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Engaged Universities: Lessons from the Land-Grant Universities and Extension

By
GEORGE R. MCDOWELL

Engagement is the vogue of relevant scholars into the twenty-first century. Yet there are concerns that scholarly objectivity requires detachment from society. The American experience with scholarly engagement comes from Land-Grant universities and extension. The Land-Grant principle emerged from the mandate to the Land-Grant colleges to improve the nation's agriculture. Agricultural science has been hugely productive because of the Land-Grant principle. The principle is general to all scholarship. The Land-Grant principle gives both intellectual and political power to engagement. Scholarship is made better substantially through the test of workability, a dimension of scholarly objectivity. The scholar is also made more skillful. The engagement making possible the test of workability makes the scholarship more relevant. Institutionalized access to the workable, relevant knowledge for those who need it generates substantial political power. At a time when universities, particularly public research universities, are seeking public support for more than their teaching, the strategies suggested by the Land-Grant principle are instructive.

American society is in peril, and its research universities have much to contribute to the society in the twenty-first century, wrote Derek Bok (1990), former president of Harvard University, in his book *Universities and the Future of America*. He explicitly identified the contributions universities can make to greater competitiveness, to a search for a better society, and to moral education. But he was also concerned to

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suggest ways and means whereby universities can organize themselves to engage the world and not "succumb to its blandishments, its distractions, its corrupting entanglements . . . [diminishing the] more profound obligation that every institution of learning owes to civilization to renew its culture, interpret its past, and expand our understanding of the human condition" (pp. 103-4). In contrast to Bok, the leadership of the Kellogg Commission on the Future of State and Land-Grant Universities is concerned that the universities themselves are in peril by failing to be sufficiently relevant to the society. The leadership of the Kellogg Commission stated at the inception of the commission,

> We are convinced that unless our institutions respond to the challenges and opportunities before them they risk being consigned to a sort of academic Jurassic Park—of great historic interest, fascinating places to visit, but increasingly irrelevant in a world that has passed them by. (Kellogg Presidents' Commission 1996)

To state the Kellogg Commission position in language Bok (1990) might have used, unless the universities engage the world more fully, they will not be able to contribute to the renewing of culture, provide an accurate interpretation of civilizations past, or provide relevant understandings of the human condition. The Kellogg Commission (1999) has codified its position on the university in society in its report *Returning to Our Roots: The Engaged Institution*, and that has started the discussion in higher education in America on engagement.

"Engagement" and "the engaged university" are phrases that derive directly from the deliberations of the Kellogg Commission and are formalized in its 1999 report (Graham Spanier, personal communication, February 2002). The concept is the newest expression of the university doing things in the society that houses it, whether the university is a public or a private institution. More than outreach, service, or extension, the connotation of engagement is explicitly a two-way street. Although newly coined, many involved with extension or public service had a two-way relationship in mind prior to the widespread use of "engagement." The tenth annual American Association for Higher Education Conference on Faculty Roles and Rewards, held 25-27 January 2002 in Phoenix, had as a theme "Knowledge for What? The Engaged Scholar" (American Association for Higher Education 2001).

Individual scholars'/professors' motivation to be involved in activities that constitute engagement, as opposed to consulting, stems from their own interests in scholarly relevance. Presumably that is what "Knowledge for What?" means at the 2002 American Association for Higher Education annual conference. For those academics primarily in teaching, engagement extends to the opportunity of exposing students to the realities of the real world for the sake of greater relevance in the teaching/learning experience. Sometimes, individual scholars make use of engagement activities to partially fund research or instructional activities through student projects used to solve someone's particular problem. For university administrators, the interest in engagement is quite different. University leaders' interest has explicitly to do with the opportunities to generate public and/or political goodwill that in the case of public institutions, may be exchanged for growth in budgets.

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But academics and their administrators, particularly those in public institutions, should have a further, deeper interest in engagement. The Kellogg Commission's (1998) intention to assist America's public universities to return to our roots bespeaks more than effective and relevant teaching, more than a politically supportive public. Returning to roots speaks of the whole institution—the academy it houses and the scholarship it supports—being both better and more relevant in a rapidly changing society. The engaged institution is the American pragmatic answer to the elitism of Bok (1990). Although never made explicit in the Kellogg Commission reports, the language of returning to roots both begs and answers the question about who should control the scholarly agenda in higher education—in America they are the people's universities.

Unquestionably, the notion of engagement or public service is a characteristic that made public higher education in America unique in the world. That American style has had a major influence on the academy throughout the world. In describing the importance of the public service influence on American higher education, Stephen R. Graubard, editor of *Daedalus*, stated in the 1997 preface to a *Daedalus* edition devoted to the American academic profession,

> Without wishing to deny the importance of [the influences of the German and British universities], the uniqueness of the American system needs to be emphasized, and not only because of the Morrill Act and the innovations introduced by the land-grant principle, with its emphasis on research in agriculture and many other fields as well. The concept of "service" took on a wholly new meaning in state universities that pledged to assist their citizens in ways that had never previously been considered. (P. v)

Graubard (1997) correctly identified the origins of the service interest of the American academy with the Morrill Act of 1862, establishing the Land-Grant colleges of agriculture, and associated the land-grant principle with agricultural science. For many inside and outside Land-Grant universities, the Land-Grant principle, whatever it means, is explicitly agricultural. That misunderstanding of a principle central to the Land-Grant universities continues to mislead and confound the understanding of an insight significant to the future of the academy and higher education.

