Proceedings of the Fifth Annual Senior Scholars Symposium

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Introduction

It is appropriate that the Fifth Annual Senior Scholars Symposium was conducted for the first time under the auspices of the University of Toronto's Senior College. The first four symposiums were organized by the Senior Scholars Committee of RALUT (Retired Academics and Librarians of the University of Toronto). In April 2009, following the Fourth Annual Symposium at Massey College, many of the participants agreed that it was time for the University's senior scholars to take the next step and form a College to support the kind of activities on display once a year at the Symposium. A month later Senior College was formally founded. The Fifth Annual Symposium is one of numerous activities the College has organized in its first year.

The fifth symposium reversed the format of the fourth. Last year, the symposium presented a panel discussion on the Future of Canada with presentations of research in progress on either side of it. The 2010 symposium opened with a panel discussion of the Future of the University that took up the whole morning. After lunch four Senior College Fellows gave presentations of current research projects.

Morning Session

The Future of the University

The Symposium's organizing committee consisting of Cornelia Baines, John Dirks, Merrijoy Kelner, Suzanne Hidi, and Roslyn Stone did some careful planning of the session on *The Future of the University*. Cornelia Baines surveyed Senior College Fellows to identify three issues affecting the future of the University of Toronto. John Dirks and Merrijoy Kelner interviewed a small group of graduate students from all parts of the university about their experience at the University of Toronto. Members of the committee held a meeting with colleagues actively engaged in university affairs to garner ideas about critical issues to be covered and recent writing on the future of the university.

The result of this planning was a symposium organized differently from the normal "panel discussion". There were no paper givers at the front of the room whose presentations would lead the discussion. Instead, scattered around the room were individuals who had been identified as having particularly important points to make, or experiences to draw upon, or who had done recent research and analysis on the future of higher education. John Dirks chaired the proceedings calling upon these individuals at appropriate places in the discussion. Interspersed among these "designated speakers", were spontaneous contributions to the discussion by many of the Fellows in attendance.

The editors of these proceedings have written the following brief summary of the main points that came up in the discussion.

Financial Stress

Provost Cheryl Misak's remarks that opened the session emphasized the extraordinary financial pressure higher education was experiencing everywhere. Partly this results from the massive deficits governments ran up in their immediate response to the recent financial crisis. Now, as governments try to arrest the growth of their indebtedness, there would be no new money for universities and possibly serious cut-backs. One had only to look at the UK to see how severely public universities might be affected. At King's College London, 10 percent of the faculty have been declared "redundant", while other universities are terminating entire disciplines.

The situation in Canada, Professor Misak observed was less severe. The Ontario Government continued to find a prominent place in its budget for universities. But this could not mean more than that universities would continue to be "flat-lined" by government. The University would have to look to its friends and benefactors to support new initiatives. The recently announced gift of $35 million for the Munk School of Global Studies was "an enormous lift".

The Provost acknowledged that the short-term fiscal crisis was not the most fundamental fiscal challenge facing the university. There was also a basic "structural deficit" within the university, especially in the Faculty of Arts and Science.

A series of measures were now being planned to address that deficit. These measures would not be as drastic as some of those in the UK and elsewhere, but they were bound to be controversial. Bumpy times, she advised, lie ahead.

Later on in the discussion, Professor Ian Clark from the University's School of Public Policy and Governance, drawing on the analysis in the recently-published book, *Academic Transformation: The Forces Reshaping Higher Education in Ontario*, he co-authored with Greg Moran, Michael L. Skolnick and David Trick, focused attention on the structural deficit built into the entire Ontario system of universities. The crux of Clark *et al's* book and of his symposium remarks (see Appendix I) is that Ontario is the only jurisdiction of its size in the world that tries to do virtually all its undergraduate education with the most expensive research university 40-40-20 model where faculty are expected to devote at least as much of their time to research as to teaching. Adequate public funding for this system is simply not possible.

The key system change that Clark *et al's* analysis calls for is structural diversification. A higher fraction of the province's research and graduate education should be done at those institutions with the most productive researchers while at other institutions there should be a shift in the balance of effort from research to undergraduate teaching. This recommendation is in line with one of the key points reported by Cornelia Baines from her survey of Fellows: that

the University of Toronto "must escape the tyranny of the BIU" (basic income unit) as the basis for funding. George Luste, President of the University of Toronto Faculty Association, also remarked that the University of Toronto's funding was simply not adequate for a leading research university. He drew attention to the fact that faculty salaries as a percentage of the University's overall budget have markedly declined.

The proposal for differential funding of Ontario universities is quite different from a recent proposal that the federal government provide extra research funding to Canada's "big-five" universities. As George Fallis, a graduate of the University of Toronto and now a Professor of Economics and Social Science at York University, pointed out in the paper he prepared for the symposium (see Appendix II), such an approach would not be good public policy for Ontario, given that only one of the so-called "big-five" (the University of Toronto) is in Ontario, and Ontario taxpayers contribute 40% of federal revenues.

Clark suggested that the University of Toronto could use its own research strengths to help lay the groundwork for Ontario to shift to a policy of differential funding. First, it could commission a rigorous study of how other jurisdictions have provided differential funding for their public universities. He referred to California, Michigan, British Columbia, England, New Zealand, the Netherlands and Japan. Second, it should continue its leadership in

evaluating university research and education costs and outputs and encourage other universities to do the same.

Concerns about Research

Although all participants agreed that research was one of the university's two primary activities, many expressed concern about the pressure on university scholars to focus their research on practical applications of knowledge that are likely to yield immediate material benefits for society. This pressure emanates from both government and business sources of funding. As Cornelia Baines reported from her survey, many senior scholars were worried that the University had surrendered to the goals of corporations and government.

Harold Atwood said he had observed how these biases of funders have had a tendency at his own university and other leading research universities to steer professors away from curiosity-driven research. He referred to recent correspondence with an Oxford colleague describing how research in subjects like mathematics and philosophy that cannot attract large research grants is totally out of favour.

Germaine Warkentin picked up on a similar theme in her contribution to the symposium: the under-funding of the humanities. If scholarly inquiry and writing in the humanities is not supported in the universities it is not likely to continue at all. The same cannot be said for scientific research. In reply to Provost Misak's statement that there is no need for supporters of the humanities to whine, Warkentin said it was important to speak out against the

uncritical version of rationalism – “the learning Latin is a waste of time” attack – that is coming to dominate public discourse. The need for the public advocacy that Germaine Warkentin calls for is indicated by George Fallis’s observation that “whatever criteria we as professors might use to assess research, we must be mindful that government (or rather the citizens/taxpayers) – who after all supported the research – will want the research assessed by the practical applications that flow from it.”

George Fallis acknowledged that the criteria for assessing universities falls far short of those used for assessing the research of individual professors. Many kinds of writings, including books and chapters in books are excluded and the only test of quality is the frequency of citation. Nonetheless, he thinks it important to pay attention to how the University of Toronto and other Canadian universities are ranked in the world. Averaging two of the three major ranking systems in the world, the Taiwan and the Shanghai rankings, which he says should only be considered for rankings in science (which includes medicine, mathematics and engineering) he finds that the University of Toronto ranks #18 in the world.

Fallis pointed out that whereas other public universities in the top-30 (in the Taiwan/Shanghai rankings) have on average 30,000 students about a third of whom are graduate students, University of Toronto has an enrolment of 64,000 of which only 18% are graduate students. His basic recommendation is similar to that of Ian Clark and his

colleagues. Ontario should develop a much more differentiated system with some universities being much more research and graduate student intensive.

To ascertain how senior scholars feel about changing the University of Toronto to a more graduate-intensive institution, John Dirks took a straw vote. The group was divided 50-50 on working towards such a change in the University's enrolment.

Other contributors to the discussion expressed serious doubts about bibliometrics: the quantitative study of research outputs. Harold Atwood is worried about the steering effect citation counting has on the research undertaken by university-based scholars. Frank Cunningham went further in urging that the University of Toronto take the lead in developing sound methods of qualitatively assessing the merits of research.

Joe O'Connell raised an important point about making more of an effort to match the staffing of the faculty to the strengths of the University's research resources. He came to the University of Toronto many years ago because of its strength in South Asian languages and culture, including its outstanding library resources. But now, he reports, there are no young scholars at UofT working in this area, to take advantage of its library resources and interest in the area within the Greater Toronto community.

The Quality of Education

When John Dirks took a straw vote on the quality of undergraduate education at UofT, the majority indicated that they thought it was deteriorating. Concerns were of two kinds: the increasing undergraduate focus on practical payoffs and careers, and ever-increasing class size and ever diminishing contacts with professors.

A number of those who responded to Cornelia Baines' survey mentioned the steering effect that GPA scores are having on undergraduate education. As one of them put it, "Thinking independently is a risky enterprise when you are seeking a high GPA." In a similar vein, Cicely Watson told the symposium about the difficulty she and colleagues at OISE had encountered in mounting a course that challenged the predominant paradigm in education. In his remarks to the conference, former UofT Provost and President Frank Iacobucci who now heads the Higher Education Quality Council, the independent body that advises the Ontario Government on higher education, emphasized that undergraduate education should not focus narrowly on preparation for careers. Andrew Baines, a medical scientist now teaching a section of Victoria College's liberal arts program, reported how that program functioned as an antidote for the concerns of his colleagues – above all by empowering students to take responsibility for their education.

