A Curriculum for the Year 2000 and Beyond

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This commentary addresses critical issues in professional education for the animal, dairy and veterinary sciences. It raises key policy questions central to the mission of the university, its service and undergraduate education functions, and the institutional reward system. It attempts to identify social and cultural barriers that constrain economic development in rural areas of this nation, which agricultural curricula should address. It suggests new educational approaches for the animal science undergraduate. It concludes by providing recommendations for effectively meeting needed curricular change.

Introduction

In an earlier conference, a new definition was given for diplomacy: "Diplomacy is the art of thinking twice before saying nothing." This paper is not written in the language of a diplomat but rather that of a provocateur. For too long we in agriculture have avoided the critical issues while the situation demanded urgent and focused conversation.

There are critical questions that seemingly require the attention of any educational program which professes to be, by nature and design, professional in character. Animal science, dairy science and veterinary science are, according to our promotional materials, professional programs with career objectives. An education in the liberal arts is to learn and to know for the sake of learning and knowing. There is inherent good in knowledge. Its productive application usually is to the benefit of mankind. It can teach us, when presented with some imagination, the significant lessons of the human experience. It seems an education for the years ahead will require both liberal and professional components.

Recently this writer asked an IBM regional account executive, "What things do you look for in a new employee?" His answer was insightful. He replied rather concisely:

1. Someone who can learn and learn rapidly and retain that which was learned.
2. Someone who is willing to learn in response to change, and is willing to change and embark upon a totally new career direction.
3. Someone who has good mathematical and computational skills.
4. Someone who can plan, organize and execute a program of work or a project on their own or with minimal supervision.

There are important issues that such attitudes, behaviors, abilities and skills as enumerated by the IBM executive pose for us. How do we get at them? What is the impact of changing demographics? Part of it relates to work ethic, part is attitudinal, and part involves development of the capacity for growth.

The determination of what it is that students require for immediate success and need for the long term is not easily determined nor achieved. There is also great difficulty upon occasion in resolving the conflict between perceived student needs and special interests of the faculty members, which have arisen from research pursuits of long standing. Even those areas which we think we know best can produce some definite surprises. For example, one animal scientist told of a conversation he had recently with an Indiana pork producer. This producer said he was tending to hire more agricultural economists and fewer animal science graduates to run his operations. The animal science graduates were very committed to producing beautiful pigs. The agricultural economists were very committed to making a profit. Some years back, one of our animal science students asked a California cattle feeder who had just addressed our students, "What kind of cattle do you like best?" The reply was most succinct--"I like the kind that make money!"

Key Policy Issues

Our first and foremost responsibility as university educators is the development of our students--undergraduate and graduate. How is intellectual maturation achieved? What attitudinal characteristics are desirable? What skills and abilities seem fundamental to initial competency? Which are of long range nature? How do we avoid inadvertently creating career ceilings which our students are not equipped to break through? Over-specialization at the undergraduate level results in expert technicians rather than thinking, creative, innovative agriculturalists. How are the graduate and undergraduate curricula alike and where are they different? Are they sufficiently different? Student intellectual development should take precedence over all other considerations, although it does not always appear such is the case when tenure and promotion decisions are made. Perhaps, if the emphasis is not on the undergraduate, then this does not apply. However, undergraduates are, for most institutions, still the bread and butter of budgets. They are the big ticket item with the state legislature. It is harder to evaluate and make an objective determination as to what constitutes a quality contribution in undergraduate instruction than it is in research. However, we must begin to try. Unfortunately, the last twenty-five years has resulted in a tendency to focus on the development of the faculty, frequently at the expense of

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the education of the undergraduate student. University reputations these days seemed founded upon the faculty honors and awards. Whatever happened to undergraduate success stories? Are we operating universities as closed, self-reliant communities which are conducted primarily for the benefit of faculty? The reward system, as reflected in retention, tenure and promotion criteria, indicates the answer may be yes, perhaps a resounding yes.