The Roots of Engagement

The Morrill Act was "the charter of America's quietest revolution" (Taylor 1981, 37). The 17,430,000 acres of land in the public domain committed to finance the Land-Grant colleges—30,000 acres per senator and congressman in each state—is not the thing to focus on in reflecting on the establishment of these institutions. Rather, the principle behind their establishment was without historical precedent. That principle asserted that no part of human life and labor is beneath the notice of the university or without its proper dignity. Both by virtue of the character of their scholarship and whom they would serve, the Land-Grant universities were established as people's universities.

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Prior to the 1862 Land-Grant institutions, higher education was reserved for, and helped preserve, the aristocracy of the society. Being a university graduate was an imprimatur of high status in the society. The Land-Grant universities opened classrooms to young people whose previous experiences were primarily on farms, in machine shops, in bakeries, or in factories. Liberty Hyde Bailey, father of the discipline of horticulture in America, and dean of the New York State College of Agriculture at Cornell from 1903 to 1913, wrote that

> education was once exclusive: it is now in spirit inclusive. The agencies that have brought about this change of attitude are those associated with so-called industrial education, growing chiefly out of the forces set in motion by the Land Grant Act of 1862. This Land Grant is the Magna Charta of education: from it in this country we shall date our liberties. (Peters 1998, 53)

As America enters the twenty-first century, the national and individual ethic with respect to formal education is dominated by the expectation of access to higher education for all—attending college has become commonplace. Today, we expect all young Americans, who are able, to go to college. Many of them expect to go on to graduate school at least for a master's degree. Even though other developed nations have emulated the U.S. investment in higher education, still during the period from 1985 to 1991, the United States consistently reported the highest enrollment for eighteen- to twenty-one-year-olds in tertiary education of all developed countries, with U.S. rates between 33 and 38 percent (Perie et al. 1997).

An even more revolutionary idea than widespread access to higher education was embedded in the establishment and evolution of the Land-Grant universities. According to Taylor (1981), it was "that thought and action were indivorcible, that the place of the academy is in the world not beyond it, that it is the business of the university to demonstrate the connection of knowledge, art, and practice" (p. 37).

Prior to the Land-Grant universities, the aristocrats of the world, including Americans, were schooled in theology, the letters, and law and in some few institutions patterned after German universities like Johns Hopkins University, medicine. The Land-Grant view of scholarship directly challenged the prevailing norms of scholarship at the time of their inception by making the work of cow barns, kitchens, coke ovens, and forges the subject matter of their investigation (Eddy 1957). In 1890, the Babcock test for butterfat content of milk was both a scientific advancement and a political/economic act necessary to rationalize markets for fluid milk.

Access to classroom instruction is not, and has not been, the only way in which the Land-Grant universities fulfilled their contract with Americans regarding public access to the knowledge they create, although that was the initial effort. Around 1900, by which time agricultural scientists had demonstrated their ability to solve some of agriculture's practical problems, farmers clamored for access to the insights of the scientists. The claims on scientists' time became so great that the outreach function of the university was formalized as the Cooperative Extension

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Service by the Smith-Lever Act of 1914. "Cooperative" referred to the partnership between the federal, state, and county governments in support of the extension program.

Smith-Lever provided for federal government funding to the universities in support of the extension outreach function, just as the Hatch Act of 1887 had funded agricultural research. Rainsford's (1972) research makes clear that the Smith-Lever Act was passed because the direct benefits to farming sought by agricultural interests in their support of both the Morrill Act and the Hatch Act had not been forthcoming. Most students in the Land-Grant colleges did not study agriculture and go back to the farm, even though they came from farm families; results of research and instruction did not reach farmers because they were not in college but on the farm.

Thus, the Land-Grant system was revolutionary in the history of higher education in three ways:

1. its classrooms and degrees were accessible to the working classes,
2. its agenda of scholarship considered no subject beneath its purview, and
3. it provided access to new knowledge to those who would never qualify, nor want, to be in its classrooms.

This system that integrated research and extension has been, and is, hugely successful. Agricultural productivity has grown enormously. American farmers who have survived the economic tests of global markets have prospered and have the most advanced means of production anywhere in the world, though many who failed to keep business and technological pace became obsolete. American society has continued to have an affordable, safe, and secure food system. The agricultural knowledge and information system (AKIS) itself has prospered with substantial support from both public and private sectors. The rate of return on investments in research and development and extension in agriculture are somewhere between 20 and 40 percent per annum (Alston and Pardey 1996). In a society whose long-term cost of government borrowing has seldom if ever been as high as 15 percent, arguably government should borrow at 15 percent and gain returns of 20 percent by investing in agricultural research and extension (Alston and Pardey 1996).

