting edge at the national level, on both sides of the aisle and in the science and religion interaction, I could digress at length on this matter. I have tried, instead, to distil my own “wisdom” on the matter into a few pithy theses.

The key conclusions that I have reached, as one working and writing actively both at the cutting edge in my own field of materials science, and participating at the frontier of the world of religion, are:

1. “Technology/science” and “religion” are two of humankind’s major spheres of creativity and motivation and guidance, they each cover vast ranges of human concern and activities.
2. Discussions about their interaction which do not cover this fullness, and breadth, do a disservice to both.
3. Cosmology is a tiny part of physics, which is a minor part of “science”. The “creation” episode or story is a very minor part of any religion. Order of magnitude estimates would say each take up say 0.1% of the field under those names. It is not helpful and it is unscientific to focus so much effort on the vanishingly small cross-section of their intersection. To confuse this tiny part with all the rich potential for interaction of science and religion is very dangerous and irresponsible.
4. The word “science”, for 99% of the public, usually refers to technology, and speakers/writers should be extremely careful in not misusing language for rhetorical advantage.
5. “Science and technology” constitutes today, humankind’s major and fastest growing, full-fledged religion, and as a system (a là Ellul) it is a competitor to all traditional religions.
6. This worldwide religion is promulgated and sustained by a dangerous duo: careless scientists and an incognito army of missionaries in every land; the print and
visual media, and their minions — reporters and writers with essentially zero depth of knowledge in either.

7. In the last few years, as the (totally insupportable) argument has been made alleging that economic prosperity is due to scientific and technological prowess, we have an extraordinary alliance of national figures covering the entire political and social spectrum supporting this state religion.

Given this situation, one needs to ask some very difficult questions about science — and, separately, about the "spiritual quest".

What is the status of science in the world today? If by "science" we refer to real science (see above), then 90% of the public associates with the word everything from new drugs to nuclear waste to fantastic new materials. This "science" is riding high in the experience and opinions of Americans. However, regarding the more abstract sciences — gravity waves, Hubble photos, Higgs bosons, and TOEs (theories of everything) — not only the public, but at least 99% of all scientists are totally ignorant and could not care less. Why? Because they can have absolutely no effect on their sciences. Of course their impact on society can never exceed zero.

At the same time, the public has demonstrated its total fascination with science fiction for a couple of hundred years. Star Trek provides continuing proof; and much of what is passed off in many of these discussions is derivative of this genre. Therefore, it is shocking to find establishment science resorting to science fantasy (from comets hitting the Earth to life — green men? — on Mars) to get the attention of the public and money from Congress. Gandhi's deadly sins should be remembered as a prediction and a warning to those who would want to capture a spiritual aura or benefit and not pay any price.

Many American scientists carp away daily on how ignorant Americans are about science and (in their own total ignorance of the hard scientific data) how "anti-science" the youth or the press, etc. are. In fact, NSF data have shown for decades that, consistently, Americans are the most pro-science national group in the world because of the media. Thus, the "approval rating" of useful, real science continues to be very high with the American public, while its knowledge of "science" continues to be low — although no worse than its knowledge of geography or history. It is science-ignorance combined with science-adulation which has brought about the continuation of generous funding for abstract science.

What is really, vastly more significant about the status of science is the increasingly widespread recognition among those that have thought or written seriously about it, that fundamental science is wound-up, complete, "ended". One can define such "fundamental science" easily, as that which affects ever widening circles of neighboring sciences. This definition was first proposed by Alvin Weinberg, founder of the Oak Ridge National Laboratory, in his classic "Criteria for scientific choice" [3]. Modern particle physics and astronomy, of course, fail to qualify by this criterion.

This is the really new feature on the horizon — the fact that "basic science", the kind that is determined by the curiosity of individual investigators alone, not aimed at any goal or product, but at understanding that which does not affect other fields —
is coming to an end. This “end of science” motif has been expanded on in four recent books:

- John Horgan’s *The end of science* [4];
- Daniel Sarewitz’s *Frontiers of illusion: science, technology, and the politics of progress* [5];
- Jean Gimpel’s *The end of the future* [6]; and
- Rupert Sheldrake’s *Seven experiments that could change the world* [7].

These follow my own 1979 Hibbert Lectures, “Experimenting with truth”, where I first broached this theme and cited Victor Weisskopf and Gunther Stent, who had said it even earlier ([8], p. 27).

The simple empirical fact is that since World War II, in spite of an annual worldwide R&D effort of several orders of magnitude greater than the total scientific effort before World War II, nothing fundamentally new — remotely approaching the significance of the discovery of quantum mechanics — has emerged.

Reductionist science has fissioned into ever narrower niches, with each discovery confined to the narrower field. The absolute experimental proof of this judgment is the fact that 100% of the corporate world, since 1992, has eliminated its basic or non-targeted research for the very sound reason that nothing useful can be expected to emerge via that route. They have turned to applications-pulled science, which can include long-term basic science.

