There is an Agricultural Engineering Division in the American Society for Engineering Education. Many ASAE members who are particularly concerned with education are members of ASEE. ASAE members in education working through their colleges of egineering have had opportunity to contribute to the ASEE "Goals of Engineering Education" study.

The American Society of Agricultural Engineers supplies ECPD with a list of ASAE members qualified to serve on accreditation visitation teams. ASAE has within the past year become a participating member of ECPD and is represented on the ECPD board of directors and on the various committees of ECPD.

An important trend in agricultural engineering curricula is a move away from hardware-oriented courses toward courses planned to emphasize the application of basic sciences in engineering for agriculture.

A look at the lists of professional agricultural engineering courses offered by two major universities will illustrate this change.

UNIVERSITY A	UNIVERSITY B
Farm Tractors	Tools and Materials
Surveying and Soil and Water Engineering	Control of Environment
Farm Machine Characteristics and Mechanisms	Analytical Methods
Design of Farm Structures (2 courses)	Bioengineering Parameters
Design of Concrete Structures for Agriculture	Analysis of Agricultural Production Systems
Electricity in Agriculture (2 courses)	Functional Design of Field Machines
Instrumentation and Measurements	Soil and Water Conservation Engineering
Design of Agricultural Machinery	Electrotechnology for Agricultural Production
Tractors and Prime Movers	Design of Functional Engineering Systems
Soil Conservation Structures	
Land Drainage	
Agricultural Process Engineering	

University A's courses are an excellent offering of a modern version of curricular content which has been successful in agricultural engineering for over 50 years. University B's courses illustrate a change that is an accomplished fact in several universities. There is sharp disagreement between the proponents of these contrasting approaches to agricultural engineering course structure. It is only fair to note that those departments adhering most closely to the traditional (University A) type of curriculum are also those departments maintaining the larger enrollments. However, the curriculum changes are *not* the cause of smaller enrollments in other departments.

Agricultural engineers are vitally concerned with what was above referred to as "physical technology related to agriculture." This is not an accepted phrase. The terms "farm mechanization," "agricultural mechanization," "mechanized agriculture," and "applied agricultural engineering" are all used, but have many deficiencies. In fact, one of the big problems with this area is lack of appropriate definition. Most students in general agriculture are given thorough grounding in biology, some background in chemistry, and much training in the practical application of these subjects in agricultural production, development, and research. For these general agriculture students, the application of physical sciences and mathematics in agricultural production and research is often minimal. Agricultural engineering departments offer and historically have offered both curricula and individual courses for the student interested in the application of physics and mathematics in agricultural production. Areas of particular interest are, of course, power units and associated machinery, buildings from both a structural and an environmental viewpoint, and the development, control, and utilization of water resources. The student of agriculture is interested in understanding these things as tools to be applied in agricultural production. He is interested in their performance characteristics rather than in the details of their design.

The American Society of Agricultural Engineers last December received a detailed report developed by a committee which had been charged with consideration of programs in applied agricultural engineering. This rather extensive report defines the needs and functions of agricultural engineering technicians and technologists. It suggests curriculum content for training personnel in these fields. The report is not subject to summarization here. However, its essential focus lies in this statement:

> "Over the past 20 years there has been a widening gap: (a) between the professional engineer and the craftsman, (b) between the professional agricultural engineer and those segments of the agricultural industry which his findings are intended to serve, and (c) between the professional agricultural engineer and the general agriculturist."

This type of gap has developed in all areas of engineering. ASAE is not unique among engineering societies as it seeks its role in bridging the chasm. ECPD now offers accreditation to engineering technology programs.

The ASAE committee on Programs in Applied Agricultural Engineering suggests 2-year curricula as training for such functions as agricultural equipment technician and soil conservation technician and a 4-year program for agricultural engineering technologists.

The American Society of Agricultural Engineers carries out its education-related activities through its Education and Research Division, which is one of the five major and parallel divisions of the Society. The division includes committees on Curriculum and Course Content, Instruction in Agricultural Mechanization, Graduate Instruction, and Career Guidance. Through these committees facts and opinions are exchanged and sound bases for educational programs are sought.

SYMPOSIUM PAPERS

Four-Year Non-Land-Grant Universities And The Professional Societies

DANIEL O. ROBINSON
Director, Division of Agriculture, Arizona State University;
Vice President, NACTA

At first glance my topic, "Four-year Non-Land-Grant Colleges and the Professional Societies," appears to have little that would be either challenging or of great concern. Let me hasten to say, however, that in my opinion there is a need for considering this topic that few suspect. The gentlest inquiry will reveal many emotionally charged prejudices regarding agriculture in non-land-grant institutions. It is as though the great educational breakthrough which originated with the Morrill Act, and established agriculture schools and colleges across the nation and opened the door of education to all segments of American society, was acceptable only in the 19th century. It appears that some consider the development of educational centers for agriculture in the 20th century or beyond a great heresy.

As a matter of fact, centers for education and training in the various fields of agriculture have grown up side by side with land-grant institutions. Wise leaders in both state and private institutions have established agricultural curricula, facilities, and faculties wherever these educational needs have been demonstrated and students could be served.

To illustrate this point, let me call your attention to data on undergraduate enrollment in major land-grant colleges and universities and in some other 4-year colleges and universities teaching agriculture.[1] After considering the data, you will conclude as I have that the non-land-grant schools make up a fairly important segment in the total picture of higher education in agriculture. This is emphasized even more when you consider the host of junior colleges having agricultural programs that are not included in the data.

The following tabulation shows the agriculture enrollment of major land-grant colleges and universities in 1965:

Iowa State University	2,288	Colorado State University	597
Cornell University (New York)	2,093	University of Arizona	590
Ohio State University	2,041	University of Kentucky	572
Purdue University (Indiana)	1,879	Washington State University	571
Michigan State University	1,479	New Mexico State University	568
Oklahoma State University	1,476	Clemson University (South Carolina)	551
University of Minnesota	1,462	Rutgers—The State University (New Jersey)	542
University of California	1,388	University of Maryland	531
Texas A&M University	1,132	University of Massachusetts	500
University of Missouri	1,124	A & T College of North Carolina	458
University of Illinois	1,099	University of Idaho	332
University of Nebraska	1,016	University of Wyoming	332
Pennsylvania State University	1,015	Utah State University	325
Kansas State University	959	University of Arkansas	306
South Dakota University	933	University of Florida	297
North Carolina University	859	University of Rhode Island	264
University of Wisconsin	822	University of Connecticut	262
University of Tennessee	820	University of Delaware	251
University of Georgia	812	University of New Hampshire	248
University of Maine	797	University of Puerto Rico	216
Oregon State University	786	University of Vermont	199
Mississippi State University	681	University of Nevada	157
North Dakota State University	650	University of Hawaii	135
University of West Virginia	623	Tennessee A & I State University	134
Louisiana State University	621		
Auburn University (Alabama)	604		
Virginia Polytechnic Institute	602		

The following tabulation shows the agriculture enrollment of some other 4-year colleges and universities teaching agriculture (1965):

