Commentary

Understanding and Tackling Aging: Two Fields Communicating (A Little) At Last

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ABSTRACT

Those who have followed this journal’s, and this author’s, efforts over recent years to stimulate the rational design of interventions to combat aging have good reason for bewilderment that the concerted application of our knowledge of biology to the defeat of humanity’s foremost killer needed to be kick-started by a bearded troublemaker whose formal academic training was not even in biology at all. Elsewhere in this issue I bemoan the persistent balkanisation of traditional gerontology, whereby biologists, clinicians, sociologists and psychologists studying the elderly seem almost studiously to avoid each other even when participating in the same conference. In this commentary, however, I have something more positive to report. A string of recent and forthcoming conferences, organized not only by those at the forefront of life-extension research but also by highly influential mainstream groups, have publicly endorsed the Methuselah Foundation’s goal of defeating aging. The field of biomedical gerontology—the interface between biogerontology and geriatrics, where biological knowledge is focused on developing the geriatrics of tomorrow—is not a traditional component of gerontology, having been poorly appreciated by biogerontologists and geriatricians alike, but these developments show that it is rapidly taking its place at that table.

THE FAMILIAR UNFAMILIARITY OF SCIENTISTS WITH TECHNOLOGY

Probably the second-best known legacy of Lord Kelvin, the eminent physicist who chaired Britain’s foremost scientific body (The Royal Society), is his assertion in 1895 that heavier-than-air flight was physically impossible. What must not be forgotten is that he was in very good company: indeed, articles purporting to prove this assertion were appearing in learned scientific journals right up until the Wright brothers’ achievement became publicized. Moreover, this particular technological breakthrough was but one in a long line of advances flatly contradicting mainstream scientific opinion.

This phenomenon is perhaps the starkest consequence of something that is not at all obvious about science and technology: that the type of creativity involved in finding things out is very different from that which is involved in building things. Most fundamentally, the ways that existing knowledge is used for these two purposes are totally different:

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scientists prioritize knowledge that can be treated as highly direct evidence for or against a given hypothesis, whereas technologists start by formulating a design, in which the various components need to perform particular tasks—tasks for which evidence is required that the prospective components will be adequate, but for which that evidence may arise from the prior use of the component in a completely different design whose overall goal bears no relation to the one of current interest. A second key difference between science and technology is in the nature of the creative process itself: scientists are detectives, for whom the quest for knowledge is an end in itself, whereas for technologists the only utility of knowledge is in its ability to direct the design process so that the end product works as required. I have in the past summarized technologists' approach as one of sidestepping their own ignorance.

Is there blame to attach here? It may surprise you that I think there is not—at least, not much. Real skill in the scientific method—and here I refer not to the mere technical expertise required to perform experiments in one's field, but to the interpretation of the results of one's own and others' experiments and the evaluation of which experiments are most worth doing next—is something that takes very considerable time and training to acquire, if it is acquired at all. I am one of the lucky few who have contrived to acquire a measure of skill and success in both the scientist's realm and the technologist's, but my use of the word “lucky” is by no means a case of modesty; I may make my own luck to an extent these days, but I have not forgotten that I got here only as a result of a long sequence of entirely fortuitous events in my formative years, which it is hard to imagine any program of training emulating with a meaningful hit-rate.

THE DISTASTE OF CLINICIANS FOR SCIENCE

Since my field (biomedical gerontology) lies at the interface of biogerontology and geriatrics, I am fortunate to be invited periodically to speak at conferences of both types. My experience at my most recent talk, just a few days ago, was typical of the response I receive from clinicians specializing in the treatment of the elderly (whether they call themselves geriatricians, anti-aging doctors or some other term): a strong feeling of dissatisfaction with my focus on the future, and an insistence that I tell them what they can do for their patients now.

I find it highly disheartening that they need to ask this; that it is not obvious to them that their patients will be more motivated to adhere to their recommendations (and their prospective patients more motivated to become actual patients) by the knowledge that such measures may afford them more benefit indirectly than directly. It cannot be denied that the most formidable enemy of the practitioner of preventative medicine—of which anti-aging medicine is predominantly composed—is apathy: the unwillingness of most of the general public to invest what they perceive as considerable time and effort in order to gain only a very modest increase in (healthy or total) lifespan. Accordingly, a core component of the anti-aging physician's arsenal should be the ability to explain to his or her patients that the life-extension benefit may well be amplified by the arrival of future therapies, far more powerful than any available today, which may occur in time for those who make the most of current medical advice and treatments but not for those who do not.