Evidence of the success of the system was made clear by the period from 1920 to the end of World War II, the "Transition to Science" era in American agriculture, according to Huffman and Evenson (1993). It was during this period that hybrid corn, among other science-based advances, was developed. However, the period of the 1950s and 1960s was the golden age for the Land-Grant agricultural research and extension system, according to Huffman and Evenson. By that time, the system was enabling U.S. farmers and the agricultural sector to successfully compete with producers anywhere in the world, as well as being judged as one of the most productive sectors of the U.S. economy (Huffman and Evenson 1993).

It will be argued here that part of the huge productivity of the agricultural science and information system derived from the engagement of campus-based sci-

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ence with the realities of agricultural problems at the farm level through extension. Busch and Lacy (1983) made clear in their *Science, Agriculture and the Politics of Agricultural Research* that most of the choice of research projects by agricultural scientists at that time was based on the personal preferences of the scientist. The only institutionalized link between the agricultural sector and the university, then and now, is through the extension function. Notwithstanding the low attention given to that activity by writers on the economics of the system (Huffman and Evenson 1993; Alston and Pardey 1996), the extension function is certainly a necessary if not sufficient condition to system success, and extension's influence on the research agenda may go a long way in explaining the high productivity of the system.

The early twenty-first century is a time when research universities, particularly public research universities, are struggling to persuade the people of America of the unique utility of such institutions, primarily in roles other than undergraduate instruction. The public support being sought is for both affirmation and funding. In that context, knowing that there was a time when the Cooperative Extension Services of the several states as arms of the Land-Grant universities were adjudged to be the most trusted source of new knowledge for ordinary Americans is instructive (Feller et al. 1984). According to Miller (2001), the Land-Grant universities that served to create and transfer science-based technology into use by agricultural producers is arguably ranked first of all the compelling scientific achievements contributing to human development and welfare from the United States in the twentieth century (McDowell 2001).

Engagement—Agricultural Scholarship Reconsidered

Scholarship Reconsidered—Priorities of the Professorate by Ernest Boyer (1990) is widely viewed as the contemporary manifesto of the dedicated and underappreciated undergraduate instructor. Boyer's work is heralded as a clarion cry for change in the academy on behalf of what many professors really do—teach undergraduates. While *Scholarship Reconsidered* nods deferentially to researchers and even acknowledges a preeminent role for research within the academy, Boyer argued persuasively that many in the academy are almost completely occupied by teaching. Faculty with those assignments, he asserted, should be evaluated for excellence in that function, and their scholarship should reflect that assignment.

Curiously, scholars heavily vested in research, many of whom view teaching as an unfortunate ancillary function of the academy that must be endured, commonly justify their relative priority setting on the two activities by arguing that excellence in research is a prerequisite of effective teaching. Unfortunately, empirical evidence does not support that claim. Involvement in research and research productivity is barely correlated with student evaluations of teaching effectiveness. It has a

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positive correlation in the range of .13 across multiple studies (Feldman 1987). The positive sign on the correlation coefficient is reassuring because it affirms that research activity by the professor does not harm students. But the statistic does not support much more of a conclusion about the relationship between research and teaching.

Academics and academic departments in the agricultural sciences have struggled with a different conflict than the one between teaching and research. In the agricultural sciences and in the departments and colleges that house them, the mandate to carry the results of scholarship to farms, fields, and barns and to have it work has created as great or even greater tension than that addressed by Boyer (1990). That tension is derived from the added institutionalized function and funding for extension/outreach imposed on those academics and academic departments associated with the early Land-Grant agenda and the federal advocate for that agenda—the U.S. Department of Agriculture. In some departments in colleges of agriculture, the extension obligation constitutes somewhere between a third and a half of the faculty full-time equivalents, with some faculty having partial appointments in all three missions—teaching, research, and extension.

Disagreements over evaluating and accrediting the extension function as legitimate scholarship is so great at some Land-Grant institutions that scholars with predominantly extension appointments are tenured under a different tenure system, and/or are housed in separate extension academic units. The analogy in the other part of the university would be to have two chemistry departments, one for chemistry teachers and the other for chemistry researchers. Such arrangements within the agricultural academic establishment are the result of great stridency and power struggles over the definitions of "rigor," the measurement and evaluation of scholarly output, and the nature and meaning of the Land-Grant principle and mission. The institutional responses such as separate tenure arrangements or separate extension departments to the stridency of the dialogue defeats the achievement of the Land-Grant principle.

So central is the ethic of carrying out extension, and so great is the debate over extension obligations and the reward and respect for them, that these issues within academic agricultural science constitute a major cultural difference between it and the rest of the university. When viewed positively, the cultural difference is described as a greater commitment to the Land-Grant principle and to the engagement it implies. At a large number of Land-Grant institutions, even the employment appointments for all academics within colleges associated with the original Land-Grant agenda are influenced by this functional and cultural difference. Twelve-month appointments are the norm within colleges of agriculture even where the remainder of the campus has ten-month academic-year appointments. It is not surprising then, given the strong association of this cultural difference with the agricultural sciences, that even Graubard (1997) might misunderstand and consider the Land-Grant principle to be agricultural-science specific. Indeed, many in colleges of agriculture and Cooperative Extension Services take a similar view.