A strong case can be made for faculty service in positions of influence for the good they can ultimately accomplish. Professional, industrial, policy making and policy recommending assignments should increase an individual's power to create appropriate change. Service in the community and state in the actual process of affecting change is needed. The time we spend reading and listening to one another's research papers, giving awards and recognitions to ourselves and generally complimenting colleagues on a job well done is equivalent to the rancher speaking at the local farm bureau about the hot, dry summer. It may result in some improvement in the farmer's public speaking ability, but it has very little impact on changing the local weather patterns. If rural America is to be revitalized, we must have the same creative leadership come out of the land grant and other public universities that characterized the 1910-1950 period. We are still operating on a vision that is essentially a century old. We must begin to look at the human resource in our states, especially the rural and agricultural people resources, and strike out in new directions. Perhaps our research needs to address how such can be accomplished.

Barriers to Development

What are the social/cultural barriers to economic development with especial emphasis on the rural areas? The following seem to be probable factors.

1. There is a clannishness of the local people in small towns. They are, by nature and experience, suspicious of outsiders. They are victims of their own jealousy. Small time victories are more important than big picture successes. Rugged individualism is more prized than the cooperative venture for the common good. Is our educational program addressing the root causes of society's problems?

2. There is a brain drain. The bright young college graduates are not going back to small town America. This means we are left frequently with those with less drive and perhaps less natural ability. At any rate, they are under motivated. How do we change that?

3. People are very conservative. There is a fiscal conservatism which is coupled with a lack of adventure. Rural people seem to have lost that pioneering spirit from which they descended.

4. Politically, rural America has lost its clout. One man/one vote has effectively turned the two chamber state legislatures into a House of Representatives. Though the Senate is still there, it is in name only.

5. Historically, economic developmental leadership in America has come from visionary and imaginative leaders. What are we doing in our universities and social institutions to prepare others like them? When will we in agriculture develop another Thomas Jefferson? Are we asking such questions of ourselves?

6. Universities have focused on discipline proficiency rather than social, political, agricultural and commercial leadership. Leadership for economic development, social improvement and environmental protection with all that such implies, must be created. It would seem the land grant and public service university ought to be in the vanguard of any such effort. What is the university doing to rectify the lack of leadership development? What are we doing to provide problem solvers in the field? What kind of leadership training is taking place in the educational system?

7. People in rural areas frequently have wonderful families and quiet, pleasant low crime communities. These and other beneficial societal features need to be retained. Any change agent must be sensitive to the highly desirable aspects of the culture.

We at the universities are part of the problem. For the last thirty-five years, higher education has focused on analysis. We have undertaken to reduce everything to its simplest terms. However, in the creation of solution, we are frequently required to synthesize sub-factors into a complex functioning whole. Analysis is learned behavior. But so is synthesis. We have left the latter largely to chance in recent years. Years ago, application on the home ranch was a real possibility. That is no longer for many a real possibility. The fact that increasing numbers of better farmers and ranchers are sending their sons and daughters to business schools should signal that something is amiss in undergraduate agricultural instruction. There would seem to be critical questions that we must ask of ourselves. For example, please consider the following as some which may be deserving of original thought.

1. What constitutes an educated person? What is it that everyone should be able to do well? What is it that everyone should understand? What issues and cultural conditions require enlightened understanding?

2. What constitutes an educated person in animal, dairy or veterinary science? What abilities are needed now? What do we project will be needed by the year 2000 and beyond?

3. What should be the nature of an education in the animal sciences if our graduates are to effectively compete in an increasingly integrated global economy?

4. To what areas are your graduates going immediately following graduation?

a. veterinary school
b. graduate school
c. farm and ranch management
d. sales: pharmaceutical, feed additives, etc.
e. marketing and meats
f. extension
g. secondary agricultural education
h. agribusiness firms
i. financial institutions (banks and farm credit)
j. governmental agencies
k. research technicians
l. livestock technicians
m. non-agricultural

5. What is the nature of the preparation required for each of those career or professional areas? How much of a core exists? What options should be available? How well done is academic advisement?