California State Polytechnic College	1,644	Arizona State University	250
Texas Technological College	1,181	Western Kentucky State College	220
Bringham Young University (Utah)	1,175	Southwest Texas State College	204
Southern Illinois University	752	Northeast Louisiana State College	189
Sam Houston State College (Texas)	533	Southwest Missouri State College	189
Tarleton State College (Texas)	531	Fort Hays State College (Kansas)	186
Wisconsin State College	530	Middle State University (Tennessee)	185
Fresno State College (California)	485	Northwestern State College of Louisiana	181
University of Southwestern Louisiana	485	Morehead State College (Kentucky)	180
Delaware Valley College (Pennsylvania)	485	Central Missouri State College	168
Arkansas State University	420	Stephen F. Austin State College (Texas)	155
Louisiana Polytechnic Institute	419	Tuskegee Institute (Alabama)	108
East Texas State College	394	Abilene Christian College (Texas)	99
Southeastern Louisiana College	351	Western Michigan University	89
Murray State College (Kentucky)	350	Nicholls State College (Louisiana)	85
McNeese State College (Louisiana)	320	Austin Peay State College (Tennessee)	76
Sul Ross State College (Texas)	306	Ohio University	73
Chico State College (California)	301	Southeast Missouri State College	66
Western Illinois University	300	Wilmington College (Ohio)	65
Tennessee Technological University	284	Berea College (Kentucky)	59
Texas College of A & I	263	Northeast Missouri State College	58
Illinois State University	260	McPherson College (Kansas)	52
		Grambling College (Louisiana)	16

It is the fond hope and dream of NACTA members that the time is near at hand when all agricultural schools in America—land-grant universities and colleges, non-land-grant universities and colleges, junior colleges, and technical schools—can all join together with mutual respect and cooperation for the purpose of making higher education programs available according to current needs rather than by tradition or origin of institution. It is our hope that standards of excellence will be established throughout all of these various segments of higher education in agriculture and, thereby, insure continuing scientific advances, technological developments, and a flow of knowledgeable and skilled personnel into the various fields we call agriculture.

With this in mind, when I consider the non-land-grant colleges and the professional societies related to agriculture, my first appeal to the societies is for recognition. Let me illustrate how important this is.

In the early part of 1965 I received a copy of a brochure from the American Society of Agronomy titled "Agronomy and You Help to Make a Better World." It was a fine little publication to be used for student recruitment. As I leafed through it, I was delighted, but when I came to the last page, heavy display type shouted "Land-Grant Colleges and Universities in the U.S. For further information write to the head of the Agronomy or Soils Department at your state institution." Below the headlines was the usual list of the giants of agriculture instruction. The booklet was useless to at least half of all the institutions teaching agriculture, including those who needed it most. I wrote to the Society and to the chairman of the Committee for Brochures. The appeal evidently paid off.

A few months ago I received another booklet from the American Society of Agronomy titled "Careers in Agronomy, Crop Science and Soil Science." It's a first-class recruitment folder and on the last page is a list of schools, but this time the heading reads "Colleges and Universities in the U.S. offering majors in Agronomy." That's real progress.

As an example of fine assistance in development of recruitment materials, I would also like to call attention to the booklet recently published by the American Society of Animal Science titled "Animal Science in a New Era for Opportunity, Challenge, Success." This booklet is one we can all use with pride since it recognizes all schools offering "majors or degrees in animal science." The usefulness of much of the agricultural recruitment material could be greatly increased if we could erase the prejudices concerning institutions teaching agriculture.

Another problem that most non-land-grant colleges face is the problem of breadth of subject material and variety of courses taught by one faculty member. The non-land-grant colleges are equivalent to centers for resident instruction with the employment of faculty being justified on the basis of production of student credit hours or numbers of students. The assignment of faculty to part-time teaching and part-time research or extension is rare since research and extension work are rarely a basis for employment of additional faculty. The magnitude of this problem is illustrated in the accompanying table.

Enrollment in agriculture and number of faculty in non-land-grant colleges and universities, 1965

Institution	No. of Faculty	Enrollment	Students Per Faculty Member
Tuskegee Institute (Alabama)	—	108	—
Arizona State University	12	250	20.8
Arkansas State University	11	420	38.2
California State Polytechnic College	69	1,644	23.8
Chico State College (California)	—	301	—
Fresno State College (California)	27	485	17.9
Illinois State University	8	260	32.5
Southern Illinois University	41	752	18.3
Western Illinois University	12	300	25.0
Fort Hays State College (Kansas)	4	186	46.5
McPherson College (Kansas)	4	52	13.0
Berea College (Kentucky)	6	59	9.5
Murray State College (Kentucky)	9	350	38.9
Morehead State College (Kentucky)	4	180	45.0
Western Kentucky State College	9	220	24.4
Grambling College (Louisiana)	—	16	—
Louisiana Polytechnic Institute	27	419	15.5
Northeast Louisiana State College	4	189	47.2
Northwestern State College of Louisiana	5	181	36.1
Southeastern Louisiana College	8	351	43.8
Nicholls State College (Louisiana)	6	85	14.1
McNeese State College (Louisiana)	13	320	24.6
University of Southwestern Louisiana	20	485	24.2

Western Michigan University	2	89	44.5
Southeast Missouri State College	2	66	33.0
Southwest Missouri State College	7	189	27.0
Northeast Missouri State College	2	58	29.0
Central Missouri State College	4	168	42.0
Ohio University	3	73	24.1
Wilmington College (Ohio)	6	65	10.8
Delaware Valley College (Pennsylvania)	17	485	28.5
Middle State University (Tennessee)	8	185	23.1
Austin Peay State College (Tennessee)	4	76	19.0
Tennessee Technological University	9	284	31.5
Abilene Christian College (Texas)	5	99	19.8
East Texas State College	9	394	43.7
Sam Houston State College (Texas)	14	533	38.1
Southwest Texas State College	8	204	25.5
Stephen F. Austin State College (Texas)	6	155	25.8
Tarleton State College (Texas)	8	531	66.4
Texas College of A & I	6	263	43.8
Texas Technological College	56	1,184	21.1
Brigham Young University (Utah)	17	1,175	69.1
Wisconsin State College	20	530	26.5
Sul Ross State College (Texas)	4	306	76.5
TOTALS	517	14,725	a 27.7

a Average.

Source: Hal Barker, Dean, School of Agriculture and Forestry, Louisiana Polytechnic Institute, and President of NACTA 1965-66.

It can be seen that in many institutions one or two faculty members would have to carry the entire responsibility for the area of plant science or animal science or economics. Thus the typical faculty member would teach several different courses each term rather than one course per semester or one course per year as is frequently the case in the land-grant schools.

Conditions which make heavy teaching loads necessary and permit limited specialization immediately raise the question of quality of educational program. This, of course, is one of the major concerns of NACTA. But before anyone concludes that it is impossible to give excellent courses under such circumstances, let me say that many high-quality courses are being given under these difficult circumstances. The recent trend toward consolidation of some of the specialty courses into larger, more general, and comprehensive courses makes it easier for the smaller schools to be in the midst of fashion in agricultural higher education.

Nevertheless, a faculty member presenting courses in several fields, or subdivisions of a single field, faces a serious problem, even though the fields are closely related. Theoretically, he could become highly competent in the few fields in which he may teach. As far as I know, no one has ever filled the human brain to capacity; there is always room for acquiring an additional specialty. The problem comes in keeping courses up-to-date and keeping abreast of new developments and changes in the field. It is in this area that the professional societies can be most helpful. Let me illustrate this by referring to some activities of the American Society of Agronomy.

In 1963 the Society published a "Laboratory Manual for Crop Production" and in 1964 a "Laboratory Exercise Source Book for Soils." The manuals were made up of favorite laboratory exercises submitted by members of the Society. They made it easier to upgrade, modernize, and enrich courses being given.

Similarly, the volumes on procedures for chemical analyses and physical analyses of soils just released by the ASA promise to be most helpful.

The monograph series "Advances in Agronomy" has done much to help the generalist keep up with advances in the more specialized fields.

Having had experience in teaching at both land-grant and non-land-grant institutions, I am sure that nearly every teacher in the agricultural colleges whether at Cornell or Cobleskill, Urbana or Carbondale, East Lansing or Kalamazoo, would appreciate every publication or program that might be undertaken by the professional societies if it would promote excellence of instruction and assist in keeping abreast of new developments.

As a representative of NACTA and one of the smaller schools, may I suggest that any project undertaken by the societies would be of greatest service if it were made up in such a way that it would be available and useful to all schools teaching agriculture.