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The Land-Grant Principle—The Power of Engagement

Engagement and the quality of science practiced

According to Blaug (1980), since the 1960s, great turmoil has occurred among those who philosophize about science and the scientific method. Among those challenging previously received theories of science were Sir Karl Popper and Thomas S. Kuhn. Both Popper and Kuhn agreed that most scientific advancement does not come about primarily by accretion but by the revolutionary overthrow of an accepted theory and its replacement by a better one. However, they disagreed substantially on whether the day-to-day work of scientists is revolutionary. They disagreed on when scientific tests are challenges of theory or tests of the ability of the scientist. They also disagreed on whether applications of science that are less than a test of fundamental theory are hack science or a necessary condition to generating revolutionary changes. Neither Popper nor Kuhn believed in induction as valid scientific method because there are no rules for inducing correct theories from facts—there is no logical basis for validation. Rather, both believed that the "falsification"—Popper's term—necessary to advancing knowledge is only possible from deductive reasoning—from hypothesizing, testing, and rejecting.

Kuhn (1970) asserted that the fundamental issue on which he and Popper agree is that an analysis of the development of scientific knowledge must take into account the way that science is actually practiced. Based on this insight from Kuhn about the importance of the behavior of scientists in the practice of their craft, the argument is made in this article that the engagement of scientists in solving real, practical problems via an involvement in public service activities contributes to the advancement of discovery scholarship and perhaps even the solving of theoretical problems.

Both Kuhn and Popper emphasize that scientific advances are made through the deductive process of repeated testing of scientific theories and the associated rejection or failure to reject the theories. Clearly, laboratory and experimental conditions and procedures prescribed by statistical analysis and the various scientific disciplines provide the most rigorous conditions for Popper's falsification. Kuhn, however, argued that Popper's emphasis on falsification in the advancement of knowledge gives too much emphasis to unusual and extraordinary research and too little emphasis to the day-to-day work in the practice of science. This day-to-day work, which is mostly solving puzzles rather than testing hypotheses, argued Kuhn (1970), hones the skill of the scientists such that on some occasions, some scientists actually are able to set forth hypotheses and perform experiments that test fundamental theories and advance scientific revolutions.

In describing his disagreement with Sir Karl Popper on scientific practice and the importance of solving puzzles, Thomas Kuhn (1970) wrote,

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> It is important to notice that when I describe the scientist as a puzzle solver and Sir Karl describes him as a problem solver, the similarity of our terms disguises a fundamental divergence. Sir Karl writes (the italics are his), "Admittedly, our expectations, and thus our theories, may precede, historically, even our problems. *Yet science starts only with problems*. Problems crop up especially when we are disappointed in our expectations, or when our theories involve us in difficulties, in contradictions." I use the term "puzzle" in order to emphasize that the difficulties which *ordinarily* confront even the very best scientists are, like crossword puzzles or chess puzzles, challenges only to his ingenuity. *He* is in difficulty, not current theory. (P. 5)

Kuhn (1970) further emphasized the importance of solving puzzles, in contrast to testing theories in scientific practice when discussing the practice of astrology. He said that astrology cannot be dismissed as unscientific on the basis of the vague and imprecise way that its practitioners couched their predictions, making refutation difficult, or on the way that they explained its failures. Even its limited success in prediction does not dismiss astrology as unscientific. Much of the same criticisms, he suggests, could have been levied at engineering, meteorology, and medicine of more than a century ago. Each of these respective fields, which were at the time more akin to craft than to a science, had shared theories and craft rules, which guided practice and established the plausibility of the discipline. And while practitioners had great desire for more powerful rules and more articulate theories, to have abandoned their practice simply because the desired new insights were not at hand would have been absurd. In the absence of a new set of rules of practice, neither medicine nor astrology could carry out research: "They had no puzzles to solve and therefore no science to practice" (Kuhn 1970, 9).

In comparing the early practice of astrology with that of astronomy, often practiced by the same people, Kuhn (1970) made the point that individual failures in prediction in astronomy would give rise to a host of calculation and instrumentation puzzles. The same was not true of astrology, which had too many possible sources of difficulty, most beyond the control of the astrologer. Thus, while individual failures could be explained, no one, no matter how skilled, could make use of them in a constructive way to revise the astrological traditions. "And without puzzles, able first to challenge and then to attest the ingenuity of the individual practitioner, astrology could not have become a science even if the stars had, in fact, controlled human destiny" (Kuhn 1970, 9-10).

Johnson and Zerby (1973) spoke of the distinction between practical and theoretical problems when discussing the way in which economists deal with values because, they asserted, addressing human problems without reference to values is impossible. The solution to practical problems—perhaps more akin to Kuhn's puzzles—Johnson and Zerby argued, result in action and require resolution. Theoretical problems, they asserted, are often never resolved—apparently consistent with Kuhn's disagreement with Popper that the testing of theories is not the usual, day-in-day-out work of scientists and are rare events.