6. How would you rate your department's educational performance for each of those areas?

7. Is the common core more reflective of the animal sciences as they were or the professional opportunities as they are to be? Are we focusing most of the educational preparation for 30% of our students (the pre-veterinary and graduate school bound) and neglecting the 70% who are headed in the commercial world? Is the educational program building career ceilings which our graduates will be unable to break through? Dr. Bart Cardon told the author on one occasion that, as President of Arizona Feeds, with increasing frequency he hired college of business graduates for feed sales and marketing positions in preference to animal agriculturalists. He said the animal science graduates knew about feedstuffs and animal requirements. The business graduates had more proficient people skills. He said of the two, it was easier to teach the business people what they did not know than to provide similar instruction to our animal science graduates. Are we teaching to the career/professional aspirations of our students or do the curricular course titles reflect heavily faculty research interests? How do we get prepared to teach those things we have never before taught?

8. What is happening to your graduates five years after graduation? Ten years after graduation? What causes some to stay in the discipline and others to move on? What attitudes and abilities did we teach that were needed? Where did we miss the mark? What is our information basis for such judgments?

New Approaches

Let us now consider a not so hypothetical case, the role of the agricultural or cooperative extension service. What is the nature of the extension officer or farm advisor? In California they are searching for a role for Cooperative Extension. Apparently, they are to be assigned the responsibility for applied research. Are extension agents information sources for the community? Do they provide feedback to the research staff at the university as to the nature of problems needing original solutions and innovative approaches? What is it they do? Are they effective change agents? What can we point to in the curriculum that indicates educational preparation that will enable one to become a change agent? What should extension do about economic development? If we in extension are really doing our jobs, then why are our rural communities drying up? How many of your rancher or farmer clientele are in economic difficulty because they are using poor or obsolete animal production technology? Is the agricultural production technology that we are teaching at the university on a par with the top 15-20% of the ranches in the state? By way of comparison, how many of our ranchers are experiencing financial difficulty because of poor strategic and financial planning? How many are over extended? How many do not understand estate planning, tax planning, personnel and insurance questions? How many of our extension officers are dealing with these issues? It is my impression that most of the farm and ranch failures of the past decade can be laid at the doorstep of poor financial planning. It is an equally strong impression that perhaps production credit officers with some additional diagnostic education may well be better suited to be successful extension agents than sharp fresh M.S. graduates who have a first rate scientific background in an agricultural science.

Part of the educational problem is our commitment to very specifically and precisely defined educational disciplines. Consider what we have done to ourselves in the animal, dairy and veterinary sciences. We have nutritionists (ruminant and non-ruminant), physiologists, pathologists, toxicologists, geneticists, meats specialists, production management people, and the list goes on. How often do we actually formulate an animal diet beyond our research? Most often we recommend supplementation of that which is locally available. We offer courses that are frequently a reflection of our research specialties. Our tenure and promotion policies are geared to research. It is easier to count papers published and much less controversial than to evaluate a contribution to social change and economic development. In November 1989, this writer gave an invited keynote address to an agriculture conference at Maseru, Lesotho. The conference was entitled, "Incorporating Practical Agriculture and Entrepreneurial Skill Into College and University Curricula: A Southern Africa Symposium." The title of the keynote address was *Developing People for Successful Food Production: An Agricultural Enterprise Project Program.* The problem in much of the developing world is that agricultural graduates seek to become governmental bureaucrats, university and college professors and extension agents rather than successful farmers. The author was also the wrap-up, or evaluation, speaker at the conclusion of the conference. Among the dozen points was this particularly pointed one: What if extension agents in Southern Africa were rewarded, promoted and recognized on the basis of the economic prosperity of the farmers in their district? An audible gasp could be heard across the conference hall. There is increasing talk of assessment in higher education. Perhaps now is the time to have courses that deal with such topics as:

Economic Development in Rural Areas
Leadership Development: Techniques and Attributes
Entrepreneurial Adventurism
Strategic Planning in Biological Production
Agricultural Policy and Contemporary Politics
Agricultural Finance and Survival Strategies
Agricultural Ethical and Legal Issues

Our graduates in the animal sciences are usually very short on educational preparation in the processes of getting things done beyond the scientific processes and principles. Yet, most will work in the agribusiness community. We are not very sophisticated politically. It is not just agriculture that is deficient, but much of higher education. We have gotten to the point in our reductionist *thinking* where we want things to fit into neat, orderly, cleanly divided cubicles. Unfortunately, life beyond the ivory tower is not usually that way. We need to be building into graduates a new spirit of

adventurism. We need people who will assume risks, who can build an economy that can sustain us in the 21st Century.