Frank Cunningham agreed that over his years at the university classes had grown much larger and there was

much less opportunity for professors to interact with students, but he thought that over all the university had been coping pretty well, and he saw no prospect in sight for smaller classes or a lower undergraduate enrolment. However, one practical change he strongly advocated was to try to have first and second year courses taught by tenured professors rather than TAs or part-time staff. It is in these formative first two years that undergraduates should be exposed to the university's outstanding scholars.

In his presentation to the symposium Ian Clark made a point about university teaching that challenges the conventional wisdom of professors. In preparing their book on *Academic Transformation* Clark and his colleagues looked at empirical studies of university teaching and found that there is essentially no relationship between teaching performance and research productivity. This doesn't mean that it is unimportant for undergraduates to be taught by active scholars, but that there is room for much more differentiation in staffing within universities. The "teaching stream" of faculty at UofT is very much in line with this idea. If properly developed and supported such a "teaching stream" might lessen Fred Wilson's concern about the university developing two classes of professors.

Stephen Clarkson commented on the declining levels of student literacy he had experienced over the years. The problem was not only English-as-a-second-language students, but students born and educated in Canada. He

suggested that the loss of a year of high school education might be a contributing factor.

Charles Chaffey focussed his remarks on the declining physical infrastructure of the university. Students experience too many shabby, badly maintained classrooms, which frequently lack basic audio/visual facilities.

Merrijoy Kelner reported that while the graduate students she and John Dirks interviewed were generally positive about their UofT experience, they did make some suggestions about how graduate education might be improved. These suggestions included a clearer program structure, better language training, and more consistent supervision. This last suggestion relates to a point made by Michael Marrus, a former Dean of Graduate Studies, that the carefully crafted guidelines for doctoral supervision are often not followed by graduate faculty.

Role of the Federal Government

While nearly all those who spoke about the role of government focused on the provincial government, a few participants addressed the role of the federal government. Frank Iacobucci, thought that there was a need for the federal government to play a coherent role in supporting higher education in Canada. This former justice of Canada's Supreme Court, like many constitutional scholars, while fully aware of the provinces having the paramount role in higher education, does not see federal participation in the field as totally excluded.

George Fallis's paper calls for enhanced federal support of national granting councils and excellence-based funding for research chairs and graduate students. Fallis also proposes creation of a non-governmental agency – a Canada Universities Information Council – which, among other things, would conduct assessments of university research not only in the aggregate, but also discipline by discipline.

Appendix I

Promoting Differentiation in University Missions: Three Suggestions for the University of Toronto

Adapted from Remarks at the Senior Scholars Symposium University of Toronto, April 13, 2010 by Ian D. Clark, Professor, School of Public Policy and Governance University of Toronto.

It is an honour to be invited to share a panel on "The Mission of Our University in the Future" with so many famous scholars and educators.

I would like to thank this morning's speakers, including former university administrators and the current president of the faculty association, for their generous comments about our book, *Academic Transformation*.[1] There seems to be agreement at the Symposium that the book properly describes the forces that have been reshaping higher education in Ontario, particularly those associated with the pressures for enrolment expansion and more research.

Several of you have congratulated me on having my name and our book featured in this morning's article[2] by "Canada's most influential columnist." Let me share my two-part formula for getting your name in the newspaper for a collectively authored book. The first part is to find very able colleagues to collaborate in the hard work. In this case they are Greg Moran, former provost at The University of Western Ontario and chair of the Ontario Council of Academic Vice-presidents, Michael Skolnik, professor emeritus at OISE and Canada's leading scholar on post-secondary education, and David Trick, former assistant

deputy minister for the Ontario Budget and subsequently for postsecondary education – one of the very few people in the province who understands the intricacies of university funding arrangements. The second part of my formula is to make sure that all of your co-authors have surnames that occur after yours in the alphabet.

Our book has many suggestions for system change but the one that has generated the most discussion this morning is the call for greater differentiation in the missions of Ontario's higher education institutions. This derives from three findings:

1) Ontario is the only jurisdiction of its size in the world that tries to do virtually all its undergraduate education with the world's most expensive model, the research university 40-40-20 model where faculty are expected to devote as much of their time to research as to teaching.

2) The dollars per student from grants and fees for Ontario universities have, contrary to popular belief, essentially kept up with the consumer price index (CPI) over the last twenty years. The reason class sizes and use of adjunct and part time faculty have been increasing in all universities is that the prices of inputs, mostly faculty salaries, have been rising much faster than the CPI, and because hours of teaching per faculty member have been declining, partly due to increased administrative complexity associated with the greater research focus.

3) The relationship between undergraduate teaching performance and research productivity has been extensively examined in the literature and the evidence is unequivocal: there is essentially no relationship. There are good and less

good researchers and good and less good teachers and no correlation between them. (This audience may find this hard to believe, but remember, you are in that quadrant of professors who happen to be good at both.)

In her remarks the morning, the Provost noted the impact that government fiscal contraction in American states and in England is having on publicly funded universities. It is no secret that Ontario is also facing dramatic fiscal pressure in the coming years. This province cannot continue to try to provide all undergraduate education using the research university model and have any hope of achieving an internationally competitive quality[3] of research and teaching.

With a more differentiated system we could, for the same system cost, achieve better research and better undergraduate education, with teaching that is better adapted to the needs of the hugely diverse population seeking bachelor's degrees. A more differentiated system would see a higher fraction of the province's research and graduate education being done at those institutions with the most productive researchers, and it would shift the balance of effort from research to teaching in other institutions.

This cannot happen without changes in government regulation and funding arrangements. The reasons are obvious: most professors would like to do more research and less teaching and would like the same pay as equivalent-ranked faculty at the highest paying institutions; most university administrators and their community supporters would like to see their institutions acquire the prestige associated with top-flight research and researchers.

But our province cannot afford to accommodate all these aspirations.

To achieve greater differentiation, provincial funding needs to become more mission-based and more performance-based. Given the strong interests at play, decisions to create a more differentiated system have to be made at the political level and they require public comprehension and support. This leads to my three recommendations for the University of Toronto.[4] To help develop public understanding and support for a more differentiated system, the University should:

1) Commission a rigorously objective research paper to be presented to the Government of Ontario that describes how other leading jurisdictions provide differential funding for their public universities. The study should document how each government funds the universities doing the most research compared with how it funds the universities doing the least research. One could look, for example, at California, Michigan, British Columbia, England, New Zealand, The Netherlands, and Japan. I would be extremely surprised if the funding for the most and the least research-intensive universities in these jurisdictions were as similar as in Ontario.

2) Continue to demonstrate leadership in the measurement and publication of the university's research and teaching inputs, costs, outputs and outcomes, and encourage other universities to do the same so that relative performance will be clearer to taxpayers, students and policy makers.

3) Encourage (and provide technical support for) every single faculty member to have a public web site that has up-to-date descriptions of teaching, research and service contributions. The internet is now the main source of information for people interested in what goes on in universities. It is remarkable how much you can now learn from university web sites about what professors are actually doing.[5] An intelligent reader does not have to be an expert in the field to get a pretty good idea of the quality and relevance of the research output of a university department by spending a few hours reviewing faculty web sites.

The transition to a more efficient and differentiated system of higher education in Ontario will not be easy. The debates will invoke equity, fairness, community pride, regional development, academic freedom,[6] institutional autonomy and collective bargaining. But this university, and one hopes other universities, can help with this difficult process by providing policy makers and the interested public with relevant facts and analyses in a highly transparent manner.

Thank you again for the opportunity to contribute to this Symposium.

Endnotes

1 *Academic Transformation: The Forces Reshaping Higher Education in Ontario*, Ian D. Clark, Greg Moran, Michael L. Skolnik, and David Trick, McGill-Queen's University Press, 2009, 244 pages. (See www.academictransformation.ca.)

2 *Universities are sitting ducks for reform*, Margaret Wente, *The Globe and Mail*, April 13, 2010. http://www.theglobeandmail.com/news/opinions/universities-are-sitting-ducks-for-reform/article1532075/.

3 The measurement of quality is addressed in Chapter 5 of our book and Michael Skolnik has subsequently extended the analysis in his nicely titled paper, *Quality assurance in higher education as a political process* in *Higher Education Management and Policy*, Volume 22/1, © OECD 2010.

4 The three recommendations in this note are specifically directed at the promotion of institutional differentiation, and not at the related issue of differentiation within universities. In our book we say (page 192): "Besides differentiation *among* universities, a form of greater differentiation *within* universities could be very helpful in enabling these institutions to cope with the diverse demands that they face. We are thinking here of the creation and widespread utilization of different appointment categories that promote role differentiation among members of faculty. In Chapter 4, we described the efforts that some universities have made to establish teaching-only positions, i.e., faculty positions in which the predominant role is teaching, engaged ... in "scholarship of teaching" without a substantial expectation of applied or discovery research within their discipline. A small portion of time could be provided for research in such positions, but it might be most appropriately focused on research that will improve teaching and learning. We noted that such positions do not exist at all universities; where they do, they are very limited in number except at a few institutions, and they make up a very small percentage of full-time faculty positions system-wide, generally not in the tenure stream. A compelling case can be made, both in regard to efficiency and quality of teaching (and research) for expanding the number of such positions and making them part of the tenure stream."