To deal with values in the process of solving practical problems, Johnson and Zerby (1973) argue that scientists must engage both practical and theoretical

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beliefs. Practical beliefs can be either descriptive or prescriptive. They are beliefs about the nature of reality, both normative reality (what people believe) and nonnormative reality (what is), and about the rightness and wrongness of possible solutions to the practical problem at hand. Practical descriptive beliefs, whether about what people believe things to be or about what actually is, are only of practical value when combined with prescriptive theoretical knowledge to yield descriptive prescriptive knowledge. For example, one may make many observations either about what people believe the world to be like or about what the world actually is like. The categories into which the observations are grouped is what gives meaning to the observations, and those categories are derived from some theoretical view of the world. Finding solutions to practical problems requires, argued Johnson and Zerby, using theoretical, nonprescriptive beliefs about what people believe to be real as well as about what actually is real.

After reemphasizing that practical problems cannot be solved without reference to theoretical questions, Johnson and Zerby (1973) continued by pointing out that the application of knowledge in solving problems is a creative enterprise requiring objectivity. "Objectivity" is used to describe both the investigator and the kind of knowledge that results from objective investigation. The investigator is considered objective when he or she refrains from identifying himself or herself and his or her prestige with a particular concept and will thus be willing to submit the concept to various tests of objectivity. Knowledge or concepts are objective when they pass tests based on rules of evidence and valid means of justification.

To say that a statement is objective because it is true, or even that the statement is objective because it is an accurate description of reality, is incorrect, asserted Johnson and Zerby (1973). Asserting objectivity because something is an accurate description of reality implies that our experience tells us that there is a correspondence with reality—the only check on which is more experience, which may be as flawed as the first.

A concept is objective, Johnson and Zerby (1973) suggested, if it passes all of the following tests:

- it is consistent with other previously accepted concepts and with new concepts based on current experience,
- it has a clear and specifiable meaning, and
- it is useful in solving the problems with which one is confronted. (P. 224)

The first test of objectivity—the test of consistency—includes both internal consistency and external consistency. Internal consistency is an analytical test and requires that concepts bear a logical relationship to each other. The advantage of mathematical models as representations of theoretical knowledge is that they are, by definition, internally consistent. However, sometimes such models fail to pass the test of external consistency. The test of external consistency is a test of experience based both on synthetic knowledge (derived from experience) and analytic knowledge (deduced by logic from propositions). New or independent experiences can be derived through observation such as statistically designed experi-

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ments, survey research, or other approaches to observation. Observations or experience provide a basis for forming new concepts. To apply the test of external consistency, the newly synthesized concept is compared with existing concepts.

The test of clarity is simply the meaning of clarity. If a concept can be easily articulated and communicated, then it will pass the test of clarity. If the concept is not clear, then it does not pass the test.

The test of workability comes from pragmatism. The test of workability, argued Johnson and Zerby (1973), is primarily interested in the usefulness of knowledge. They illustrated the workability test by suggesting that the assumption that light moves in a straight line passes the workability test of objectivity if the problem being solved is the sighting of a rifle. Presumably, if either interstellar travel or molecular behavior is being contemplated, then quantum insights to the behavior of light must be considered to pass the test of workability. Similarly, the assumption that the earth is flat is workable when contemplating the construction of a building or a bridge, but not when plotting intercontinental air routes. To site a house for the best passive solar heating in the Northern Hemisphere, pure empirical observation will lead one to choose a southern exposure. To explain the empirical results, one will likely have to abandon the flat-earth assumption.

Two points are made from this formal discussion of the way that science is practiced and scientists behave. First, and contrary to Popper, the daily practice of science in less than falsification of basic theories but rather in applications or practical problem solving is not hack science, but a different brand of scholarship valued for the problems it solves. The second point is that this type of scientific practice has as much likelihood of contributing to Popper's falsification and ultimately to scientific revolutions, by virtue of the fact that in the solving of practical problems or puzzles, the scientist has some external discipline impelling a decision. If someone acts on the scientist's suggested solution to the practical problem, the additional test of workability will be passed.

By engaging in such problem-solving activity, the skill of the scientist is increased and he or she may, in Kuhn's (1970) terms, be more likely to be able to set up the experiment that actually tests the theoretical hypothesis. The test of objectivity that permits the scientist to work from his or her discipline on the practical problem is the test of consistency. The test that permits that an actual solution be found to the practical problem at hand is the pragmatic test of workability—light moves in a straight line or is influenced by gravity depending on the application. To restate the point, the exposure of the scientist and his or her theories to the rigors of application in a practical problem ("puzzle" in Kuhn's terms) not of his or her choosing provides a clear test of the capacity and knowledge of the scholar, and perhaps also of the theory.

Research and extension scholars within the Land-Grant-based agricultural science establishment compelled to provide workable answers to farmers' practical problems served to force the workability test of scientific objectivity on the whole enterprise. Part of the way that the test of workability was imposed was through the debates and tension between scholars with research appointments and those with extension responsibilities. The institutionalized and funded engagement via the

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extension function ensured the continuing exposure of the science to the rigors of that test of workability. The fact of its solving practical problems of real people elicited political support to continue and grow the appropriated funding.

In 2002, the state legal obligation to match federal contributions of appropriated funds for agricultural research (Hatch and MacIntire/Stennis monies) is dollar for dollar. The actual contribution from the states exceeds six dollars for each federal dollar provided (Hatzios 2002). The agricultural audience knows what a research university is and supports it.