Twenty years ago, four California universities and the Agricultural Education Foundation initiated the California Agricultural Leadership Program. That unique privately funded continuing education effort has resulted in a new level of industry and rural community activism. Four of its graduates are or have served in the legislature. One graduate was elected in November 1990 to the U.S. House of Representatives. Commodity organizations, local school boards, city councils and other agencies have graduates who are vitally involved as elected and appointed members. In 1980, the W.K. Kellogg Foundation offered every state land grant university a $200,000 seed grant to start such an effort in their state. The need to build a cadre of rural leaders is still unfulfilled in many states. What is also needed is a unit of the university who is willing to attempt such a process with its undergraduates.

In 1980, while in the company of a group of California Agricultural Leaders, this writer sat in the United States Embassy in London, England. We were meeting with Dr. Kingman Brewster, the U.S. Ambassador. Immediately prior to that appointment, Brewster had served as President of Yale University. In anticipation of meeting him, the author formulated a question that potentially could yield considerable education insight. The question went something like:

> Mr. Ambassador, you served with distinction as President of Yale University where you were concerned with the development of outstanding young people. Now you have had a unique opportunity to serve in one of our nation's most sensitive foreign posts. On the basis of your experience, what ought to be the nature of the formal education for would-be career diplomats?

His answer was simply, "I believe a liberal education is still best." If that is true, why are our foreign service career people so frequently caught off guard? The latest major miss was in Kuwait when as late as August 1, 1990, the U.S. Embassy was advising people to stay put, that no serious danger was imminent. An inadequate undergraduate education for 2000 and beyond is not confined just to agriculture. It is endemic to all of higher education. We are living on past triumphs and financing our laziness by taking resources that rightfully belong to generations yet to be born. This is not about the 30-35% you are sending on to DVM and Ph.D. degrees. The concern is for the next generation of needed community and agri-industry leaders. What are we doing for them? If your son or daughter were interested in a B.S. degree only, would you have them major in your department? If the answer to that question is no, then serious rethinking of the curriculum is warranted.

On September 6, 1990, in the commentary section of the Los Angeles Times, Ernest L. Boyer, President of the Carnegie Foundation for the Advancement of Learning, and a Senior Fellow of the Woodrow Wilson School at Princeton University, asked:

Is the modern university sufficiently engaged in service to the nation? Are today's scholars too much in the ivory tower, unresponsive to national and world affairs?

If those are relevant questions for the liberal arts institutions, then the challenge is even greater for the land grant university. Boyer goes on to say:

Today, however, while service is routinely listed as a priority by many universities, it is accorded little attention where the application of knowledge is most appropriate.

Twenty years ago, Christopher Jencks and David Reisman of Harvard pointed out that the affiliation of professional schools with universities had tended to dampen their commitment to service, even though the original purpose of these schools was to bridge theory and practice. Professional schools, according to Jencks and Reisman, have, oddly enough, fostered "a more academic and less practical view of what students need to know."

The universities' current detachment stems, at least in part, from internal priorities. The conventional view of scholarly excellence tends to be hierarchical, contributing to what some observers have called the "culture of separation." Tenure and promotion depend more on research and publication than the application of knowledge, and unless and until the reward system is changed, it's unlikely the academy will address itself to national needs.

Boyer is on the right road, but he needs to go further. Universities must begin to be the hands-on leaders in producing beneficial social change and economic development and in educating others who can give an impetus to the work.