5 See, for example, "A taxpayer view of university funding, or, Steve and Di's evening on the Internet", Ian D. Clark, *University Affairs*, March 8, 2010, http://www.universityaffairs.ca/a-taxpayers-view-of-university-funding.aspx.

6 See, for example, "Different Pipers, Different Tunes – A review of Selling Out: Academic Freedom and the Corporate Market", Ian D. Clark, *Literary Review of Canada*, April 2010, http://reviewcanada.ca/.

Appendix II

University of Toronto as a Research University: Where UofT Stands in the World

Adapted and expanded from remarks at the Senior Scholars' Symposium, University of Toronto, April 13, 2010 by George Fallis, University Professor, Professor of Economics and Social Science, York University.

I am delighted to have been asked to offer some thoughts on "University of Toronto as a Research University: Where UofT Stands in the World" as part of this Senior Scholars' Symposium. I note I am the only speaker who is not a University of Toronto professor. But I feel very much part of UofT: I attended high school at the University of Toronto Schools, when it was still affiliated with UofT; I was an undergraduate at Victoria College; and I spent a sabbatical year at Massey College. Perhaps, I can characterize my remarks as those of an affectionate outsider.

John Dirks invited me to speak, I think, because of a book I had written, *Multiversities, Ideas, and Democracy,* and some current research I am doing comparing fifteen high-income countries in terms of their national research output and the rankings of their universities.[1] My thoughts draw heavily on this work.

Let me begin by stating that I believe we *should* ask: how do our universities as research institutions compare with other universities around the world? This question is seldom

asked in Canada and this symposium is to be commended for posing it directly. Also I believe that Canada is best served by differentiation among its universities (more differentiation than we have now) and that Canada should have some research universities that are among the best in the world.

Before turning to how we might assess UofT as a research university and its place in the world, I want to make two prefatory remarks.

First, the university has many missions, not just to conduct research. Its mission is also to provide education, especially undergraduate education, and to contribute to the economic, political, and cultural life of our society. It has a role in a democracy as independent analyst, critic, and conscience – a countervailing power to government and business. A great university must be judged according to how it fulfills all of these missions. We should be reminded that most of the leading research universities of the world have more undergraduate students than graduate students. I agree with Frank Rhodes, then president of Cornell University, when he wrote: "it is undergraduate teaching, and learning, that is the central task …it is on undergraduate education that the health of the research university will stand or fall."[2]

Second, whatever criteria we as professors might use to assess research, we must be mindful that government (or rather the citizens/taxpayers) – who after all supported the

research – will want the research assessed by the practical applications that flow from it. And with this in mind, governments may judge that the long-term wellbeing of society is better served by using available resources to support many high-quality research universities rather than by concentrating resources to create a few world-class institutions. This influence of government is perfectly legitimate, and desirable, in a democratic society.

Now, let us turn to the question: how are we to judge a research university? As academics, the main criterion will be the quantity and quality of the research published by its professors. We judge the quality of research by its contribution to knowledge: by its originality, depth, and influence on the discipline or a field within the discipline. We believe these assessments should be made by peers, by scholars in the field.

Research at universities is important, not just for the research itself and the findings, but also because the research is complementary to graduate education, to educating advanced knowledge workers, most of who will leave the university sector and make their contributions elsewhere. A great research university is also judged by the quality of its doctoral education.

Many professors object to any attempt to assess the quality of the research of a (their) university or to rank universities. However, society has little patience with these objections and rightly sees them as a diversion to escape

accountability. And we, as professors, can hardly object to research assessment for we engage in it all the time.

Consider when a professor is being considered for promotion to full professor. Their research, teaching, and service are assessed. The research assessment begins with the Curriculum Vitae (CV) prepared by the professor: all published research, in all forms, is listed. The assessment focuses upon publications in peer-reviewed media, although research disseminated in other ways may also be assessed. Then, the peer-reviewed publications are sent to a group of leading scholars in the candidate's field. These scholars write an assessment of the entire body of work: its originality, depth, and contributions to the discipline/field. The assessment letters are qualitative; but many also include quantitative bibliometric data, discussing the number of articles/chapters/books published, the quality of the journals and academic presses that have published the research, and how and where the work has been cited. Many universities complement the referees' letters with their own bibliometric analysis of the body of research. The assessment also considers honours and awards received by the candidate because of their research: perhaps having a paper named "best article" in a journal; many disciplines/fields have prizes for the best book published; or being elected a fellow of the society in their discipline. And the assessment usually also considers the research grants received to support the work, as a proxy for research accomplishment. Grants are peer-reviewed and awarded according to the research record of the applicant and the

promise of the particular project (the promise of its originality, depth, and contribution to the field). Of course, fields of research differ greatly in the availability and need for research grants, and so the record of securing grants plays a very different role in research assessment across disciplines and fields.

The tenure and promotion process is the gold standard of research assessment: (i) it is comprehensive, although focusing on peer-reviewed publications; (ii) the body of work is assessed by leading scholars; (iii) there is bibliometric assessment of the number of publications, quality of journals/presses, and citations; (iv) there is consideration of honours and awards; and (v) there is assessment of the grants secured to support the research.

Ideally, to assess University of Toronto as a research university we would apply this gold standard to *all* the work published by *all* UofT professors. The assessment would have to be done on a discipline-by-discipline, even field-by-field, basis.

Then to see UofT's place in the world, we would compare this gold-standard assessment with a similar assessment of other leading research universities.

However, this ideal is unattainable. It is impossible to apply this gold standard to an entire university. Even if the gold standard were applied to every professor, the assessment of the entire university would be multi-dimensional. How could we aggregate these results to give an assessment of

UofT as a research university? And if we are to consider UofT's place in the world, how could we possibly *rank* the universities as research institutions? Ranking requires a single dimension (or weights to combine the separate dimensions into one).

Nonetheless, I do not believe we should ignore the question of how the University of Toronto ranks in the world as a research institution. We should approach the question as scholars: thoughtfully, rigorously, and mindful of what the data can and cannot tell us.

The possibility of large scale research assessment exercises arose with the establishment of the Institute for Scientific Information (ISI), founded by Eugene Garfield in 1960. ISI first provided a print-based indexing service, most importantly the Science Citation Index (SCI), the Social Science Citation Index (SSCI), and the Arts and Humanities Citation Index (AHCI). (Science is defined to include medicine, mathematics, and engineering.) The creation of these citation indices begins with *a list of journals to be monitored*. Having selected the list, then each article published in each journal is recorded, along with the author(s) of the article, the institutional affiliation of each author, and all the articles cited in the original article. The record of the cited article would contain the title, the author(s) of the cited article, their institutional affiliation, and the journal where it was published. These citation indices are widely used in the sociology of science to study

how disciplines evolve and how key ideas are spread through a field.

In 1992, ISI was acquired by what is now Thomson Reuters. The unit is now called Thomson Scientific. Thomson Scientific has created the Web of Science, an enormous database, now digital rather than print-based. In 2009, the Web of Science monitored over 10,000 journals. The Web of Science includes within it the Science Citation Index Expanded (monitoring over 7,100 journals), the Social Science Citation Index (monitoring over 2,100 journals), and the Arts and Humanities Index (monitoring over 1,200 journals).

The rankings of world universities used below are primarily research rankings using the Web of Science data. The limitations of the rankings are obvious when compared to the gold standard. The research assessments are not comprehensive; they do not have leading experts assess the work, although all the articles were peer-reviewed originally; most do not examine honours and awards; and they do not consider research grants. They are purely bibliometric exercises.

The most fundamental limitation is that not all research publications are included in the Web of Science. The Web of Science is limited to journal articles, and only articles in the journals on the monitored list. Chapters in books are not included. Books and monographs are not included. Conference proceedings are not included. Therefore, the

count of publications by professors at a university is only even somewhat comprehensive in disciplines/fields were the journal article is the main means of dissemination and where there is a generally accepted list of highly regarded journals where the best research is usually published.

The coverage of the Web of Science has been tested in several ways. In one large-scale test, the CVs of the all the professors of several universities were collected and their refereed publications documented. Then the question was asked: what percentage of the refereed publications on the CVs would be counted using the Web of Science. The answers ranged from a high of 90 percent in chemistry to a low of 6 percent in law. The Web of Science works well for some fields of science; it works much less well for many disciplines in the social sciences; and it works very poorly for the arts and humanities. There is considerable work going on to develop better bibliometric data for the social sciences, arts and humanities. But none of this work is yet available at a world level.

Assessing the research at universities, and then ranking them, will likely be much more robust if it were done on a discipline-by-discipline basis or a field-by-field basis, rather than trying to compare the aggregate of all research across the university. Also at a discipline level, the Web of Science data could more easily be augmented.

In the rankings of world universities discussed below, only data from the Science Citation Index and the Social Science

Citation Index are used. Data from the Arts and Humanities Citation Index are not used at all. And because of the poor coverage of the social sciences, the rankings are not really much of an assessment of social science research. Therefore the world university rankings should only be considered rankings of research in science (which includes medicine, mathematics, and engineering).