Engagement and the relevance of the science practiced

Yet one more aspect of the power of engagement can be seen in the Land-Grant and extension experience. The issue is scholarly relevance. The quality of science practiced is different from the relevance of the science practiced. Relevance has more to do with the scientific agenda and the usefulness of the products of that scholarship in the society.

In the Twelfth Congress of the Universities of the Commonwealth, August 1978, the theme of relevance was a prominent one. Sir Charles Wilson, principal emeritus of the University of Glasgow, was somewhat hostile to the notion of a need for greater relevance in teaching and research as evidenced by greater responsiveness to local, national, and international problems. His objection was that "those who would make a whole philosophy out of 'relevance' would . . . like the universities to come closer to the world of action and practice and to sacrifice some of their detachment in favor of social involvement" (Wilson 1979, 22-23). For Wilson, the risks associated with involvement in daily events are a loss of scholarly detachment and neutrality. Wilson's (1978) concerns sound remarkably like Bok's (1990) concerns twelve years later, when he argued that engaging the world may be a distraction to the "more profound obligation that every institution of learning owes to civilization to renew its culture, interpret its past, and expand our understanding of the human condition" (p. 104).

John F. A. Taylor (1981), in his book *The Public Commission of the University*, poses an answer to Wilson and Bok.

> Of this only are we perfectly assured, that in the new relation of science and society there can be no such thing as a university beyond politics. A mere silence on public questions will not prove its innocence; quarantine will not prove its loyalty. The path of a university is unavoidably a political path for the reason that neutrality is unavoidably a political role. The problem of a neutral is not how to be out of the world but how to be in it—how to be in it without being of it. (P. 29)

According to this notion of the public commission of the university, part of scholarship is to be aware of societal issues related to the particular area of scholarship—to be relevant. The implication of relevance or irrelevance is usefulness or uselessness. The test of relevance affects both the agenda of the scholar and the

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conduct of the scholarship. Ensuring that this relevance in scholarship occurs is important to the administration of the university. As with academic freedom, relevance is important not just for the sake of the scholars but also for the sake of the university and the society.

For many academics, the exposure to real-world problems comes through consulting activities rather than through public service. Indeed, consulting, like public service, makes a positive contribution to scholarship through both the test of workability and the test of relevance. However, understanding the direction in which the flow of benefits is moving and not to confuse this benefit from consulting with public service is important. Similar observations can be made about the corporatization of the university. While the corporate owner provides real-world input (and funding) to the scholarly agenda, it is a far cry from an institutionalized test of scholarly relevance, where relevance is measured in societal terms. In the current scramble for funding support for higher education from corporate business, the danger is that university administrators will confuse usefulness to corporate America with usefulness to the society. The notion has long been rejected that what is good for General Motors is good for America.

This discussion of relevance also provides some basis for comment on the difference of perspective between Bok (1990) and the Kellogg Commission (1998) on the Future of State and Land-Grant Universities about greater engagement of universities in the society. Bok is concerned that without the engagement with the society, the society is in peril. The Kellogg Commission is concerned that without engagement with the society, the public universities are in peril. An implicit concern by the Kellogg Commission is that without engagement, the universities will have nothing to say to the society, which will be a social loss. Ensuring the involvement of university scholars in public service becomes an institutionalized test of their relevance.

The Bok (1990) view clearly comes out of the private, elite university culture and its remnant aristocratic view of the university and society. The public university/Land-Grant university leaders more closely reflect the public support/public obligation perspective that was part of the social contract between the American people and the Land-Grant universities.

Taylor (1966) provided a balance between Bok (1990) and the Kellogg Commission (1998) and the possibility that the university would become only an instrumental agency of the society:

> He who regards the university as an island, who lets it become one, is treasonable to it. He provincializes its community, and diminishes himself. He gains a province and loses the world. He may even gain the world, but he shall have denied its soul. (P. 225)

> In its relation to society, the university's function is, in the first instance, to provide the means to ends that society has chosen for itself. But it is a lame architect who houses an activity without civilizing it. You do not sensitively house the life of a man by providing only for the movement of his bowels, and if in seeking to serve his needs you search out only the known needs that he declares and will think to define, that he needs a kitchen and a place

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> to lay his head, you will serve him very ill indeed. He buys the services of an architect; you give him the services of a privy-carpenter. (P. 228)

Disaggregating the very high returns to investment in agricultural research and extension to identify the magnitude of the respective impacts of engagement through extension on science quality and on relevance is exceedingly difficult. Even measuring the contribution of extension in disseminating the results of scholarship is highly elusive and seldom done. Arguably the institutionalized and funded obligation for engagement of researchers with final users via extension is part of the explanation of the high success of the agricultural knowledge information system.

The Land-Grant principle

The principle of scholarly behavior that evolved from the growth and development of the Land-Grant colleges of agriculture into the Land-Grant universities as they struggled to address the problems of American society at the later part of the nineteenth century and throughout the twentieth century can now be discerned. Partly because of the character of the society and partly because agrarian interests acted politically to establish the Land-Grant colleges, the early agenda was directed to agriculture. The principle that emerged is general to all scholarship.