Curricular Redesign Recommendations

Posing provocative questions is much easier than getting reasoned responses which address changing needs. However, it would seem the following are sound recommendations:

1. Some type of market research is needed with the various firms, agencies and businesses that hire our graduates to determine what they believe constitutes relevant education and professional preparation.
2. The same effort needs to be undertaken with firms, agencies or businesses that formerly but no longer hire our graduates and with similar employers who we believe we should staff but do not.
3. Determine what standard of proficiency is required for written, spoken and listening communication. What is the writing component in your curriculum?
4. Consider the option of a second language. That would seem to be fundamental if one is really earnest about an internationalized curriculum.
5. Consider preparation that addresses those abilities that enable one to bring about social changes and economic development.
6. Determine what proficiency level is warranted in management and leadership education.
7. Consider what level of political and legal sophistication is required to enable a graduate to serve effectively in our society.
8. Define the skills needed in
   a. mathematics and computational sciences
   b. science

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Student Assessment of Animal Science Instruction for the Future

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Abstract

Supplementary to the Midwestern Section American Society of Animal Science 1991 teaching symposium titled "Animal Science and Education - Are We Losing Our Identity?" a survey was conducted of the 20 registered Block and Bridle Clubs in the Midwestern Section. Results of the survey indicated that students do not perceive Departments of Animal Science to be losing their identity but students do believe that future curriculum will place greater emphasis on biological science courses. Overwhelmingly 66.1% of the students agreed that more computer skills should be integrated into Animal Science curricula and 79.1% of the students agreed that more hands-on experience should be included in animal production courses. From a student perspective, this survey suggested Animal Science departments should continue to offer courses in production and management while increasing science, business, and computer skills.

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Introduction

We are in an era of rapid change. Fewer young people are needed in traditional animal science production jobs and fewer young people are choosing to major in Animal Science. At the same time, demands by employers for graduates with both technical training and animal experience exceed supply. Emphasis on research at our universities is very high. Increasingly more of our Animal Science graduate students come from Chemistry and Biology undergraduate majors. Fewer dollars are available, and funding education, research and service is more difficult. Our knowledge is expanding at an ever increasing rate. Indeed, education seems to be in crisis. The call is for more emphasis on the traditional skills of reading, writing, speaking, etc. at primary, secondary and post secondary levels. Consequently, more pressure is put on students, faculty and administrators to be more productive. On the one hand the animal industry wants students with more production skills. Agribusiness wants students with more business experience. Science needs graduates with greater basic science knowledge. To quote Andrew Barkley (1991), "Students enrolled in agriculture (animal science) often demand relevance to the real world."

Because of negative public perception of a weak agricultural economy, because of competition for students from other sciences and because of changes in emphasis, some institutions are considering name changes to replace agriculture science. Life science is a buzz word under consideration at the secondary level. Some universities out of necessity have combined traditionally separate Departments of Dairy, Poultry and Animal Husbandry into singular Departments of Animal Science. Even Colleges of Agriculture have had name changes reflecting a merging of disciplines, i.e. the University of Missouri College of Agriculture, Food and Natural Resources.

Consequently, the Teaching Program Committee of the Midwestern Section of the American Society of Animal Science chose the title "Animal Science and Education -- Are We Losing Our Identity?" for the 1991 Teaching Symposium. Invited speakers were Edward McMillan, CEO Purina Mills, who presented the industry perspective; Bud Harmon, chair of the Department of Animal Science Purdue University, who represented administrative concerns; and representing faculty, Robert Kaufman, Professor of Meat and Animal Science, University of Wisconsin. Some of the issues addressed during the symposium included "future needs of education", "compatibility of basic science and applied instruction", and "modernizing the curriculum is change needed"? Obviously missing from the symposium was the student perspective. Therefore, in an effort to ad-

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c. composition
d. applied animal, dairy and veterinary science
e. interpersonal relationships

9. Define the attributes of character relating to ethics, service and people that would seem to be of critical importance in a rapidly changing world.
10. Attempt to project what type of teaching/learning environment is needed to give graduates a competitive edge. What can we do to get them to continue learning throughout life?

Redesigning a curriculum is never easy. Changing the direction of curricular evolution is painful. However, the recent demise of a sister department at the University of Nevada Reno is a rather loud proclamation that revolutionary thinking is not only desirable, it is absolutely necessary. A curriculum for the Year 2000 and beyond will be different. Whether we prepare such will determine whether or not we will be a part of an educationally dynamic and vibrant 21st Century.

Literature Cited

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