There are three major rankings of world universities: the Shanghai Jiao Tong University Institute of Higher Education's *Academic Ranking of World Universities* (ARWU); the Higher Education Evaluation and Accreditation Council of Taiwan's (HEEACT) *Performance Ranking of Scientific Papers for World Universities*; and the Times Higher Education /Quacquerelli Symonds (THE-QS) *World University Rankings*.

The Shanghai and Taiwan rankings are based almost exclusively on SCI and SSCI data in the Web of Science as discussed above. The rankings are based not simply on the number of articles published, but are also based on the quality of the research using data on citations per paper, on the impact factor of the journals where the article appears, on highly-cited papers, and on highly-cited professors. The Shanghai ranking also uses data on a few especially prestigious awards in science: alumni and faculty winning Nobel Prizes and Fields Medals.

These rankings have been widely, and justifiably, criticized because they only assess research (and a limited domain of research at that); they do not assess how well the university

fulfills its many other missions, most especially the mission to provide undergraduate education. However, the Shanghai and Taiwan rankings are suited to the topic of this paper precisely because they are research-only rankings – although of course, we must keep reminding ourselves that these rankings assess research mainly in science, medicine, mathematics, and engineering, and completely omit research in the arts and humanities.

The THE-QS *World University Rankings* tries to assess much more than the research mission of a university and is less suited to this paper. Also, there are some severe methodological problems with a reputation survey that it conducts. Thus, it will not be used here.

And what do the rankings say about University of Toronto's standing in the world as a research university?

UofT ranks # 11 according to the 2009 Taiwan ranking and # 27 according to the 2009 Shanghai ranking. Although the Taiwan and Shanghai rankings are seeking to measure the same thing and are quite similar in methodology and in their data sources, individual universities receive quite different ranks under the two systems. I took the average rank and then re-ranked world universities according to their average rank. On this basis, UofT ranks #18.

Unquestionably, UofT is the top in Canada and among top in the world as a research university in science, medicine, and engineering. This is a tremendous accomplishment,

especially recognizing that UofT is less well-funded than leading research universities in the rest of the world.[3]

Using this average Taiwan/Shanghai ranking, I examined the top 30 universities to see if they have any distinguishing characteristics. Twenty-two of the top 30 universities come from the United States, four from England, two from Japan, and two from Canada (the other was the University of British Columbia ranked 30th). Given Canada's size and the amount we spend on higher education research, with two top-30 universities, Canada does slightly better than expected.[4]

Among this top 30, 87 percent have a medical school and 57 percent are public universities. Medical schools are important in these science-focused rankings because the publications by researchers in university-affiliated hospitals and medical research institutes are included as publications of the university. UofT is like the majority of the top 30, being a public university with a medical school. (A university is defined here as 'public' if the government provides substantial operating funds for undergraduate education. By this definition the English, Canadian, and Japanese universities are public; only the United States has private universities.) The US private universities are a case unto themselves with their huge endowments: they average half the size of the public universities, are over 50 percent graduate students, and have very low student-faculty ratios. Although even at US private universities, most of the funding for research comes from the public sector.

The better comparators for UofT are the public universities in the top 30. These universities average about 30,000 students with about 33 percent of their students being graduate students. UofT is a striking anomaly in this group: UofT has over 64,000 full-time students of which about 18 percent are graduate students. UofT is much larger and more undergraduate-focused compared to the other top public research universities.

I believe that as a matter of public policy Canada and Ontario should strive to have research universities among the best in the world and that we should try to have our leading research universities closer to this benchmark: 30,000 students with one third at the graduate level. Given that these universities would have 20,000 undergraduates, they would be much more selective at the undergraduate level than our current very large universities. Canada is an anomaly among all nations in the large size and undergraduate-focus of our top research universities.

If the Government of Ontario, as a matter of public policy, took this benchmark as the goal, UofT is something of an elephant in the room. UofT has not been evolving toward this benchmark. From 1997 to 2007, UofT added 23,000 full-time undergraduates, an increase of over 70 percent. Over the same period, it grew at the graduate level by 57 percent: UofT reduced its percentage at the graduate level. It would be impossible to attract enough high-quality graduate students for UofT to reach the 33 percent graduate benchmark, given its current 53,000

undergraduates. The benchmark structure could only be achieved with a radical restructuring of UofT.

If we can agree that Canada and Ontario should strive to have research universities comparable to the leading universities across the world, what might this imply for public policy?

Recently, the self-defined big-five research universities in Canada proposed that the federal government create a separate fund of additional research money for the big-five institutions to enable them to compete better at a world level. Would this proposal be good public policy for Ontario and for Canada? I believe not.

It would certainly be poor policy for Ontario because Ontario has only one university in the big five, yet Ontario would contribute about 40 percent of the tax revenue collected by the federal government to pay for the research fund.

Furthermore, aggregate university rankings are not the same as rankings discipline by discipline. There are many top-30 departments outside the top-30 universities. The continental Europeans were very distressed to find no university in the top 30. But on digging further, they found that many European universities had departments in the top 30. The world university rankings favour large comprehensive universities with strength in all the measured fields (the American model). UofT does well for this reason. (If you examine UofT's ranking across the

subcategories provided in the world university rankings, most of the subcategory rankings are below its total rank of 18. This is true for all middle- and lower-ranked universities in the top 30.) If you privilege one flagship university, you miss world-leading research clusters in other universities.

But the problems run deeper than this. A jurisdiction as large and diverse as Ontario would be ill served by one flagship university, with it given pre-eminence across all disciplines. What we want to accomplish is differentiation across universities: with some universities being more research-intensive and graduate-intensive, with excellent and accessible undergraduate education available across the province, with universities encouraged (and held accountable) to be excellent at what they do, and with a handful being world class in research across many disciplines and others being leaders in a few disciplines. The heart of the matter is system design, the funding formula, and accountability. It will not be accomplished by 'picking winners' or granting privileges based on past performance. What is needed is an unambiguous focus on international standards of excellence in allocating research funds within a system where universities both collaborate and compete.

It is puzzling that the big-5 focused their proposal at the federal level. Most of the levers of public policy are at the provincial level: the province is responsible for system design and the funding formula. Most of the research at Ontario universities is funded by the provincial operating and capital grants, through the funding of faculty time for

research (lowered teaching loads), and the provision of libraries, computing and information technology infrastructure, and buildings. Unfortunately, Ontario missed the opportunity to re-consider system design and the funding formula during the expansion of undergraduate and graduate education over the past ten years.

The federal contribution to achieving top-ranked research universities should begin with sustaining the national granting councils and then providing special research funding, competitively awarded, and based unequivocally on international standards of excellence. This funding would flow to where the best research is being done in the country, not to pre-chosen universities. Interestingly, this has been the federal approach (both Liberal and Conservative) over the last fifteen years from the Canada Research Chairs and the Canada Foundation for Innovation, to the Canada Excellence Research Chairs Program and the Vanier Canada Graduate Scholarships. This federal approach has done more to create differentiation and international research excellence across Canadian universities than any other public policy; the big five have particularly prospered with it; and all the while there is a consensus across all universities in support of it. Why the big five proposed a change is a mystery.

If I were to recommend three public policies to sustain UofT's place as a world class research institution – and that are good policy for Canada and Ontario – they would be:

- A revised vision of the Ontario university system based upon differentiation, and a funding formula to support it.

- A continuation of the federal strategy for research support, including increases to the national granting councils and special excellence-based funding for research chairs, infrastructure, and graduate students.

- The creation of a non-governmental agency – a Canada Universities Information Council – with the responsibility, *inter alia,* to conduct assessments of research at Canadian universities, both in aggregate and discipline by discipline, and to benchmark Canadian research against the best in the world.[5]

And of course, I would conclude with the reminder that I began with: "it is undergraduate teaching, and learning, that is the central task …it is on undergraduate education that the health of the research university will stand or fall."

Endnotes

1 *Multiversities, Ideas, and Democracy*, George Fallis, University of Toronto Press, 2007, 475 pages. "University-based Research within National Innovation Systems: A Comparison and Ranking across 15 High-income Countries," George Fallis, mimeo, 2010.

2 "The Place of Teaching in the Research University," Frank H. T. Rhodes, in Jonathan R. Cole, Elinor Barber, and Stephen R.

Graubard, eds.,*The Research University in a time of Discontent*, Johns Hopkins University Press, 1994, 404 pages.

3 However much one may dislike university rankings, these rankings have helped UofT to demonstrate its excellence in science research.

4 See Fallis (2010), op cit, for the methodology and analysis used to support this conclusion.

5 The agency would also provide information and assessment regarding all the missions of the university; particularly regarding access (as the now-cancelled Canada Millennium Scholarship Foundation did so well).

Afternoon Session

The Presenters:

Frances Burton, Professor Emerita, Anthropology.

Dennis Duffy, Professor Emeritus, Department of English.

Richard Simeon, Professor of Political Science and Law.

John D. Stewart, retired Senior Associate Consultant, Department of Medicine, Division of Occupational and Environmental Medicine at the Mayo Clinic.