The principle revealed is that synergistic power derives from scholarship practiced where tests of workability and relevance are institutionalized—the power of engagement. Further synergy is generated when access to the knowledge is ensured for users who will find it useful in their lives. Some of the power from engagement and access to knowledge is intellectual by virtue of the contribution to both the quality and relevance of the science practiced. Other power is political, resulting from the engagement with users of the knowledge, the access they have to the scholarly product, and the usefulness of the new knowledge to them.

In the agricultural science experience, the power of the Land-Grant principle translated itself into high productivity of the AKIS and into substantial funding support for that system from federal, state, and local levels of government. Classroom instruction can also be enhanced by engagement through the greater relevance of both the instruction and instructor. The method of instruction may also become a part of the engagement.

The success of the Land-Grant principle as applied to the agricultural problems of the society can be used as a guide to the development of the larger university. The engagement that would emerge would ensure that universities, particularly research universities, play a larger, more useful role in the society. Furthermore, notwithstanding the fickleness of the political process, practice of the Land-Grant principle across the entire university should provide for greater support from the people and their representatives. This positive supportive relationship between the society and its universities would seem particularly likely in this period of our history when we call ourselves an information society.

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Academic Agriculture Captured—From Architects to Privy Carpenters?

Another, more cautionary lesson emerges from the Land-Grant universities and extension experience of more recent years. Part of the success of the Land-Grant principle at work on the agricultural agenda has been the continuing support by agricultural audiences for agricultural research and extension—the AKIS. However, as the success of the AKIS has grown and as a result of its success, the numbers of farmers producing the nation's food and fiber have significantly declined. The economic forces changing agricultural technology, global markets, and rising income expectations have resulted in ever fewer, ever larger farms. At the time of the 1862 Morrill Act, fully 60 percent of the people of the nation were engaged in farming. Today that number is less than 2 percent.

As Land-Grant colleges of agriculture grew into Land-Grant universities, so also did the range of scholarship practiced. At the beginning of the twenty-first century, there are 151 Doctoral/Research University–Extensive, out of a total of 3,941 institutions of higher education classified by the Carnegie Foundation. The 151 are the jewels in the crown of American higher education. Of these 151 universities, 44 are Land-Grant universities. The remaining Land-Grant universities established in 1862 are in the next category, Doctoral/Research University–Intensive category. All Land-Grant universities created in 1862 are classified as Doctoral/Research Universities (Carnegie Foundation 2001).

As the character of the Land-Grant institutions changed in response to the changes in the society, the agenda of the Cooperative Extension Services in the respective states did not follow suit. In most states, the portfolio of the extension service from the Land-Grant universities is still predominantly agricultural. In 1992, the last year for which complete statistics are available, extension to agricultural audiences on agricultural subjects still constituted 47 percent of the extension resources on a national basis (McDowell 1992). In most states, the extension service is still under the control of the college of agriculture and its leadership. Indeed, the Cooperative Extension Service associated with Texas A&M University, a Doctoral/Research University–Extensive, only changed its name from the Texas Agricultural Extension Service to Texas Cooperative Extension on 27 July 2001 (Texas A&M University 2001).

Within the Land-Grant universities, some of the most vicious internecine struggles of recent years have been over the leadership, control, and portfolio of the Cooperative Extension Service. Numerous university, college, or extension administrators within Land-Grant universities have lost their jobs in part because they attempted to move the extension organization toward a broader program portfolio and away from domination by the agricultural part of the program. Carcasses of such people in the 1990s are in Minnesota, Michigan, West Virginia, Virginia, South Carolina, Georgia, Iowa, Alabama, Illinois, and Missouri among others

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(McDowell 2001). In 2002, legislators in the Minnesota House of Representatives filed legislation to direct the University of Minnesota Extension Service to refocus its extension programs back toward agricultural programs. The action was in response to a proposed reorganization of field staff made necessary by serious budget cuts in state, university, and extension budgets (Dick Hemmingsen, personal communication, 29 March 2002).

The Minnesota case illustrates the forces at work on behalf of the agricultural portion of the extension agenda in most of the states and their Land-Grant universities. In the face of some threat to agricultural extension programs, the agricultural community seeks to protect their programs, even if it means forcing the university to abandon other long-established programs. When the threat to agricultural programs is perceived to be the result of efforts by university or extension administrators to realign program resources, agricultural interest groups often participate in promoting the removal of the offending Land-Grant administrator.

These circumstances are so prevalent across the Land-Grant extension system that describing the system as being held hostage by agricultural interest groups is considered a fair characterization of the relationship between Land-Grant extension and the agricultural client groups at the beginning of the twenty-first century (McDowell 2001). The irony of the hostage relationship is that it grows out of the declining political power and inability of the agricultural community to maintain budgetary support for the university and extension. They use the power that farm groups continue to wield to win battles over internal university and extension allocations. The result is an ever narrowing of the extension portfolio and a downward spiral of support for the extension system.

Table 1 illustrates this narrowing of the extension portfolio in favor of the agricultural program at the national level from 1973 to 1992 (McDowell 1992).

This hostage taking of the Land-Grant extension system is insufficient to complete the argument that the AKIS has moved from architects to privy carpenters. The difference between the two, Taylor would say, is in the character of the housing envisioned and designed.