We in NACTA feel that there should be no schism in agricultural higher education due to the nature of institutional organization or origin. We feel our common purposes are to extend the understanding of our natural resources and their management for the benefit of man, and to serve the agricultural industry and the students who come to our campuses. With this in mind, we invite all institutions and professional societies concerned to join us in a genuine effort to maintain or establish excellence in higher education for agriculture.

1 Source: Proceedings of the 79th annual convention of the National Association of State Universities and Land-Grant Colleges (1965) and Hal Barker, Dean, School of Agriculture and Forestry, Louisiana Polytechnic Institute, and President of NACTA 1965-66.

Two-Year Colleges And The Professional Societies

DEWEY McNIECE[1]
Professor of Agriculture Economics and Business Administration
and Coordinator of Agri-Business Program,
Abraham Baldwin Agricultural College, Tifton, Georgia

We are constantly striving to improve our competency in the instructional area. In ameliorating and refining our teaching techniques and modernizing our curricula, we should consider the following items:

1. Are we cognizant of the tremendous changes taking place in agriculture? Are we becoming obsolete?

2. Are we conscious of the changes that must be made to keep our curricula current? Do we insist on retaining skill courses when they should be supplanted by courses in basic science?

3. Do we keep abreast of the multitude of innovations taking place in our profession?

4. Do we attend the meetings of our professional societies and the conventions, colloquies, and conferences of a homologous nature? Do we belong to a professional society just because it is the conventional practice? Are we acquiring the utmost value from the societies from the standpoint of meetings and journals?

5. After attending the meetings, do we have adequate time to explore the ideas we have acquired? Or are we burdened with committee assignments, excessive teaching loads, preparing documents and proposals, and engaging in other activities only vaguely related to our profession?

6. Have we attained the sought-after academic climate that would make our teaching more challenging and rewarding as well as more beneficial to our students?

How can the professional societies render assistance and elucidate the issues confronting the teachers of agriculture in junior colleges, and are they fulfilling these needs? To secure a cross-section of viewpoints, a questionnaire was transmitted to junior colleges that offer agriculture as one of their curricula. An excellent response was received and the many comments were pertinent. It is realized that the societies, per se, cannot provide all of the answers because of a divergence of emphasis and attitude, but from the responses received, it would seem that many of the programs of the professional societies should be reevaluated and that changes should be initiated that would permit them to extend their efforts to ameliorate the intellectual status of the teaching profession.

Analysis of the questionnaire showed that approximately 25 percent of the respondents are not members of a professional society. This group of nonmembers may feel the societies are not beneficial or worthwhile, and they do not want to be members just to conform to custom. It could also be that the societies have not exerted sufficient initiative in making known the advantages of membership. It would appear that a professional society could be more helpful to the profession if the membership were widespread.

A substantial number, approximately 35 percent, of the teachers that replied to the questionnaire made disparaging comments concerning the journals, of which the following are typical:

"Directed more toward research and graduate students."

"Not geared to junior college teaching."

"Most of the articles are too involved or specialized for our purposes."

"Even though the information is current, most of it is of little or no value."

"Too advanced for junior college student absorption."

Even though many of the comments were complimentary, the above observations should induce leaders of the professional societies to consider the possibility of giving their programs wider appeal.

Over 60 percent of the respondents commented that the journals could be changed to better meet their needs, and the following comments are typical:

"Make it less technical."

"Place more emphasis on applied science and less on basic science."

"Include more articles on philosophy of teaching."

"Bring research data down to the working level."

"Print a less technical summary of the articles."

"Publish articles that could be used for student assignments."

"Place more emphasis on teaching."

"Provide more practical information that could be used in the classroom."

"Include evaluation of new programs in agriculture being carried on by community colleges."

As a number of complimentary remarks were received, it appears that some of the professional societies are performing a more creditable service for their members than are others. Some societies may be oblivious of exigency in the situation, and an exchange of ideas among societies appears to be essential. A committee could be selected from the many societies representing various areas in agriculture to study, evaluate, and make recommendations for improvements.

Do teachers secure beneficial information at meetings of the professional societies? Over 90 percent of those fortunate enough to attend felt that meetings were beneficial as they are now conducted. Some of their comments are as follows:

"Unpublished information is gained from colleagues."

"Industrial exhibits are helpful in learning about new techniques and equipment."

"Valuable for contacts in field of job placement."

"Ideas presented on instructional methods."

"The benefit is mostly from personal contacts with colleagues."

"Provides opportunity to visit in rotation the agricultural colleges and their facilities and research projects."

"Sometimes they have good speakers who give material that is specific and to the point."

"Secures some helpful hints, but little which applies directly to area of concentration."

"Provides new techniques and approaches to problems."

The other remarks were quite similar in that they pointed out current research information was received.

The suggestions for improvement of meetings included the following:

"Condense to 'meat' of the issue."

"Present important information and adjourn."

"Include workshop type meetings."

"Subdivide into annual regional meetings in order to make attendance easier for the teacher with community college workloads."

"Provide less regimentation with more opportunity for visiting colleagues."

The consensus of the respondents was that "meetings" would be more beneficial than the "journals" if attendance were possible. Because of the expense and time involved with meetings, journals are presently more helpful.

A question about the desirability of a publication that would be directed more toward junior college teaching brought a varied reaction. The majority stated that a journal of this type would be helpful, but many commented that they realized a separate publication would probably be financially impossible. Several suggested special issues of the present journal, or a section devoted to junior college teaching.

Many general suggestions were made on ways in which the professional society could be more beneficial to junior college teaching. Included were the following:

"Give recognition and status to the junior college student (he is not second rate)."

"Include more junior college teachers on policy-making committees."

"Encourage more papers to be given on college teaching procedures."

"Publish more material regarding requirements, working conditions, and opportunities in the field."

"Organize a junior college section at annual meetings and provide information on faculty loads, salaries, and fringe benefits."

Two of the comments were so markedly different in their content that they are used almost in their entirety:

"We need information concerning people, places, problems and their solving that directly relate to the junior college. This needs to be prepared by those involved . . . not by high paid, non-doing administrators that don't know what they are talking about."

"There are three of us in our department and we try hard to keep up with all that goes on. Dues keep us broke if we join all of the societies or groups. We all have the same problem of trying to turn out students as industry will take them before they have had their training completed. This leads to criticism of us for not training them well enough. Professional societies could be of tremendous assistance to us in getting more and better students, in letting high school counselors know what the field is like, in speaking before high school groups, and getting the word around as to the opportunities in agriculture."

Admittedly, this paper has emphasized the critical remarks. I do not feel this approach is unjustified, for we have evidence that many teachers are dissatisfied, and it appears that many professional societies are unaware of their deficiencies. The leaders of these organizations should take a very critical look at their shortcomings and attempt to serve all members, not just the research-oriented scientists.

A recent study disclosed that over one hundred junior colleges offer curricula in agriculture. Therefore, a redirection of effort could bring great benefit not only to the junior colleges but also to the senior colleges.

1 Paper presented by F. S. McCain, Chairman, Division of Agriculture, Abraham Baldwin Agricultural College

Problems Encountered By The Professional Societies And Some Solutions

CARROLL V. HESS
Dean, College of Agriculture, Kansas State University

I deeply appreciate the opportunity to participate in this meeting. I am glad that those of us associated with land-grant colleges of agriculture have this opportunity to improve our relationships with other colleges offering programs in professional and technical agriculture. We have a common mission — that of providing quality education for those who qualify and are desirous of it. Many of your graduates will be transferring to our colleges for advanced study.

These comments are based on experiences as chairman of the Student Affairs Committee of the American Farm Economic Association, while I was teaching and doing research at the University of Minnesota.