Fire: The Spark that Ignited Human Evolution

Frances Burton

My presentation is based on my recently published book and focuses on the impact firelight had in speeding up human evolution as change accelerates change. *Light* is neglected in discussions of the importance of fire in human evolution. Over the course of human evolution change fostered further, even more rapid change. Initially committed to trees, a stage which lasted from the birth of primates to only tens of millions of years ago, primates slowly developed the flexibility of living in the trees and on the ground, and by 20 million years ago (Mya) there is fossil evidence of ape ancestors experimenting with bipedalism. By between 7 and 5 Mya, the experiment was finalized in the form of ancestors who could readily walk smoothly on

two legs, although they still utilized the trees for sleeping and protection. By 4 Mya, brain size had significantly increased and by two and a half million years, tools were being made and used. This is rapid evolution, geologically speaking, and the fact of it took a long time to appreciate, since underestimating our earliest ancestors as non-human animals is part and parcel of how we distinguish ourselves. But what if chimpanzees could make tools, plan hunting groups – and even war parties–and live by social rules both complex and stringent? In fact, they do all that and more. Now suppose that as early as 6 million years ago, a creature somewhat like a chimpanzee and having at least their capabilities stood upright and shuffle-walked. Such fossils have been found. What if, like contemporary apes or baboons, they ate insects along with the occasional rabbit, monkey or other small mammal. And what if unlike many other mammals, they would approach smoldering embers from lightning strikes, for example on termite mounds, to find insects there. Playing as apes do with all sorts of objects, they might well have also played with burning branches as chimps have done under experimental conditions, and as they have been witnessed to do in the wild. And what if over eons, they developed an association with the source of the smouldering embers – the fire. I see this association developing over time beginning with the first stage, approaching and sitting or lying beside fire, and perhaps taking smoldering branches and carrying the fire along to the next sleeping site. Somewhat later, the capacity to nurture the fire heralds the next stage. Bringing to a

natural fire some dried grasses or twigs and sticks would be emblematic of the beginnings of a shift in migratory patterns. By nurturing fire, the ability to remain at a particular site increases. The third stage is when the genus *Homo* exists, and when dietary habits include regular cooking over fires that are confined by stones or within pits. Finally, the ability to manufacture fire develops, but this only with our own species, *Homo sapiens*, and quite recently.

The stages of association with fire:

1. The earliest – bipedal hominins, between 5 and 7 Mya
    - approach and associate
    - carry

2. The middle period, around 3 to 4 Mya
    - nurture
3. The third around 2.6 to 2 Mya when Homo is present.
    - Dietary habits
    - confine

4. The final period, 500-200 Kya [kilo-annum]
    - manufacture

The *light* is neglected in discussions of the importance of fire in human evolution. I see light from fire as a major impetus to the process of hominisation as it changed our daily rhythms and affected genetic systems beginning at a time when our ancestors first walked – however incompetently – on two legs as far past as 6 million years

ago. The candidates are known, their habitats described, their behavior assumed. Beginning at just about the time of the divergence between apes and the human line at 7 million years ago, the catalog includes *Sahelanthropus tchadensis*, *Orrorin tugenensis*, and the two *Ardipithecus* finds, the most recent of which, *ramidus*, dates from around 4 million years ago. What these fossils have in common was bipedality, the anatomy of which is most secure for *Orrorin* and *Ardipithecus*. The changes that took place at the divergence is increasingly well known as the genome for chimpanzees as well as humans is documented. There is a gain of at least 678 genes and a corresponding loss of 740 genes (Hahn *et al.* 2007) between chimpanzees and us, and the change is not only in the genes *per se*, but in the fact that certain processes caused changes in gene expression NOT just in gene sequence. By 4 Mya brain size increased from chimp-sized, around 400cc to 550cc. The "Rubicon" for humans is around 1000c.c. By 3-2 Mya stone tools are being manufactured as well as used. The ecological impetus for the acceleration in hominisation was an asteroid impact at 8.2 Mya which caused drying and cooling and encouraged the growth of seed plants, plants with storage organs, some kinds of grasses and their allies (C4 plants) over the trees, shrubs and other grasses that had been bountiful (C3) plants. The shift in abundance of plants had a concomitant effect on diet. C4 plants are deficient in some nutrients, in particular fats and carbohydrates.

While non-human primates are devoted to a diet of insects, the need for these was underscored by that shift in plants.

The scene was set: a bipedal creature with a habit of eating insects whose intellectual capabilities of reasoning, insight, memory and social dependence fostered the association with fire. Many mammals are not afraid of fire. Ungulates, for example will continue grazing while fire approaches. Baboons do so as well and anecdotes about apes are supported by experimentation with chimps and fire demonstrating a lack of fear. Recent studies indicate that chimps know the direction fire is moving in, will approach it, and stay put while fire burns near or even around them. The evidence for association with fire is not secure until well after 1 million years ago, although there is suggestion of association as far back as nearly two million years ago in the mouth of a cave in Ethiopia. Remains of baked, hardened or discoloured sediment is particularly indicative of fires which experimentally have been found to reach temperatures of between 400°C and 600°C., but the evidence is scarce and still debated. In any case, fire in open sites will not leave traces as wind and water disperse what might have been evidence. Open fires [campfires] and hearths are known through structural features, like the concentration of ash or charcoal, and above all by a bordering of rocks or pits.

Animals do approach fire: there are insects (*pyrophilous*) that seek out burned spaces and birds of prey fly towards smoke knowing that smoldering embers contain small vertebrates and invertebrates worthy of eating. Probably the effect of heat will make some nutrients more available as well. Since chimps can approach fire, and since they easily associate one thing with another, and since they

relish insects, I think it fair to assume that they would see smoke, whether a burning termite mound or grass, and approach it recognizing the potential for easy meals. Mammals require vitamin B12 which they cannot synthesize. This essential vitamin (*cobalamin*) is necessary for the production of blood cells and enhances the action of melatonin as well. It is abundant in bacteria and, significantly, insects.

Fire has several properties early ancestors might well have appreciated, the most obvious of which is heat and light. It is the generation of light which I believe had a major impact on the direction and speed of our evolution. The property of light as it hits the surface of an object is called *illuminance* and is measured in *lux*. The light of the sun is the standard, and considered to be over 1 million lux. Dusk and dawn which set circadian rhythms measure around 10 lux. So does campfire. Over the four million years between the first bipedal hominins and our forebear, *Homo erectus*, the exposure to the light of fire not only extended the day, but more significantly, it's light changed the daily cycles of the hominin body, and that brought about changes that accelerated the journey towards us. Light after dark, as in industrial light or fire light, enters the body through the eyes, and suppresses the flow of melatonin, the hormone responsible for circadian rhythms. The effect would ultimately be to change reproductive patterns, which are triggered by light or, rather, the cessation of it. Seasonality shifts with the suppression of night as the circadian clock is affected. Melatonin is directly involved as it influences the

daily levels of estrogen and testosterone, and all reproductive tissues. It is the decline in melatonin which causes puberty, and whether or not the exposure is to natural light or artificial light is unimportant in this. Furthermore, the hormone dopamine, acts when melatonin does not. It is a 'feel good' hormone responsible for pair bonding, and for lengthening the time of learning through, for example, story-telling and direct instruction.

The process by which rapid change can occur in the genome is called epigenetics. The term was coined in the 1940s by C. H. Waddington to describe how different tissue types can be represented from one genotype – one set of instructions. The epigenome, as it has come to be called, in concert with genetic terminology, is a biochemical system lying alongside DNA. This molecule is too large to fit at length in the nucleus of a cell, and so it is wound around groups called *histones*, as rope on a spool. At certain points, there are chemical 'marks', usually on the tail end of the *histones*, which can alter the expression of the genes nearby. The epigenome unites genome with environment, as diet, chemicals in the air, water, light, and what is outside the body has a means of getting inside to act on genetic information. The genes themselves remain unaltered but their expression changes by this "gene silencing". Epigenetic effects are developmental, in the life of an individual. Are there transgenerational effects as well? The most recent information suggests that through micro-RNA (miRNA) changes can continue to the offspring, and that receptors in the nucleus are affected by melatonin which in turn alters

the structure of DNA (Blaustein 2010). In effect, the epigenome, lost in fetal development, is reconstituted at birth. Indeed, as long as the environmental context remains the same, the probability of similar epigenetic effects is highly likely. While the epigenome does not actually change the genes, it does establish a context in which changes in genes may be selected. Fire *light*, it seems to me, was such an agent.

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The Second Death of Lewis R. Yealland: A Cautionary Tale

Dennis Duffy

London, England, January 1917: a man in khaki sits in a dark room, lightened only by the bulbs affixed to the electrical battery. Another man, the one in the white lab coat, the man in charge, wants that soldier to talk. Previous attempts—featuring electric shocks to neck and throat, "hot plates" affixed to the back of his mouth, and burning cigarette ends applied to the tip of his tongue—have failed to break the soldier's silence.

The doctor in the white coat assures the 24 year-old private that he will not be leaving this room until he talks. A jolt to the back of his throat makes him jump far enough to detach the wires from the battery. He is tied down, and a weaker current courses through his body, "more or less continuously" for an hour. Treatment continues for the next three hours. The subject first regains the power to make guttural "ahs." Later, he will pace around the room, groaning those sounds, until it is time for stronger shocks to the outside of his neck. The subject then begins to ask for water. Repeated applications of electricity get him to the point of sustained speech, the presentation marred by shaking in the left arm. More current for the arm, and then for the other three limbs, restores the private to the point

where he can call himself “a champion.” The doctor agrees, stating that the man is “a hero.” He can now return to the Western front, a cured man.