The future of science is in such real science — the sciences of agriculture, materials, health, engineering, and earth science — where you can touch, see, and feel the results. It will be applications-driven science — including new very basic science — but always oriented toward a goal. The demand upon scientists, administrators, and journalists will be to return to honest presentations about science, with no hype and no predictions.

4. The rise of whole-person-medicine: nemesis of reductionism

Reductionism has served science qua science, well. However, illicit claims, exaggerations and hype, transferred to a whole-person world, have eroded science’s credibility. The reason why this time reductionism has met its match, and the majority of the public will soon realize the limitations of science, is the meteoric rise of whole-person or integrative or complementary medicine. Scientific or high-tech medicine — as in every primitive-culture — was the proving ground to the public of the validity of all the religion of science. For 50 postwar years, miracle drugs and miracle new tools for diagnosis and surgery were by far the most effective and widespread authentication of the scientific weltanschauung. Antibiotics made relativity believable; X-rays and MRIs made details of the big bang and red-shifts credible, even if esoteric and changeable. The experience of healing by high-tech medicine, allied to the gigantic PR and misleading advertising campaign by industry, conferred credibility on all high science.
Suddenly, however, since about 1995, there has been a revolution — the heroes of healing have changed. Deepak Chopra, Andrew Weil, Dean Ornish, Larry Dossey, Herb Benson, and more are the new gurus or champions of “whole-person” medicine. They have been given more sustained attention (cover stories in Time and Newsweek, a dozen PBS multi-hour series) in the media as healers, than any scientist has ever received (with the exception of Einstein). Their message is quintessentially wholist, integrationist, and fundamentally anti-reductionist. The whole person is body, mind and spirit, an interacting “three phase composite” (in materials science terminology) and may be accessed by any combination or any one of those channels.

As establishment science reaches increasingly into the fringes of the reductionist forest, it is ceding more ground, in the popular mind including (proportionately) scientists, to integration to wholeness — as experienced by tens of millions of Americans. Whole-person medicine is the testing ground, the place where the experience of millions of citizens, will shape their own views of truth and reality. The rise of this “alternative” has been so rapid as to boggle the mind. Moore’s law pales into insignificance when compared to the rate of market capture by complementary modalities. The careful data collection of Eisenberg et al. [9] at Harvard showed that — unbelievable as it may sound — in 1997 more Americans went to alternative providers, than to conventional physicians. Their experiments with truth in their own persons, now challenge the high-faluting claims of high-tech medicine and by close association, high-tech science.

5. The real question: what are the spiritual commitments of scientists?

Science and the spiritual quest often deals with wrong categories. Science is vague and abstract; to the public it is reified in persons. The scientists’ commitment to science is easily seen in their dedication to their work. The more appropriate question is: In what concrete form of commitment is the spirituality of the scientist manifest? How can it be judged? What, in Gandhi’s terms, is their sacrifice? What service, social cause, working for political or social goals, for the poor?

I believe that Einstein was committed to just such a reified spiritual quest. He said, in 1931, at Cal Tech:

Concern for man himself must always form the chief objective of all technological effort — concerning the big, unsolved problems of how to organize human work and the distribution of commodities in such a manner as to assure that the results of our scientific thinking may be a blessing to mankind, and not a curse. Never forget this when you are pondering over your diagrams and equations! ([10], p. 122.)

I personally have found great spiritual growth via this route of working on “the role of labor, and the distribution of goods” in our contemporary society, where these issues are orders of magnitude more significant than subtle changes in a hypothetical cosmology.
6. Epilogue

My subtitle links low-church and real science. That is an authentic match. The low-church is that end of the religion enterprise concerned with the social aspect and incarnated demonstration of its (theoretical) theological affirmations. The Bible says: by their fruits ye shall know them. It is always in the low-church that this ferment of research, of innovation, is taking place. From Martin Luther fighting against indulgences to Martin Luther King fighting against segregation, the emphasis of low-church is on the present cutting edge of ortho-praxis. The niceties of the placing of an “i”, an iota, in the Nicene creed, or the number of angels dancing on the head of a pin, and other esoteric of ortho-doxy are utterly quaint and unintelligible to modern humans. Yet they are still the stronghold of high-church theorists. Likewise real science deals with the incarnation of scientific principles — into materials or medical procedures, which touch people, where they are.

The spiritual quest of the masses must be grounded in, but not limited to, the real, sensible, the immanent. The great contribution that science can make is to help such persons find and link the transcendent dimension to their particular immanent realities.

References


Rustum Roy was founder of the Materials Research Laboratory at Pennsylvania State University and of the Science, Technology, and Society Program at the same institution. He is the author of Experimenting with truth (1981), on the science–technology–religion interaction, and Lost at the frontier (1985), a critique of contemporary US science and technology policy and of some 700 scientific papers.