Permit me to refer briefly to personal experiences relating to lagging professional support of undergraduate education. In the Department of Agricultural Economics and Rural Sociology at Pennsylvania State University as a new Ph.D. in 1950, I sensed a great need to strengthen the undergraduate program and to increase the quality of students enrolling in agricultural economics. Other faculty members were generally sympathetic with the effort, but most of them concentrated on research, graduate students, and publications. The Department Head encouraged me, counseled me, and supported me, and made good progress in strengthening the undergraduate program and attracting more and better qualified students. But those efforts left me short on publications at budget time. Naturally this made it difficult for the Department Head to obtain equitable rank and salary for me. Others had made greater contributions to the graduate study and research programs and hence had more publications.

The late forties and early fifties was the time when graduate study and research programs were rapidly expanding in most land-grant universities. These programs overshadowed, or even detracted from, undergraduate teaching. During the fifties many new faculty members were being recruited with promises of few teaching responsibilities, particularly at the undergraduate level. Emphasized then were opportunities to teach graduate courses and to carry on well-funded research programs. The result was greater workloads in undergraduate teaching, advising, and curriculum planning by faculty members whose efforts were not research or graduate-student oriented. Some staff members, recognizing that the grass really was greener across the fence, shifted to that area. Others, seeing the needs of undergraduate programs, voluntarily shifted their emphases to the undergraduate level. The commitment of the latter led to strengthened enrollments and undergraduate programs and provided the reservoir for the phenomenal growth in graduate enrollment and associated research efforts that have continued since the late fifties.

Many faculty members who responded to the undergraduate "call to duty," suffered temporary setbacks in professional and financial advancements. But I am happy to report that those who excelled with their increased teaching responsibilities, in general, have been rewarded commensurate with researchers and graduate faculty members.

The growing national concern for improved teaching and forward-looking curricula is reflected in greater uniformity of rewards for quality performances by teachers and researchers alike. However, some unwarranted salary lags (or discrepancies) still penalize those who emphasize undergraduate teaching.

The real breakthroughs in undergraduate education in our professional association came under the dynamic and imaginative leadership of Dr. John Sjo, a member of Kansas State University's faculty, after he was appointed chairman of the Student Affairs Committee in 1961. Dr. Sjo's strategy was to survey Department Heads across the nation to ascertain major undergraduate educational needs and to solicit suggestions for strengthening undergraduate programs in agricultural economics. His survey disclosed:

1. a desire to strengthen undergraduate student participation in local professional clubs and in the National Student Section debate and public speaking competition,
2. a felt need for workshops, symposia, and conferences to improve undergraduate instruction and curricula in agricultural economics, and
3. an interest in developing a professional society to recognize teaching excellence.

The Student Affairs Committee immediately responded by developing several proposals for consideration by the AFEA Executive Committee. While the Executive Committee at first had some reservations, there was support for proposals that merited it. A reluctance to support the proposals financially was due mostly to fear of a flood of similar proposals from other interest groups in the profession. To our amazement, the greatest obstacle was negativism among undergraduate teachers themselves. Many faculty members, when asked why undergraduate instruction was not being recognized or why efforts were not taken to improve undergraduate instruction, said the AFEA Executive Committee either did not see the need or opposed proposals to increase support of student activities

and conferences to improve undergraduate education. Dr. Sjo was actually advised by some not to approach the Executive Committee, not to ask for greater financial support of Student Section activities.

Fortunately we were not easily deterred and vigorously presented a proposal for AFEA to support and co-sponsor with the Harvard University Graduate Business School a symposium on "Improved Curriculum in Agricultural Business Management" in 1961. The Association was very reluctant on this proposal. But its success paved the way for AFEA financial support and sponsorship in 1963 of another very successful workshop on "Improved Undergraduate Instruction in Agricultural Economics" in which 80 agricultural economists participated. In August 1966 a third successful symposium, on "The Nature of Agricultural Economics—Implications for Improved Instruction," co-sponsored by AFEA and the Commission on Undergraduate Education in Agriculture and Natural Resources (CLEANAR), was held at Virginia Polytechnic Institute. Nearly 100 agricultural economists participated. One-third of the participants were from non-land-grant institutions, compared with only one non-land-grant participant in the 1963 symposium.

In addition to supporting the three symposia, the AFEA Executive Committee has increased its financial support for cash awards, plaques, and keys to be given to winners in the Student Section's national debate, public speaking, and essay contests. This has generated greater enthusiasm by undergraduates for the competition, and many faculty members give untiringly to advising and coaching undergraduates in these activities. The result is an unusual opportunity to develop students' communicative skills.

Further proof of professional association support of undergraduate instruction came in 1965 with the Distinguished Undergraduate Teacher Award and cash stipend equal to other top cash awards of the Association. In 1966, a similar award was made for the outstanding agricultural extension educator. Awards for excellence in publications have also been expanded somewhat. The Association's two vice presidents enjoy national recognition for their teaching at both undergraduate and graduate levels. One received the Distinguished Undergraduate Teaching Award last year. So recognition has arrived for teaching excellence in our professional society, and it is yielding results through administrative rewards.

Our particular professional society was late in recognizing undergraduate instruction. My major criticism of our Assocation is that it has never budgeted a certain sum for support of worthwhile proposals associated with improved undergraduate or graduate education; but, in my judgment, a substantial part of the blame for lack of support has to be shouldered by undergraduate teachers themselves. Their long-standing negativism and defeatism resulted in a tardy and ineffective voice in the Executive Council. Researchers and graduate faculty were quick to present proposals to recognize excellence in their areas, and the Association responded quickly. It is true that researchers and the more prolific writers gain national recognition more easily and thus tend to be elected to the executive committees of professional societies. They also tend to be appointed more frequently to important national committees than do excellent teachers. I think the major explanation is that teachers have lacked imagination and aggressiveness in getting the attention of the so-called power group in the Association. This is a strange paradox when good teachers are usually both aggressive and articulate. They have chosen to hide their light under a bushel while their research colleagues were pressing for instruments of greater recognition and subsequently far greater rewards and support. This partly explains why there have been no national or regional forums for the teachers to parallel regional or national research committees meeting regularly to discuss research methodology and new projects. The teachers have lacked a strong, unified voice.

Permit me to digress. I have observed that department heads in the last 10 to 15 years have most frequently assigned the less able faculty (i.e., low in rank and in research ability) to heavier undergraduate teaching, particularly at the freshman-sophomore level. This shift comes about almost automatically as new faculty members are assigned research and graduate teaching and advising because of pressure to give higher priority to staffing research and graduate study needs. This has had two very detrimental effects on undergraduate education. Worst for the profession is the inferiority complex that culminates in grumbling, rationalizing, and general deterioration in the quality of teaching by those faculty members. That, in turn, spells disaster for undergraduate teaching programs and subsequently affects enrollment and graduate programs. As a result of this trend, undergraduate teaching takes on an image of mediocrity which can and does discourage the more aggressive, professionally motivated staff member from being identified with the undergraduate program. I believe it is fair to say that those with low research ability also frequently have low teaching ability, although there are many good exceptions, attributable to the person's motivation to teach. Notice I said low research ability — not low research output.

Also, I believe the overall academic scholarship of those currently carrying the underclass teaching is generally below that of the upperclass and graduate faculty. Promotions and salaries necessarily reflect this. Therefore, lower salaries and fewer promotions are identified with undergraduate teaching rather than with lower academic scholarship and performance. This administrative tendency is of great concern to me as a new administrator because recent knowledge, theories, concepts, and problem-solving approaches are as important in undergraduate education as in graduate education; they differ in the latter only in sophistication. May I add parenthetically here that I do not believe that this trend *will* or *should* continue. In my opinion, quality instruction is more important at the introductory level in most disciplines. I have always maintained that graduate students will learn in spite of poor teaching — not so with freshmen and sophomores.