This account of a wartime therapy for a condition known then as “shell shock” has not been lifted from the testimony of a war criminal. We are not scanning Mengele’s case notes. It came from a book by Dr. Lewis Ralph Yealland (1885-1954): Hysterical Disorders of Warfare (1918). The text, available online at http://www.archive.org/details/hystericaldisord00yealuoft was introduced by Lt. Colonel E. Farquhar Buzzard, later knighted for his contributions to the medical war effort. Lewis Yealland had graduated from the University of Western Ontario’s medical school in 1912. What then can we now make of this and other accounts of similar medical triumphs—for so they were viewed in their time—to be found in his book?

Yealland’s first report on his work appeared in the *Lancet* (June 9, 1917; pp. 867-73), with a future Nobel laureate, Dr. E.D. Adrian, as the piece’s primary author. With a prominent military doctor introducing his book, an equally prominent researcher as the primary author of his initial report, and a post-war series of prestigious appointments accompanying a successful Harley St. practice, as well as a degree *honoris causa* from his alma mater in 1948, Lewis Yealland died with every assurance of an honourable posthumous reputation.

Something however, had happened to this Canadian expat. By 1997, the film *Behind the Lines* had portrayed him in the fashion of a war criminal. The movie, based on Pat Barker's 1991 novel *Regeneration* had taken its cues from its source. Barker's novel was nominated for the Booker prize, an award which the complete trilogy received in 1995. Barker's novels had in turn echoed the scorn of leading feminist critic Elaine Showalter's 1985 monograph on hysteria and its cures, *The Female Malady*. Showalter had no hesitation in calling Yealland "the worst of the military psychiatrists" (181). With what ease could a medical-journal reviewer of Regeneration refer to Yealland's work as "brutal." (*British Medical Journal* Vol. 312, No. 7039 (May 4, 1996), p. 1171). It was but a step from that to a historian of military psychiatry to attribute what he saw as Yealland's callousness to his evangelical religious orientation (Ben Shephard, *A War of Nerves. Soldiers and Psychiatrists in the Twentieth Century*. Cambridge, MA: Harvard University Press, 2001; pp. 76-78). What wasn't he guilty of? What religious and cultural explanations for his wickedness could be excluded?

At some point—after I discovered that the mad doctor was in fact Canadian-born and trained—the question occurred to me: how true is all this? Is there more to Lewis Yealland and what he was up to than present-day have allowed? Those questions led me to this paper, which is not a whitewash of Yealland, but an attempt to place his War work within a less presentist and denunciatory context. Let me begin with some biographical notes.

Son of a British-born journalist who had settled in London ON and served for decades as editor of the *Free Press's* evening edition, Lewis Yealland attended St. George's public school, and graduated from Western's medical faculty in 1912. Interning at Hamilton and in New York, he eventually became a resident physician at what was then the Ontario mental health system's showplace, the Lakeshore facility in Mimico that is now a campus of Humber College.

Like approximately 600 thousand other young Canadians, Lewis Yealland by 1915 found himself overseas, though in a non-combatant role. His country instead needed him to work with the victims of what was then known as "shell shock." Everyone knows that the Great War was primarily an artillery war; it is also true that the literature on shell shock is as great as that on shell fire. But that need not concern us here. What is of interest—and what gave this young psychiatric physician his wartime occupation—was the fact that the conditions of trench warfare left men so psychically and physically wrecked that they twitched, moaned, wept, shrieked, stayed locked into muteness or partial paralysis to a degree making them unfit for further combat. The Great War death machine, as Richard Rubenstein calculates it, needed 1500 corpses on an average day. Yealland's job—and that of many others involved in military medicine—was to restore these shattered fighting men to combat status, to refit the war machine's damaged goods.

He had been trained in the stimulus/response psychiatric methods outlined in William A. White's classic *Outlines of Psychiatry* (in widespread use in North American med schools from 1907 to 1935 and beyond). Somewhere between Toronto Lakeshore and Queen's Square in London, Yealland had come upon the uses of "faradism," that is the application of electrical current directly to affected parts of a bodily organism crippled by psychosomatic trauma. My opening paragraphs have explained what that treatment could involve. Yet the Queen's Square clinic claimed a 100% success rate, and a Canadian military hospital in Ramsgate boasted a 70% cure rate after it adopted the faradic approach. Whichever statistic you trust, the fact remains that both are impressive.

Yet our present-days sensibilities still recoil at the image of men subjected to painful electric shock, no matter how high the cure rate claimed. A great gulf has opened between the cultural image of physicians between Yealland's time and ours. The state's widespread usage of electricity in the torture of counter-insurgents, the role played by Nazi doctors in the administration of the death camps, the Soviet Union's practice of psychiatric confinement as a cure for political dissidents: these horrors on which we have supped for decades have rendered us sensitive to the deliberate imposition of pain as a therapeutic practice. Our drive for the pain-free in treatment extends beyond the practice of dentistry.

Anyone who has been to the movies over the last four decades knows how intense is our longing for the imagery of medical malfeasance. Such imagery confirms our anxieties about scientific medicine in general, and its capacity for abuse by the state. We cherish the prospect of recklessly investigative scientists, grant-driven brutes whose "cures" burnish our humanity. That "*mentalité*," a fact of today's cultural climate explains why Yealland's critics do not seem to have read beyond his imprudent book's early chapters. For the exposition of Yealland's therapies there makes the case against the man less of an open-and-shut type.

The first, labeled G2, involves a 24 year-old whose "shakiness"—the result of a shellburst over his head—had earned him a military discharge, and relieved Yealland of responsibility for returning the ex-soldier to the line. Yealland listened non-committaly to the patient's complaints, which in addition to tremors, included fantasies "of an indecent nature." Sternly reproving the soldier, Yealland forced him to commit to answer "yes" if he was seeking a cure. Using a weak current, Yealland passed a roller electrode over both arms. When the tremor subsided, he removed the electrode. But when the tremor renewed, a stronger current made it subside.

Then began the treatment through interview of the "indecent delusions," which the patient came to agree were illusory, and which he then asserted that he had banished by trusting the commands of the physician who had cured

the tremor in his arm. When the doctor urged him never to "discuss such subjects again with anybody; do not entertain them in your mind for a moment," the patient agreed. As Yealland put it, "I have every reason to believe that the whole effect of the treatment was to introduce healthier elements into his mind" (180-87).

What have we seen here? Assume that the indecent images involved sexual behavior (the patient's assertion that while in another the hospital he had witnessed such acts suggests this). Somehow the trust engendered by the therapy for his tremors laid the private open to the doctor's power of suggestion, enabling him to repress those discomforting images, at least for the present. Because the pathologizing of those delusions so violates our present-day sexual ethic, viewing the medical treatment objectively renders it a test case for us. Can we set aside our own sexual politics and concentrate on what has happened here? A patient, for whatever reason uncomfortable with his physical and psychic condition, underwent a somatic treatment that in turn enabled him to cope with his own inner disturbance. We may want to instead embrace the patient and reassure him that the content of his delusions is acceptable to us. Such however, would probably have not been the reception that his behavior would have provoked—as both he and the physician agree—in his own time and place. Was the "cure" permanent? Did it rather lead to a lifetime of desperate concealment? Who can say? The fact remains: the physician conscientiously treated both body and mind. He employed both mechanical and talk therapy in an effort to restore a

troubled man to at least a semblance of peace, and possibly even to some degree of serenity.

Let us consider another case, G3. The 19 year-old former private's distress—his "fits"—at a shellburst some sixty feet from him earned him a discharge two months later. Ironically, civilian life held its terrors; the Zeppelin raids of September and October 1917 unhinged him. Arriving at Yealland's office in the evening, restrained by two other soldiers, and with a nurse holding a tongue depressor to his mouth, the man was sweating profusely and rolling his head about. After being made to sit, the ex-soldier had sufficiently recovered from the incident to rub his eyes in a daze. Yealland offered to cure his fits, explaining that he would first induce another attack by applying a mild current, and then cure it by administering a stronger one. And this—in many ways an early version of Electro-convulsive therapy—is what happened. Following the promised seizure, the patient was given a strong current to the front of his body, while being told to sit and stop his shaking. He did so, and while dazed told to "Look bright" while another shock went to his abdomen.

Again a procedure was outlined: it was time to cure the tremor and the stammer by another application of electric current. Applying a "gentle faradism" along the spine, Yealland urged the patient to "keep himself steady." Then the current was applied to the patient's trembling arms, and then to his legs until the tremors ceased. So did the stammer. His walk was normal. Was he cured? "He

remained in the hospital for two months after this, and up to the time of his discharge there was no recurrence of the fits." Yealland then concludes that "The patient received fifteen minutes' treatment" (187-89).