I am thus eager to find an explanation for these physicians' failure to see the situation that way. I appreciate that in many cases the reason may be simple short-sightedness. As with most specialists, there is a tendency to focus more on what one can provide oneself and less on referring the patient to others. But I sense that there is sometimes more to it. Specifically, this short-sightedness may be driven by a difference of mindset, reciprocal in some ways to the separation of scientists from technologists that I discussed in the previous section. I want to stress that this is not something for which clinicians should be particularly blamed—not so much so, anyway, as if plain short-sightedness were the whole story. Why? Simply because, again as with scientists' difficulties with the technologist's
approach, it is a product of training; a broader mind may, in this case, equate to a less efficient mind in terms of the provision to the patient of what the physician is expected to deliver.

**CAN MEDICINE BECOME MORE BIOLOGY FRIENDLY, AND VICE VERSA?**

The foremost question raised by the preceding sections is this: Can the tension between the scientific and the technological aspects of the study of aging be eased? If (as I have argued herein) that tension is not really anyone’s fault, the case is strong for exploring and promoting efforts to alleviate it.1

A number of recent events are giving the increasingly firm impression that this hope is not in vain. I speak here in particular of “events” in the sense in which that term is most often used in science: conferences. The highly successful series of SENS conferences in Cambridge, England since 2003 has led the way in bringing biogerontologists together with biologists working in more goal-directed, but hitherto generally disease-specific, areas, as has been documented in Rejuvenation Research in the past. More recently a meeting in Canada with a similar range of topics enjoyed similar acclaim. However, these meetings could, in truth, only be regarded as a provisional indication that biomedical gerontology has really arrived, since they have all been spearheaded by the present author and/or his foundation.

The motivation for this commentary is that that the days of that caveat can now, finally, be seen to be numbered. Firstly, the just-mentioned spread of the concept of “biomedical gerontology”—a term first coined by Denham Harman in the name of the international society he formed in 1985, perhaps before its time had truly come—will continue in June 2008 with a conference in Los Angeles that is only partly organized by me and whose other organizers (professors from UC Berkeley and Harvard) are altogether respected within the biogerontological community—even among colleagues who have been cautious in embracing the SENS concept. But even more significantly, conferences organized not by scientists but by lobbyists and activists, are now taking the foreseeable defeat of aging seriously enough to embrace it publicly. A first example of this, early in 2007, was the invitation to the Methuselah Foundation to participate as a co-organizer in a small meeting in San Francisco coordinated by the Alliance for Aging Research.2 More recently, the Foundation was invited to be an official sponsor of a high-profile conference in Boston, The Stem Cell Summit, focused on the policy furor surrounding stem cell therapy and designed to educate policymakers and the public on this key area of biotechnology (and of SENS, of course). The Stem Cell Summit had as one of its organizers the Genetics Policy Institute, a leading pressure group seeking to put an end to the uninformed analysis of stem cell and other modern biotechnological research that has led U.S. public policy so severely astray in recent years.3 A string of similar invitations to participate in conferences relating to the politics, ethics, and even theology of cutting-edge biotechnology have recently been received.

**CONCLUSION: SYMPOSIA—CIPHERS OR STEPPING STONES?**

The cynical observer may reasonably ask whether participation in such conferences (and in other similarly high-profile speaking opportunities) really constitutes progress in influencing public attitudes to radical life extension, or whether it is merely a seductive but ultimately superficial activity. My view is that such events would not be staged by experienced lobbyists and pressure groups if they were not effective in winning influential friends for the causes they promote and thus affecting public policy. Administrators and scientists alike are currently cautious in the extreme in their discussions of the possibility that biomedical gerontology might lead to greatly extended lifespans,4 preferring to highlight alternative (though much less plausible) scenarios5–7 and attempting (though this has recently been gratifyingly moderated8–10) to marginalize those who discuss radical life extension freely. While the war on aging remains fundable only by wealthy individuals, only a small minority of
whom are sufficiently visionary to get involved, it will not proceed at the pace that would be possible if the science was the only rate limiter. Events with extensive media coverage, attended by those with real power, will progressively reassure policy-makers that this is an area in which there are votes to be gained (rather than only to be lost, as the intense controversy over the ethical pros and cons of such research11–16 might currently suggest), and will thereby release the necessary much larger sums.

REFERENCES


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