As an outgrowth of the above, too many young Ph.D's recruited in the past 5 to 10 years want to avoid being identified with "undergraduate mediocrity" and insist on permission to teach at least one graduate course. Or they insist on minimum teaching responsibilities. They see the quick road to professional recognition via research and publication. We are doomed in our efforts to strengthen undergraduate education if we permit such an image of undergraduate teaching to prevail. The alternative is to assure all faculty, particularly new faculty, that the prime educational objective is to develop a first-rate undergraduate program and to reward and recognize those who excell at this level. Good undergraduate teachers must enjoy the same stature and prestige as do top researchers and graduate teachers. Strengthened undergraduate programs are the bases for vigorous graduate and research programs. The undergraduate program is the reservoir of future talent. Stressing graduate programs alone soon depletes your educational capital. That is what happened in the late forties and early fifties in our profession. It was the AFEA Executive Committee's recognition that the reservoir of talent was low that prompted their support of Student Affairs Committee efforts to strengthen undergraduate education—to build up the reservoir of able graduate students. It had almost been forgotten that the only perron to graduate programs is strong undergraduate programs. Professional socities need to be alert to this and support efforts to correct it.

Another point needs to be made. Our professional journals have an image as instruments for exhibiting only the researcher's wares. In a sense the journal has become a county fair for the researchers. This image has discouraged teachers from submitting articles related to im-

proved curriculums, teaching aids, teaching innovations, or teaching experiments. Here again the teachers have lacked necessary imagination or drive. As a result the excellent, innovative teacher remains unknown and unappreciated except by campus colleagues and students. His experiences and ideas do not get national attention. More important, the whole profession loses by his negligence. In an expanding national market for professional competence, the journal contributors have a comparative advantage, which their salaries have reflected. The result is another blow to undergraduate education. There is a ray of hope on the horizon. Recent policy statements from professional journal editors suggest a significant change in attitude toward articles relating to undergraduate education. The door is certainly open. Teachers who take advantage of this certainly should, and likely will, be rewarded.

Administrators must be alert to the condition in apportioning promotions and salary increments. Otherwise the mass exodus from the classroom to research offices to "crank out" research journal articles and publications will impair balanced research, public service, and undergraduate-graduate instructional programs. Faculty are alert to the fact that a national reputation is needed to advance. If it can be achieved more quickly through graduate teaching than through undergraduate teaching, the most alert and most talented are not encouraged to take the rough road to national recognition. That Ph.D.'s of necessity and for self-esteem praise their graduate teachers and major professors shifts the spotlight from the good undergraduate teacher.

SOME SOLUTIONS

Solutions to the problem of professional society support for undergraduate education should now be obvious. They lie principally with those who have responsibilities in undergraduate education—the undergraduate teachers themselves. Those assigned research responsibilities have long and effectively represented the need for increased funds and expanded staffs. They present proposals forcefully and effectively to administrators and professional societies. They seek recognition for excellence in research and graduate work. Administration and professional societies have responded. Undergraduate teachers too long either have accepted defeat or failed to present their needs effectively.

I am unwilling to give great comfort to those who insist that the officers of our societies are so research oriented that they are completely insensitive to even deplorable undergraduate teaching conditions. The officers were once students and in most instances currently teach or are associated with teaching, so they are not blind to the needs. The problem is more with the leadership of the professional areas needing support than with the leadership of the societies. I say to undergraduate teachers, "Rise up and be heard." Use more imagination and initiative in presenting your need for support, both to your professional society leaders and to your administrators at home. Those who deserve recognition usually receive it. Throw off the shackles of inferiority and mediocrity. Collect your strength and ask to be heard. You will be given that opportunity. There is sufficient evidence in all societies to warrant this statement. Be certain that you first recognize your own deficiencies and take measures to correct them or display willingness to improve before asking for recognition for excellence. Display a constructive attitude in your proposals. The best way for a "C" performing student to convince the professor that he should be given an "A" is to perform at the "A" level. I challenge all undergraduate teachers to take the measures necessary to clean up their own backyards before yelling "foul play" or "unfair discrimination."

Defeatism, negativism, something for nothing, inferiority expressions have too long permeated the teaching profession. Good teachers can now find a favorable administrative climate with rewards commensurate with excellence. The two largest increases in salary on our faculty this next year will go to two relatively young staff members who have for years devoted themselves largely to undergraduate teaching, advising, and curriculum planning. The climate now is favorable. Don't let opportunities float away on a sea of apathy. Capitalize on the air of national concern for quality teaching in our universities, colleges, and public schools. Demonstrate that you can deliver. Don't waste more precious time in grumbling. Take action. Administrators now recognize that they need quality teachers. Collect your strength and ask for a hearing through the appropriate committee in your professional society. Show more enthusiasm for professional improvement schemes than your research colleagues have shown for their programs. I am confident you'll be heard favorably.

I encourage all professional agriculturalists in academia to become members of their professional societies, to become involved in their societies' policy making. Only through active membership can you influence policies. Stop being a knotholer; pay the admission price and become a participant.

As teachers, we have failed to use the officers of our professional societies for counsel and support in our professional teaching improvement efforts. Use the society to get changes in graduate study requirements to prepare college teachers. If the present committee structure is inadequate, press for modifications. Don't be satisfied with the status quo. Don't short-change yourself on that important "Think" time. Your administrators and professional society leadership should consistently provoke your thinking. Be critical of your efforts. Also, tactfully challenge your administrators and professional society officers. At least be the innovator if you cannot be the inventor. Create rather than recreate in your professional niche. The professional societies and administrators can become important instruments in providing opportunities for professional self-improvement. The consequences of educational obsolescence are too great a risk to take in today's academic market. Present-day demands on society do not tolerate negligence in professional development. Society today provides greater opportunities and rewards for teachers than ever before in history. The same climate that has created the rewards for excellence, however, has accelerated obsolescence of professors. Teachers who expert the status quo to continue can become the only person in their classes who don't know that the answers to their test questions have changed. I'm sorry to admit that our college has one or two in that category. However, I can assure you that promotions and salary increases are going to the type I have tried to describe in my remarks.

Strike while the iron is hot. I apologize if I appear to be unduly harsh in my admonishment of teachers. But it took me many years to come to a realization of the problems outlined here. My only desire is to share these with you.

The Role Of The Professional Society In Undergraduate Education

W. P. MARTIN

Head, Department of Soil Science, University of Minnesota;
Past President, Soil Science Society of America

It is a pleasure for me to attend this fine conference of the NACTA and discuss with you the ways in which the

professional society in agriculture may contribute to undergraduate teaching. I am a representative of the Soil Science Society of America. In addition, I am a representative of two groups with which the Soil Science Society has close working relations: the American Society of Agronomy and the Crop Science Society of America. My illustrations will be taken largely from these associated professional groups.

This is an excellent time in history to hold such a symposium as this, for innovation in higher education is everywhere evident, and the opportunities in agriculture have never been so favorable or so necessary as they are today. The nation is beginning to realize that worldwide population gains are placing serious burdens on our natural resource base and on our agricultural establishment. With increasing public backing from the urban as well as the rural community, we are thus entering an exciting period of activity for agriculture, one that will involve research and development programs across the board. These programs must be backstopped with teaching and major recruitment of students into the field.

In this most stimulating situation, with such significance for the future, organized professional groups will have to play an increasingly important role. They provide status for those in the discipline and defend the profession before the public and in the academic community. They provide career information, help recruit young people into the profession, and assist in placement. They assist in the maintenance of "standards" in both research and teaching. And they definitely support education in meetings and in special symposia, in publication, and in teaching materials, ideas, and incentives. They also aid in providing for travel to foreign lands.