However off-putting this smug conclusion, the fact remains that a patient in deep distress found his condition significantly alleviated and even cured for at least 60 days by a physician's self-confident, reassuring and carefully-explained use of electrical therapy. What also emerges from these and other cases in *Hysterical Disorders* is a sense of the physician's personal qualities called for in the psychiatric textbook and mentioned in Colonel Buzzard's Preface. The mention of his "strong personality and kindly approach" by his anonymous "Munk's Roll" obituarist leads to the question of whether Yealland was gifted with the kind of personal presence, however austere and commanding, that reinforced the strength of his suggestions and commands to his patients? Unquantifiable as these personal qualities may be, anyone who has ever experienced medical treatment from either side of the desk knows that such forces exist. The possibility that personal force may have supplemented Lewis Yealland's treatments is at least as evidence-based as his demonization.

Undoubtedly a medical expert could find much to dispute about cases G2 and G3 both. But then neither Elaine Showalter, Pat Barker or Yealland's other critics or myself could be called medical experts. My stated aim here has been to examine the validity of all these critical assertions.

The logic that I have attempted to follow—chiefly that of amplifying and contextualizing the discourse about Lewis Yealland's career and practices—suggests that neither he nor his treatments merit the disgust with which they have been treated. What we find instead is the record of a practitioner capable of discernment and humanity in his therapeutic approach, in the face of the demands posed by crippled patients on the one hand, and the military and social system on the other. I claim no heroic status for Lewis Yealland, but only that of the respect we give to any science worker lurching his way between darkness and light in an impalpable past whose demands we can only gauge by guesswork and analogy. A recent academic article presents a convincing case for abandoning clearly-dichotomized and blame-loading conceptualizations of issues arising from Great War mental-health institutional practices, especially within a Canadian context. (Mark Osborne Humphries, with Kellen Kurchinski, "Rest, Relax and Get Well: A Re-Conceptualisation of Great War Shell Shock Treatment," *War and Society* 27 No. 2 (Oct. 2008). 89—110.) Such advice may apply to the case of Lewis Yealland.

An online set of student notes about Barker's Regeneration views Yealland as a stand-in for an indifferent state: he "serves a larger allegorical purpose … a metaphor for the control the government exerts over its people. Unsympathetic to individual cases, the state continues in its "aims," fighting a war that seems purposeless and sacrificing helpless men. Like the state, Yealland does not consider the consequences of his actions"

http://www.sparknotes.com/lit/regeneration/canalysis.html#Dr.-Lewis-Yealland.

I suggest that it is time for a more nuanced view, one that views the man's work in itself and not as an allegory of present-day anxieties.

Thinking about Sudan: From Theory to Practice to Teaching and Back

Richard Simeon

In this paper, I want to talk about some recent experiences in my own work that have been especially rewarding, and that nicely illustrate how our work as scholars, as teachers, and as contributors to public affairs can stimulate, reinforce and invigorate each other.

I am going to concentrate on my recent experiences in Sudan, but this interface between scholarship, teaching and public involvement has happened at least twice for me before.

First, as a young professor at Queen's, I had the great good fortune to become director of a federalism research institute, the Institute of Intergovernmental Relations, just a couple of months before the first election of the PQ in Quebec in 1976: and that set my path on thinking, writing, and participating in constitutional reform in Canada for many years, during what Peter Russell calls Canada's Constitutional Odyssey.

Second, in the 1990s, I had the good fortune to watch the democratic transition and the development of the first democratic constitution in South Africa, adopted in 1996. I played only a tiny role in that, but it led to teaching in Cape Town and Toronto with an excellent South African colleague, deconstructing the new constitution in a comparative context, and to a continuing body of research

on the difficulties of actually implementing what many inside and outside South Africa regard as a model constitution. Once again practice, teaching and research were fused together.

The South African experience edged me out of my long preoccupation with Canadian federalism and constitutionalism and into a more comparative world – like many other colleagues. As constitutional reform sputtered to a halt in Canada after the failure of the Charlottetown Accord in 1992, no longer was Canadian unity quite so high on the political agenda.

At the same time, Canadian scholars were beginning to discover that the rest of the world had a growing interest in Canada. As ethnic, linguistic and cultural divisions elsewhere were growing, Canada, to some, presented a model of relatively (and I emphasize relatively) successful accommodation of multiple dimensions of diversity: Aboriginal and non-Aboriginal peoples (perhaps our greatest failure); French and English; easterners and westerners; and immigrant communities from around the world. Were we just lucky, or was there something in our history, in our parliamentary and federal institutions, in our political culture that could provide an explanation? And if so, might there be lessons from Canada for other countries faced with similar patterns of what Charles Taylor calls 'deep diversity.'

These are now global challenges. From the late 1980s, we were experiencing the 'third wave of democratization,' following the demise of the Soviet Union and the collapse of the Berlin Wall. And along with that came a veritable epidemic of constitution writing and re-writing that was

immensely exciting both at a theoretical and a practical level.

At the same time, and not unrelated, there was a massive rise in what we might call ethnic or identity politics around the world. Lifting the yoke of authoritarian politics allowed long suppressed national aspirations to come to the fore. In Spain, peacefully and democratically, after the death of Franco; in the former Yugoslavia bloodily and destructively.

Other forces were also fuelling the politics of ethnicity: for example the dramatic increase in immigrant populations in North American and more especially Western Europe; conflict over water, oil, gas and other resources in Africa and so on.

So my scholarly focus shifted to embrace a broader set of questions that ask: How can modern societies that are characterized by what Charles Taylor calls 'deep diversity' manage their differences in ways that are conducive to order, peace and stability, and to democracy and human rights.

These are obviously huge questions. They engage not only the analyst: what explains the dynamics of these conflicts, what factors are involved in escalating them, and so on? But also the philosopher, asking questions about social justice.

My own small piece of this world is on what we call institutional or constitutional design.

How does one craft Bills of rights, constitutional courts, election systems, legislatures and executives that can work together to enable stable, effective, democratic

government? How does one design institutions so as to reward political leaders who practice democratic politics, who build bridges across groups, and who are able to learn the arts of respecting your opponents and building compromise?

Can one construct rules and procedures which constrain undemocratic behaviour?

There is an immense amount of research and writing on this but very few firm conclusions. That's because the success or failure of any institutional structure depends on a huge set of contextual factors – history, the colonial legacies, the nature of the underlying divisions, etc. – that are impossible to control for.

Sudan, for example, is pretty much an artificial country – the North, Arab; the South largely animist and Christian. Put together by British colonial officials, ignorant of culture and history. Historically Arabs dominated the country, including a slave trade which lasted well into the twentieth century.

In modern times the country has been dominated by a highly conservative and authoritarian Islamic regime, headed by Hassan Bashir, who as you know was recently indicted by the International Criminal Court for atrocities in Darfur. After he took power there followed a 22 year civil war between North and South costing the lives of millions and dispossessing other millions.

The civil war was finally brought to an end in 2005 by a Comprehensive Peace Agreement and a new Interim Constitution. It gave very substantial autonomy to the South; including a provision for the South to vote on

secession early in 2011. But implementing it has been very difficult, with many violations on both sides. Now as the country gears up for the secession referendum in the South, enormously difficult questions arise. Can the vote be conducted peacefully, and democratically, with tension running so high? How will borders be drawn? What about the country's oil and gas resources which, crucially straddle contested borders?

All this brings me finally to my own experience in Sudan.

A couple of incidents on the way. First, with my University of Toronto colleague David Cameron, and under the auspices of a Canadian-based but international NGO called the Forum of Federations, we worked with professors from Iraq. Iraq had just passed its constitution which was bringing federalism to the country. They needed to figure out how to make it work, and we were trying to help.

One of my presentations in that program was on the question of whether there were essential pre-requisites or conditions in order to operate a federal system effectively; what was necessary to make federations work?

And so I launched into a list: to be successful, I noted, federations needed to be basically democratic, to have strong roots in constitutionalism and the rule of law, to at least have some sense of common identity and statehood, to conduct politics with a minimal level of trust – and so on, the usual litany.

And then I rather ground to a halt. My audience looked bemused. As I looked around the room, I realized that NONE of these conditions applied in Iraq, so what right did we

have to be advocating federal solutions? What hope could one have that they might succeed?

The next year, I was leading a similar mission this time working with professors in the Sudan. At a planning meeting we held well beforehand, my senior Sudanese interlocutors said, “You know, Richard, the experience of advanced, rich, democratic federations like Canada, the US, Switzerland or Germany don’t really have much to tell us.’

We are desperately poor. We are deeply divided. We have no democratic traditions. And we are just coming out of decades of civil war.

We looked at each other, and said, they are right. And so we re-designed the program to focus much more on countries like India, Nigeria, South Africa, Ethiopia – countries with much more similar histories and circumstances, and which are experimenting with different variants of federalism and decentralization. And we changed the composition of the team: now we had two South Africans, an Indian, an Ethiopian, and a Lebanese-Canadian.

And I think these changes had a dramatic effect on the success of the workshops.
But that experience in the field, so to speak, has now had an effect on my research, along with colleagues here and elsewhere.

Late one night in a Khartoum hotel room (OK, there is not much else to do in Khartoum), we began to design a new research program that would first of all break down the research silos that separate those of us who work on peace-making and peace-building in war-torn societies and those

who work on the institutional designs that can put a peace agreement into words and create institutions that will manage the conflicts and provide good governance into the future.