The character of the knowledge provided to agricultural producers at the end of the twentieth and beginning of the twenty-first century suggests that the AKIS has achieved the status of privy carpenters. Farmers are getting what they want, but not what they need. In the face of global economic forces, the factors affecting farm profitability are multitudinous. More and more farm profitability is dependent on successful strategic business behavior rather than simply the successful production of undifferentiated agricultural commodities. Notwithstanding this contemporary economic environment for farming in which at least one writer argues that we are seeing the end of commodity agriculture in the American economic portfolio (Blank 1998), the vast majority of the knowledge produced and distributed to farmers through the AKIS is precisely about on-the-farm production technology of commodities.

In 1992 at Virginia Tech, Virginia's Land-Grant university, the number of agricultural extension specialists time-committed to on-the-farm technology was fifty-five full-time equivalents as compared to six full-time equivalents directed to

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TABLE 1
NATIONAL, STATE, AND LOCAL EXTENSION PROFESSIONAL FULL-TIME EQUIVALENTS, BY PROGRAM AREAS, 1973, 1982, 1987, AND 1992 (IN PERCENTAGES)

	1973	1982	1987	1992
Agriculture and natural resources	38	44	46	47
Home economics	21	22	23	24
4-H and youth development	32	27	25	22
Community and rural development	9	7	6	7

SOURCE: Bottom 1992.
NOTE: More recent data were sought from the Cooperative State Research, Education and Extension Service of the United States Department of Agriculture to bring this table up to the late 1990s. The U.S. Department of Agriculture was unable to provide the data by these or any other categories that would permit an estimation of these categories and still sum to 100 percent of the full-time equivalents.

before and after the farm-gate issues in marketing, management, food technology, and food processing. Similarly, the National Research Initiative of the U.S. Department of Agriculture, the major competitive grant source of funding for agricultural research in the United States, had in that year approximately $85 million committed to on-the-farm production technology and its management and only $8 million for trade, markets, policy, and food technology (McDowell, 1992). No appreciable difference is seen in the emphasis of the National Research Initiative or agricultural extension programs across the country in 2001 from what was true in 1992.

Farmers ask for on-the-farm technology and its management because it can more often be done from their tractor seats: the domain of actions and activity with which they are most familiar and most comfortable. New knowledge in that arena, even if its payoff is lower, is what they want. Other, more strategic behavior such as forward contracting, other price risk-management activities, or collective action on marketing or policy changes at the federal, state, and local levels are more difficult to accomplish and require more exacting behavior of them as business people. As hostage takers, farmers are used to getting what they want and in many cases are not getting what they need.

Conclusions

The Land-Grant principle that emerged from the creation of institutions of higher education to address the problems of a majority population engaged in agriculture in the nineteenth and early twentieth centuries represents one of America's finest contributions to civilization and to scholarly practice. The principle applies to all scholarship. When scholarship is practiced in an environment that institutionalizes the engagement required by the principle, the scholarship is better and more relevant.

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The scholars who practiced under the Land-Grant principle throughout much of the twentieth century were the architects of America's agricultural success and also of the world's Green Revolution that emerged from the same scholarly practice in the latter half of the twentieth century. The capturing of that AKIS by being taken and held hostage by agricultural interest groups in more recent years appears to have turned the architects into privy carpenters. The trends toward greater corporatization of academic agricultural research will not likely offer any improvement.

Is it possible that Bok (1990) was correct? Is it possible that the part of the academy most engaged with society in the twentieth century—Land-Grant agricultural science—has succumbed to the blandishments, distractions, and corrupting entanglements that are Bok's concerns of the academy too closely engaging the society? The difference between Bok and the Kellogg Commission (1998) is the difference between relevance and irrelevance. In Taylor's (1966) terms, the difference between architects and privy carpenters is the difference between being objective, relevant scholars and subjective, relevant scholars.

The experience of the Land-Grant universities and extension in engagement suggests that great intellectual and political power can be garnered from creating environments where engaged scholarship is practiced. The experience suggests that institutionalizing and funding engagement in the whole university is important to achieving its benefits. Unfortunately, at the current point in the history of the academy, those in leadership roles who speak encouragingly of engagement have little more than exhortation to offer.

The exhortation of scholars to become architects of the use of particular kinds of knowledge in society is important in the absence of having anything else to offer. However, the Land-Grant experience in the agricultural sciences suggests that moving past exhortation to funding and formal expectations of engagement can achieve great things in the academy. That same experience also warns that being engaged is different from being held hostage.

America's universities, particularly its research universities, are struggling for support, including affirmation, from the society and the polity that house them. Former University of Michigan president James Duderstadt is reported to have joked that during his tenure at the University of Michigan, the university changed from being a state university, to a state-assisted university, to a state-related university, and finally to a state-located university (Kellogg Commission 1998). For universities, particularly public universities, to be related to society only by virtue of their location is to be truly disengaged. Those who have sought to capture the AKIS and hold it hostage have at least done so because they understood its importance to their part of the society and valued it. Helping the agricultural community to understand that the subjectivity they impose is costly to them is a second-order problem for agricultural science. That excess in engagement fades by comparison to those parts of the academy whose value is unknown, unappreciated, and at worst unused or completely owned by corporate interests and otherwise unavailable to the society.

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