As noted earlier, my illustrations will be taken largely from the societies that represent the field of agronomy and the associated soil and crop sciences. The American Society of Agronomy was founded in 1907, and Crops and Soils Sections were formally organized in 1932. In 1936, the American Soil Survey Association merged with the Soils Section and became the Soil Science Society of America, and this Society in turn provided sponsorship for the International Society of Soil Science in the U. S. The eight divisions of the SSSA also function within the framework of the ASA and elect ASA board representatives. The Crop Science Society of America was organized in 1956 with seven divisions.

"Resident Teaching," with "Student Activities" as a subdivision, is one of four divisions in the ASA that serve all three societies. There is thus a wide range in divisional activity and disciplinary background, from soil chemistry to, say, crop genetics or perhaps microclimatology, and the original membership of 101 in 1907 has grown to about 6,500 in 1967.

Our organizational structure, cooperative ventures, and interdisciplinary understandings are unique, and increasing liaison with other professional groups is everywhere evident. Strong interdisciplinary support for improvement in educational effort is apparent, and participation in the affairs of the agronomic education divisions is rapidly increasing.

Case Study

UNDERGRADUATE TEACHING IN AGRONOMY AT PURDUE UNIVERSITY

In his presidential address before the American Society of Agronomy in 1959, Dr. J. B. Peterson, Head, Department of Agronomy, Purdue University ("Thank You, Mr. Lincoln," Agron. J., 51:697-702, 1959), described the characteristics of a good teacher and also a case history of a professional-type organization for undergraduate teaching in agronomy. He was describing, without identifying it, the organizational structure for teaching in his own department, which supports the "problem-centered" approach to learning. The natural science areas in agriculture are ideally suited to this approach, because, said Dr. Peterson, they make clear to the student that he must have "specific knowledge" in order to understand the functioning continuum of nature.

Rapport between student and teacher is paramount. Therefore, teachers were sought who had the following qualifications:

> **Outstanding intellects as shown by scholastic achievement . . .**
>
> **Capacity for creative research . . .**
>
> **Kindly sincere interest in fellow men . . .**
>
> **Friendly, warm-hearted view toward people, free of bitterness, selfishness or prejudices . . .**
>
> **Interest in a career with major emphasis on undergraduate teaching but with a wish for a stimulating sideline in some type of research.**

Heavy teaching loads were minimized, and work schedules that provided time for research were established. Research problems were designed to entail broad literature review, and publication was encouraged. The teaching group was organized into a policy-making group so that it could compete with the research groups.

Morale was maintained at a high level. The number of majors in the department increased steadily. Even though the number of students in agriculture declined, student attrition decreased sharply and a higher percentage of students graduated in the upper third of their class.

This case history, of course, represents good administration. And it has had its impact in the professional groups that are crosslinked to the department. Members of the faculty community almost without exception identify with the professional society representing their discipline. Their activities on campus are reflected in their activities within the profession, and group activities in the profession are surely reflected in the programs on campus. The success of the Purdue experiment was quickly noted in the American Society of Agronomy. The faculty have all been active in the divisions of resident teaching and student affairs, and others have thus become aware of a successful educational philosophy.

PROFESSIONAL SOCIETIES' RELATION TO EDUCATIONAL INNOVATION

The kinds of information most accessible and most useful to faculty members are those that come within the disciplinary group. And it is the professional society that has been the most persistent in providing access to information about educational innovation and research. It must be admitted, however, that research accomplishments have been the most rewarding. The national societies have promoted the advancement of knowledge and have provided impetus for strengthening the departmental units that have made it possible for the universities to become centers of excellence. This is important to undergraduate teaching. It emphasizes for the student that objective inquiry is as important to the "educated man" as the possession of knowledge. However, the professionally oriented departmental structure has tended to compartmentalize the undergraduate student body, and to the beginning student this can be confusing.

It is important that departments establish a balance between programs responsive to students' needs and those

responsive to professional purposes. More attention could be given to the complex of educational problems that require, for solution, more cooperation among departments in the development of programs. The departments could thereby respond to the *overall* education of students, including students who are not specializing in a given discipline. The departments in agriculture do not represent narrow areas of specialization. Nevertheless, the societies representing very broad interdisciplinary interests would appear to be particularly well qualified to respond to the needs of *undergraduate* education.

Now I realize that the kind of structure I have described is better suited to land-grant universities than it is to many of the colleges and universities (including junior colleges) represented by persons at this conference. There are, however, many opportunities today for research grants from government and foundation sources, and one should not exclude the "library problem" involving critical review of the literature, or field researches on adjacent farmlands. This can contribute to an effective teaching program. I'm also suggesting strongly that one maintain membership and activity in one's professional society. Strong representation from the teaching segment can ensure more attention on the part of societies to those activities specifically related to teaching and education.

CHANGING CURRICULUM PATTERNS
(Minnesota Illustration)

The primary objective of most agricultural students is to achieve both professional competence and, by meeting general education requirements, cultural competence. In recent years we have seen increasing emphasis on broadening the curriculum in agriculture and a decrease in specialized training at the *undergraduate level.* This has been partly in response to the demands of employers in the agribusiness complex who are hiring more agricultural graduates and who are more interested in graduates with a good general education than in those trained in a specialty.

Curriculums in agriculture reflect this trend. At Minnesota, for example, five new curriculum programs were recently instituted, the fifth one being accepted by the faculty February 6, 1967.*

**Agriculture and Forestry Bulletin* (1967-69), College of Agriculture, Forestry and Home Economics, University of Minnesota, St. Paul.

Significantly these were titled:

Agricultural Science and Industries

Agricultural Business Administration

Biological and Physical Sciences in Agriculture

Food Science and Industries

Resource and Community Development

The traditional "major" has given way to such interdisciplinary designations as "Animal Science," "Resources Economics," and "Plant and Soil Sciences." "Areas of specialization" have been retained in the departmental disciplines of agronomy, horticulture, entomology, soil science, and others. There are few rigid course requirements, and notable flexibility has been built into the programs.

In our educational revolution, it is right that there should be experimentation, that rigid disciplinary lines should be moderated, that the student not be moved too quickly into the area of specialization. However, we must recognize that if programs become too general and diffuse and departments too large, the undergraduate student may lose the opportunity of association with fellow students and staff who are motivated by specific and common professional interests.

President James B. Conant of Harvard noted in *The Education of American Teachers* (McGraw-Hill Book Co., New York, 1963) that "there is a rationale for the idea of studying a field in depth quite apart from the student's future profession or vocation . . . " and put the argument this way:

"Only through pursuing a subject well beyond the introductory level can the student gain a coherent picture of the subject, get a glimpse of the vast reaches of knowledge, feel the cutting edge of disciplined training, and discover the satisfactions of the scholarly habit of mind (so that if he becomes a teacher, he can communicate something of this spirit to others). Thousands of students each year wander through survey courses with only the shallowest knowledge of the subjects. I believe that if the student once has the experience of getting inside a subject, he is more likely to become so interested in it that he will wish to go on with it on his own (which I regard as one of the hallmarks of an 'educated' person); at the same time he will be less likely to be timid in addressing himself to other complicated subjects, or to accept dogma, or to countenance nonsense on any subject." It is the professional organization that encourages and defends this point of view—mostly through the teacher who identifies with a given professional discipline.

EDUCATION AND OUR ASSOCIATED PROFESSIONAL SOCIETIES

Francis Keppel, in *The Necessary Revolution in American Education* (Harper and Row, New York, 1966), points out that the first upheaval in American education was a "quantity" revolution and that the second one must be a "quality" revolution, which in turn must be dependent on the teaching force, through the curriculum and through research and the instruments of learning. In this latter context, he refers to teaching aids, prepackaged laboratories, and programmed learning, and to research on their effective use. He notes that books are increasingly important and are "one of the oldest teaching machines known to man." He further suggests that the curriculum should be less "quantitative" and more conducive to "creativity . . . a spirit of inquiry." "Education is not some isolated technique for training the young, but a central part of the culture in which it exists, and it must change as the culture changes."