Second, we have felt it necessary to rethink many of the concepts and ideas that we commonly use about federalism, power-sharing and the like – concepts that arose largely in the west – in ways that would make them more relevant both in terms of understanding politics in these countries, and help us improve the design of institutions. We have a pilot project coming up on that very soon, and hope we can extend it.

So there we have a nice example of how the experience of a scholarly practitioner or adviser can be modified and reshaped by the people and conditions one meets on the ground. As I regularly say to foreign groups I am speaking to: I am going to learn as much or more from you as you will from me. It is not a cliché.

And now, in the last academic year, comes the third step: How this Sudanese experience has influenced our teaching? David Cameron has had a similar but much wider experience than mine, having done extensive advising and educational work in Iraq, Sri Lanka and Nepal. My colleague, Sujit Choudhry, in the Law School has also blended scholarship and practice in Nepal, Sri Lanka and elsewhere.

So this spring, we took the big lessons we had learned in our work and combined them with a rigourous analysis of the scholarly literature into a course we called Constitutional Design for Divided Societies.

We wanted to ensure that the students didn't just apply abstract theory to mythical cases. We wanted them to have a deep conceptual understanding of specific real world cases. And we wanted them to make clear recommendations as to the best way to proceed.

We divided the students into five country teams Lebanon, South Africa, Sudan, Northern Ireland, and Sri Lanka. Each was responsible for preparing a Country Report analyzing in depth the country's situation, and making recommendations for the future. In effect we asked the students to become international advisers in deeply conflictual situations. Students concluded by presenting their work at a conference where leading scholars and practitioners assessed and commented.

The result, as I think Peter Russell, who was one of our discussants, can affirm, were remarkable, in terms of the depth and quality of the analysis, the ability of the students to work effectively in teams and so on. It was amazing educational work for all of us. And plans are already under way to have the students' work published on the web.

And I think they came away with some of the lessons we have learned from our own experience:

- How devilishly complex and difficult so many of these situations are. There are no simple solutions.
- How important it is to for foreign advisers to be humble; to recognize these are design decisions that must be made by and for the local indigenous people themselves, not by outsiders; how important it is to avoid the temptation of saying 'have I got a model

for you,' while whipping some earlier document from one's back pocket.

- How difficult, and perhaps dangerous, it is to unthinkingly transfer institutions from country to country.
- How important it is recognize that change seldom comes quickly: how long for example did it take Britain to learn the rule of law and invent parliamentary democracy?
- To be satisfied with small victories.

Inhaled Insulin, A Pharmacological Breath of Fresh Aire

John D. Stewart

The newly developed inhaled Insulin presented here and its unique delivery system was developed to more closely mimic the function of a healthy pancreas, not simply to avoid the use of injections and implanted insulin pumps.

We have recently successfully completed large-scale independently reviewed multi-centered Phase III trials that have conclusively demonstrated that the blood glucose response with this inhaled insulin is indistinguishable from that of a normal pancreas – and largely without the complications and adverse events commonly associated with the various injectable forms of insulin.

It is important that some basic facts of human anatomy, physiology and biochemistry be reviewed at this point in order for you to more fully understand the mechanism and magnitude of improvement provided by this new form of Insulin and its novel delivery system.

Insulin injected by needle or pump is in the form of a five molecule cluster or pentomere, as the three dimensional structure of insulin in solution is such that five molecules aggregate, really fit-together like the pieces of a three dimensional puzzle. Only single molecules or monomers are biologically active, thus your body must first, in some real sense, pull the pentomeres apart before biological activity can begin.

The injection is into the area or space under your skin, really into your “tissue or lymphatic fluid”, not into your blood, as is done in some emergency and intensive care situations.

Now most people are not aware that they have two circulation systems: one, our blood, and the other our tissue or lymphatic fluid. At the level of the smallest, narrowest or shall we say, the thinnest-walled blood vessel, the capillary, fluid and sometimes cells are pushed out through the very thin vessel wall and is not intended to return to the heart via our veins but return much more slowly by way of another set of vessels, the lymphatic canal system, to re-enter the blood via the left side of our heart where this fluid is remixed with the oxygenated blood returning from your lungs to be pumped out again.

Thus the insulin injected/pumped into your tissue fluid, once the five molecule cluster is separated into its monomeric or single molecule form, must enter the blood largely through the capillary wall, in some sense from the ‘wrong side’, to be useful, while some of the insulin takes a more circuitous less time-predictable route via the lymphatic drainage or canal system to the heart then into the blood.

Individuals differ in many ways, the time taken to split up the insulin clusters, how much of the insulin goes almost directly into the blood, how much goes via the lymphatic system and how long it takes to reach the heart. For some the lymphatic circulation is very slow and carries a physiologically significant dose such that a few have adverse events at two o’clock in the morning from an injection taken relatively early in the evening.

Our Inhaled insulin is taken by simply breathing in from a novel device a little smaller the most cell phones, when the food is in front of you and you are ready to eat. This insulin is not 'fast acting', it is ultra-fast acting because it begins to have its blood glucose lowering effect in most people 36 to 40 seconds behind that of a normal pancreas, producing a 'glucose excursion' that is indistinguishable from that of a normal healthy individual. Peak insulin levels are reached within 12 to 14 minutes, again mimicking the release of meal-time insulin from a normal functioning pancreas.

The carrier 'molecule' at normal environmental conditions, pressure, temperature, and humidity forms into a spherical form called a "Tecknosphere" or in more everyday terms, a "fuzzball", that has very good aerodynamic properties such that a single inhalation results demonstrative full lung distribution. These spheres are of a surprisingly uniform size, with a diameter of approximately 2.5 millimicrons. The external and internal surface areas are very large with an internal porosity of close to 80%. Careful longitudinal studies have shown that there has been no damage to lung membranes or tight intercellular junctions.

The monomeric copies of human insulin are essentially adsorbed on to the surfaces of the 'fuzzball', and remain there until the sphere reaches the blood through the lung where the insulin is released as needed.

We learned early on that it was very hard if not almost impossible to overdose a patient as the body's response to the inhaled insulin was "non-linear" – that is at a certain point more inhaled insulin did not produce as much blood glucose reduction as expected. Of great significance was the observation that the measured 'glucose excursion' was as

we have said before the same as that of a normally functioning pancreas. Thus, fine blood vessels, capillaries are not exposed to repeated osmotic shock or osmotic stress thereby limiting disease progression – in other words the secondary effects of diabetes such as blindness and nerve damage.

The inhaler, trade named the “MedTone Inhaler” is slightly smaller than and folds up like many cell phones and delivers the very fine white powder, “techcnospheres”, without the use of a propellant or pumping by the user. Simply breathing in twice while holding the mouthpiece between the lips delivers the insulin and its carrier molecule. This process depends on the internal shape of the colour coded cylindrical cartridge.

Room air is drawn into the base of the cartridge tangentially and off-centre where the internal shape is that of a cone producing a mini-vortex that “fluidizes”, really lifts-up, the very fine powdery medication sending it out the top and into the lungs. As mentioned above, two inhalations in sequence from the same cartridge are required to ‘clear’ the cartridge ensuring that the full dose is received. The used units are designed to be returned to the Pharmacist for recycling/reloading to help reduce costs.

The dose can be calculated easily without a computer by the patient, a family member, a physician, or pharmacist using a formula that has been thoroughly researched over a period of years. It incorporates the diagnostic type, that is Type I or Type II, previous blood glucose levels and in the case of people who have been using injected insulin, the amount, type of insulin, and timing. As the medication is in powder form it is stable within a range of liveable environmental

conditions, thus the inhalator can be loaded when the person leaves home in the morning and an 'extra' cartridge can be carried for a number of reasons, such as staying out for dinner.

The benefits of this formulation and novel delivery unit – inhaler– are clear, especially for older patients and those with some visual impairment there is much less chance of dose errors because of the colour-coding.

Second, it is very easy to remember because you only take it when the meal is in front of you and you are ready to, or more accurately, you are about to, start eating.

Third, Inhaled insulin is very much less sensitive to dose, resulting in a very low risk of significant hypoglycemia.

Fourth, there is much better glucose control, with increased glucose elimination early after a meal, that is, an essentially normal post -meal glucose excursion and reduced 'excess' insulin activity in the late post-prandial, post-meal period.

The limitations are that you must be a non-smoker with no measurable lung disease and able to maintain defined lung function. At present you must not have asthma; however, there are ongoing studies to see if asthmatics can successfully use this product under defined conditions.

The search for an inhaled insulin and its delivery system began slightly more than twenty years ago, now this product that is expected to be released in 2011 clearly has the potential to revolutionize the lives and life of all diabetics both Type I and Type II.

Senior College

Purpose

The University of Toronto's Senior College supports and fosters the scholarly, professional and creative activities of retired faculty, librarians and senior administrators. The College's mission is to serve as a beacon for intellectual exchange, academic and cultural activities, as an interdisciplinary research institution, and a focal point for collegial interaction among members of the University's retiree community. Senior College will also build and administer a talent pool of members who are willing to perform academic services within the University and in the outside community.

An underlying conviction is that supporting and mobilizing the scholarly resources of retired faculty and librarians significantly benefits the University's education and research mission, provides a valuable resource for the wider metropolitan Toronto community, and contributes to the well-being of retirees.

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