Our professional societies are part of the culture in which we exist and are, in fact, undergirding the educational revolution for improving the "quality" of the instructional programs noted.

In the American Society of Agronomy, for illustration, problems of resident education are centered in Division A-1 (Dr. B. O. Blair, Purdue University, Chairman) and student activities are in subdivision A-1a. An Agronomic Education Committee (Dr. R. D. Seif, University of Illinois, Chairman) also functions in this area and is responsible for educational activities and coordination among the three "associated" societies. The CSSA has recently organized a Crop Science Teaching Improvement Committee (Dr. A. W. Burger, University of Illinois, Chairman) and the SSSA has a Training of Soil Scientists Committee (Dr. W. A. Raney, USDA, Beltsville, Md., Chairman), which provides "certification" for students adequately trained in "breadth" as well as "depth."

Dr. Raney is also chairman of a Professional Status and Standards Committee, which in a recently formulated but not yet published position paper "deplores the complacency that universities have towards teachers" and urges the Soci-

ety and everyone to support the recognition of "quality in teaching as well as research as justification for advancement." The paper also recognizes the beginning course in soil science as the critical link with other disciplines and suggests that more emphasis be given to fundamentals and principles and less to recipe.

In an earlier paper, Dr. Burger outlined very well the educational activities of the American Society of Agronomy. They need not be repeated here. However, I would like to lend emphasis to some of the programs that relate to undergraduate teaching.

Significant programs that have been presented recently before Division A-1, Resident Education, and are indicative of up-to-date concern for innovation and improvement are as follows:

> **Instructional Innovations (Columbus, Ohio, Nov. 2, 1965). (These include "tele-communications" and "audio-tutorial" instruction.)**
>
> **New Teaching Techniques (Stillwater, Okla., Aug. 24, 1966). (These include "single-concept video tapes" and "programmed learning techniques.")**
>
> **Reports to ASA by Committees from CUEBS (Commission on Undergraduate Education in the Biological Sciences) (Stillwater, Okla., Aug. 24, 1966).**

I should note that an "audio-tutorial" program for beginning soil science is being structured. It follows the techniques developed by Professor S. N. Postlethwait, Purdue University, for beginning biology. Though it does not have direct Society sponsorship, it is an outgrowth of program activity.

Audio-recording tapes were made of certain symposium presentations in the research divisions so that materials could quickly be made available, for a fee, to the membership and others who want immediate access to such materials. Tapes could help a teacher in updating his instructional materials and in gaining students' attention. Efforts of this kind could be organized more specifically to meet the instructional needs of those in the agricultural professional groups represented by this conference.

Subdivision A-1a, Student Activities, also contributes to agronomic education as it provides motivation for the student, increases rapport with teachers and advisers, and involves teachers in such activities as the student speech contest, the student essay contest, and soil and crop judging contests.

It should be noted that *Agronomy News* (American Society of Agronomy, Dr. Matthias Stelly, Executive Secretary, Madison, Wis.) is now regularly devoting a section to education in response to current major concern with student preparation and teaching activities. This is highly desirable!

At the forthcoming annual meeting in Washington, D.C., November 3 and 4, 1967, the associated societies will cosponsor two conferences:

> **With the Commission on Education in Agriculture and Natural Resources, National Academy of Sciences - National Research Council, a conference on Undergraduate Teaching in Agronomy.**
>
> **With the American Association for the Advancement of Science a conference on Educating Agricultural Scientists for Tomorrow.**

It is important that conferences of this type be held, that attendance be encouraged, and that symposium publication be readily available at a reasonable price. In fact, it is recognized that publication of papers from the divisional programs relating to education have been minimized in favor of "original research" reports. A change in philosophy to admit more papers relating to the teaching and education needs of the profession or the establishment of special publications in this area would surely be helpful.

At the beginning of each annual meeting, the administrative group in the associated societies now organizes an Agronomic Administrators Roundtable for the consideration of key problems, including those related to teaching. The last one was titled "Recruitment of High Quality Students" (Dr. C. Dale Hoover, Mississippi State University, Moderator; Stillwater, Okla., Aug. 21, 1966). This is an excellent means of supporting teaching incentive.

And as motivation for good teaching, the Society makes annually an Agronomic Education Award. The last recipient was Prof. Murray D. Dawson, Oregon State University, Corvallis, who was cited as an "effective, stimulating teacher and counselor devoted to improving college instruction and curricula." Chairman of the selection committee was Dr. L. H. Smith, University of Minnesota, St. Paul.

An Agronomic Science Foundation is being established, whose purpose is stated as follows: "The Foundation is organized to contribute to human welfare by furthering the acquisition and dissemination of scientific knowledge of crops and soils and of conditions affecting them. The Foundation will . . . administer [funds] for such activities as: Providing scholarships, sponsoring achievement awards, sponsoring groups studies by science students and/or teachers and counselors, subsidizing lectures . . . ; sponsoring seminars and conferences on science and education; awarding travel grants; sponsoring printing and distribution of publications . . . ; supporting visiting science programs; promoting translations of foreign scientific education to the public." The Soil and Crop Science Societies can function also as independent foundations with identical objectives. It is important that these foundations serve as a source of funds for the preparation of teaching materials, for the teaching symposium and publication, and for other activities in the future that support educational innovation.

The National Science Foundation is supporting a visiting scientist program and the publication of *Soviet Soil Science*, a periodical. The visiting scientist program enables selected members of the associated societies to travel to the non-land-grant colleges and universities for seminars, classroom lectures, and staff consultation. *Soviet Soil Science* (Dr. A. P. Mazurak, University of Nebraska, Translation Editor) is published regularly under the auspices of a translation committee (Dr. H. V. Reuszer, Purdue University, Chairman); it makes significant literature available to students, teachers, and researchers.

SUPPORT OF PUBLICATION AND RESEARCH

The principal way in which the professional society supports undergraduate teaching is through pubilcation of reports on original research. It also supports research as an important facet of good teaching. This was well stated in *Education at Berkeley* (Report of the Select Committee on Education to the Academic Senate, University of California, Berkeley, March 1966) as follows: "Research (or creativity) and teaching can be made to nourish each other. Our ideal is a kind of teaching suffused with the excitement and authority of research, and a kind of research responsible to the humane requirements of teaching . . . and scholarship is a promoter of good teaching."

Writers of classroom texts are usually teachers and members of the profession. They summarize the literature published in Society publications, and texts are revised periodically as new research information becomes available. Professional journals, monographs, and symposium publications become the key reference materials for the subject matter area corresponding to the professional discipline. Publications of the associated societies include: *The Agronomy Journal, Crop Science, Proceedings of the SSSA, Agronomy Monographs*, and a Special Publication Series edited

at headquarters, 677 South Segoe Road, Madison, Wisconsin, Dr. Matthias Stelly, Executive Secretary, and *Advances in Agronomy*, published by contract with Academic Press, Inc., New York.

The information explosion is real and the associated societies in agronomy, like others, are currently investigating title and abstract coding, data recall, and machine retrieval systems to speed the literature search and summary for use by teachers and researchers.

Major overhaul of traditional publication procedures and philosophy are envisaged for the future, perhaps with the elimination of the subscription journal and direct purchase by machine printout of designated reprints or perhaps of tapes from Society headquarters. A service enterprise of subject-matter summaries with commentary could well be instituted to assist the teacher (as well as the researcher) in keeping his lecture and reference materials up-to-date. The professional society must be alert to such innovations if it is to provide the needed services for its membership.

A special publication committee organized by Division S-5, Soil Genesis, Morphology and Classification (Dr. L. J. Bartelli, Soil Conservation Service, Lincoln, Nebr., Chairman), has assembled the significant literature in this field into a publication titled *Readings in Soil Formation and Classification* (Dr. J. V. Drew, University of Nebraska, Lincoln, Editor, SSSA, Madison, Wis., 1967).

Another committee from Division S-5 (Dr. Henry Foth, Michigan State University, East Lansing, Chairman) is preparing slide sets illustrating profiles and landscapes of the common soils of the U.S., together with supporting discussion sheets.

The Society publishes *Glossary of Soil Science Terms* (Proc. Soil Sci. Soc. Amer., 29:330-351, 1965), which is kept up-to-date by a terminology committee (D. D. Evans, University of Arizona, Tucson, Chairman).

In 1964 the Soil Science Society of America published *Soils Laboratory Exercise Source Book*, edited by Hyde S. Jacobs and R. M. Reed. It consists of successful soils laboratory exercises from 31 agronomy and soil science departments, and is intended for use at the college level. A similar collection of exercises in crop science was published by the American Society of Agronomy in 1961. In the future these may be designed to fit into audio-tutorial and programmed learning packages.

CONCLUDING STATEMENT: THE PROFESSIONAL SOCIETY AND UNDERGRADUATE TEACHING

In conclusion, may I reiterate that the professional society is everywhere linked to its membership, to teachers and researchers throughout the land, and must be sensitive and responsive to the interests and needs of its members. Francis Keppel's "necessary revolution in American education" has its repercussions in the professional society, which undergirds and supports an effective and innovative teaching activity.

Agriculture readily breaks down into professional-type departments that are ideally constituted to attract and hold competent teachers, who should be encouraged to develop a modest but stimulating research interest. They naturally support an easy rapport between teacher and student and evidence the need for breadth as well as depth in the training program.

The professional society in agriculture must be alert to innovation in teaching methodology that must be passed on to the membership. It must also provide recognition and reward for excellence in teaching as well as in research. There is evidence, in fact, that the professional societies are alert to their responsibilities, and I would conclude by strongly recommending that those principally engaged in teaching join and support their professional groups and take an active part in the proceedings. It will assure continuing attention to teaching and education, so essential to our future!

Challenge To NACTA And The Professional Societies

GEORGE A. GRIES
Department of Biological Sciences
University of Arizona

While listening to this series of excellent talks and reports I must admit to letting my mind wander and meditating on the rise, metamorphosis, and decline of organizations — all types of organizations, labor unions, religious groups, educational and professional societies.

All seem to be formed initially for one of two reasons. They are either "offensive," formed to solve some mutual problem of the members by united effort, or "defensive," designed to resist some threat, real or imaginary, to the individuals.

Once organized, an association of individuals analyzes its aims and goals and develops plans to attack them. Sometimes they solve them quickly, sometimes only after a long, hard struggle. Occasionally the threat that stimulated the organization of a defensive group turns out to be a paper tiger. But when the raison d'etre of the group has been dispatched, does it then dissolve? No, never! Kingdoms once built are not given up without a struggle. The normal reaction is to seek new goals, new projects, which, usually would have been of little concern to the original membership.

Let us take, for example, the university department. I am certain that on every campus represented here, at least one of the existing departments was formed simply because at some time in the past there was an individual who could not get along with his immediate supervisor and, therefore, was established as a one-man department to get him out of the department chairman's hair. But reflect on what happens when either of the two gentlemen retires or moves to another university. Are the departments reconsolidated? New department heads are appointed and a useless duplication of effort continues.

If I may, I would like now to turn my attention to the Association of Land-Grant Colleges. When it was formed, the land-grant colleges had many problems in common. The problems were unique. The land-grant colleges had certain peculiar funding practices and certain philosophical problems; other institutions did not have them. With time, however, the land-grant colleges lost much of their individuality and shared more interests with other state universities. In recent years, the former Association of Land-Grant Colleges has been expanded to include other state universities.

The agricultural groups in the Association initially also had many features that were unique to them. The peculiar

needs and problems of the experiment station and extension service sections are still sufficiently distinct to warrant their existence. One cannot help wondering, however, how distinctive the problems of the resident instruction section are when compared with the problems of the non-land-grant colleges and universities offering education in agriculture. Problems they do have, but are they truly distinctive enough to warrant the existence of an independent and exclusive organization? The only obvious difference that comes to mind is that most of their instructors are only part-time teachers, whereas those in the other colleges of agriculture are usually employed full time for instructional activities. Having originally been formed within the Association of Land-Grant Colleges, the resident instruction section has remained a tight-knit, exclusive group and has never really spoken for the sum of agricultural educators. No one can question the validity of their aims and goals. Their programs are excellent, but these aims and goals are not unique to the land-grant institutions.

When NACTA was formed, its stated goal was the improvement of teaching in agriculture and, in contrast to the land-grant college organization, it included both administrators and teachers of agriculture. I am reasonably convinced, however, that it was formed, in part, for defensive reasons, because of fear and jealousy of the land-grant colleges. In any case, although it gave lip service to welcoming members from the land-grant colleges into its organizations, it has remained primarily an organization of the non-land-grant personnel. A glance at its committee memberships will substantiate this.

It is my contention that the field of education in agriculture desperately needs a single organization to represent it as a united front. There are many problems common to all teachers of agriculture in the junior colleges, 4-year colleges, and technical colleges. If there are problems unique to different types of schools, these might be handled by sections of the new organization, or by existing associations, but coordination of their efforts could be effected by the parent society. I would suggest that such an organization should be patterned after the American Society for Engineering Education and should have open membership to teachers and administrators alike.

Now, if NACTA wished to become this society, I believe it could, but at the same time I believe that a number of changes in philosophy and format would have to be undertaken. They would have to forget their allegiance to certain schools and their suspicions of others. If there is a need for an instrument to consider administrative problems unique to non-land-grant institutions, the deans of these schools might form a new and separate organization. In any case, I urge the members of NACTA to lend their support to the establishment of a single forum to consider the common problems of all educators in agriculture. Present plans call for the dissolution of CEANAR in 1969. Some agency is sorely needed to assume its liaison activities between RICOP, NACTA, and other commissions, and the professional societies.

Let us examine, now, the nature of the professional society. Certainly, these associations have a real reason for being. They allow continuing dialogue among their members on matters related to their field of specialization. Most professional societies got into the teaching game rather late in their development, and some have developed very active programs. In hearing those programs reviewed today, however, I wonder how much of their activities are really related to the improvement of education in agriculture as a whole and how much of it is an effort toward self-aggrandizement and the recruitment of students into their profession. I must admit that this latter is not an unworthy goal, but I would point out that there is a limited pool from which all of our agricultural sciences are attempting to select their students. It seems to me that there is room for considerable consolidation and much coordination in the efforts of the various professional society committees. Why must agronomists and horticulturists, for example, be working on supplementary reading materials or single-concept films or audio-tutorial laboratory sessions in areas such as soil fertility, cytogenetics, and weed control, which are common to both disciplines. Why should the various animal societies similarly be duplicating one another's activities.

The teaching committees of the various professional societies have many common interests, most important of which is the improvement of higher education in agriculture through the improvement of the learning situation for the students involved. Much of the liaison and coordination of the professional societies could be undertaken by this new association that we have discussed. The teaching committees of the professional societies could give it much support in its early stages, and I'm certain they would gain much over the long run. It is my understanding that the teaching wings of the engineering societies have actually been strengthened by the work of the American Society of Engineering Education. My challenge then to all, to NACTA, to RICOP, and to the professional societies, is to pause to re-evaluate your goals. Are your most important programs really unique only to your organization's members, or could these problems be more effectively handled by consolidation with other societies?

I'm not asking for the demise of any existing society. I assume that each has a reason for being. I am convinced, however, that improvement in education in agriculture is dependent upon liaison and coordination of effort by all who are interested in it, and it is my firm belief that a single society dedicated to the improvement of instruction and learning in agriculture is the answer.