tion function). Many of the available resources are predetermined or given and the department cannot do much to change *them.* However, it can do a great deal about the variable resources. This is possible for within the production function resource inputs can be substituted for one another usually to some degree and frequently to a considerable degree. Thus, it becomes the responsibility of the department chairman to instigate better and greater utilization of the variable resources for it is known that larger quantities or better quality of one resource used with constant quantities of others will increase a department's quality of performance up to some point. It is also known that the same variety of skills (production techniques) will not necessarily be used at different output levels. Therefore, the department chairman becomes the pilot or manipulator of the variety of existing skills to maximize the performance of the department. It is his responsibility to seek and find the best possible combination of resources and skills to yield the highest quality of performance possible by his department.

Similarly, it is possible to relate the performance of an individual faculty member to a production function and to relate the axioms stated in the previous two paragraphs to the performance of the individual faculty member because they apply to individual producers as well as to producers collectively.

For an example, let us assume we wish to measure the quality of performance of faculty member No. 3. After reviewing the expectations involved with hiring No. 3 in relation to the department's objectives and No. 3's personal goals, as well as changes in these objectives and goals over a period of time, a weighted formula to evaluate No. 3's performance may be developed. If it is concluded that No. 3's role is primarily quality teaching; his secondary role to develop a new course; this third role to participate in developing an interdisciplinary program; and minor roles of performing scholarly activities; participating in college and university activities; and department service, we may develop his performance (production) record as follows:

$$Y = .6A + .15B + .10C + .05D + .05E + .05F$$

Y = Total performance
A = Teaching quality
B = New course development
C = Interdisciplinary activities
D = Papers published or presented
E = College & university activities
F = Departmental service

It should be emphasized that this production function is just for faculty member No. 3 in year X. It may or *may not be* duplicated for any other faculty member and it may not be utilized for No. 3 again.

The next step is to determine the rating scale to be utilized in evaluating each input. For simplicity purposes it would be easiest to have a maximum rating of 1 or 100. However, all inputs should have the same rating scale.

The next step would be to determine the ratings for each input and finally compute the performance record. The final figure may be used to compare the performance of No. 3 with all other faculty members.

The ratings for each input may be difficult to obtain. For an example, input A, teaching quality of faculty member No. 3, will be utilized. The following criteria are available: preregistration class enrollment; final class enrollment; student rating of teaching performance; student withdrawals; comments from other faculty; comments from students; comments from faculty who utilize No. 3's course as a prerequisite to their course; personal observation. A production function of No. 3's teaching quality may be established after thoroughly evaluating the quality, credibility, and reliability of the inputs.

$$A = .15S + .05T + .10U + .10V + .10W + .15X + .20Y + .15Z$$

A = Teaching Quality
S = Preregistration enrollment
T = Final enrollment
U = Student ratings
V = Student withdrawals
W = Faculty comments
X = Student comments
Y = Personal observation
Z = Faculty comments (course prerequisite)

The purpose of relating the department chairman's evaluation of an individual faculty member to a production function is to illustrate the importance of this responsibility. Evaluation deserves more than a guess or a personal opinion at a given instance of time for successful evaluation is a key to one of the several locks that open the door to a successful, progressive department. It demands all the valid inputs possible and requires that the department chairman utilize them to the best of his capability.

PREDICTING STUDENT ACADEMIC SUCCESS IN COLLEGE

Dr. G. Carl Schowengerdt
Professor of Agriculture, Southeast Missouri State College
Former Head of the Department of Agriculture and
Chairman of the Division of Practical and Fine Arts

Educators for many years have searched for a meaningful guide to measure the academic ability of students. This search has progressed through a long evolution of intelligence tests, charts, measurements of one sort or another and ranking of student performance. With a comparison of the accumulated data and student performance in college it became apparent that there is a direct correlation between a student's academic achievement in high school and his chance to obtain a C or better in college.

Many different types of intelligence tests have been used to measure student academic ability. Many were designed to measure certain specific items in academic achievement; i.e., reading ability, mathematical ability, comprehension, etc. As would be expected, many intelligence tests prove their worth in indicating performance, others were of little or no value. Out of the maze of tests two selected by the Southeast Missouri State College as reliable were, the Ohio State University Psychological Test (OSUPT) and the student's high school class rank. The OSUPT gives an excellent measure of the possible mental ability of the student and the class rank indicates the student's attitude toward academic work and his ability to perform. A high OSUPT score coupled with a high high school class rank would indicate that the student not only possessed the ability to do excellent college work, but his attitude and performance would be of comparable caliber. Suffice to say that if the opposite were true, chances of making a C or better would be very slight.

The Southeast Missouri State College has accumulated data on students performance since the fall term of 1958. These data, utilized in a manner similar to that of studies conducted by the University of Missouri, [1] have been used to predict the academic success of students enrolled at Southeast Missouri State

[1] Prediger, Dale J., Krauskopf, Charles J. and Callis, Robert – Predicting Academic Success at the University of Missouri. Testing and Counseling Service Report: Vol. 17, No. 2, January 1963.

College. The predictions from the University of Missouri are based on OSUPT scores and the student's high school class rank, but the conclusions drawn from these are similar to those shown in Southeast Missouri State College records. The GPA scores are based on a four point system. That is, A = 4 points, B = 3 points, C = 2 points, D = 1 point and F = 0 points. Therefore an accumulative GPA of 3.00 would indicate above average achievement. An accumulative GPA of 2.00 or higher is required for graduation.

Data are available for all schools and colleges at the University of Missouri, but suffice for this paper only the figures for the College of Agriculture and Forestry will be shown.

TABLE I: Predicted First Semester Grade Point Average, University of Missouri College of Agriculture and School of Forestry*

High School Percentile Rank	Ohio State University Psychological Test, Form 22, Raw Scores										
	33	39	46	54	65	75	87	99	112	120	128
98	2.32	2.43	2.53	2.64	2.75	2.85	2.96	3.07	3.17	3.28	3.39
97	2.16	2.27	2.37	2.48	2.59	2.69	2.80	2.91	3.02	3.12	3.23
94	2.00	2.11	2.22	2.32	2.43	2.54	2.64	2.75	2.86	2.96	3.07
90	1.84	1.95	2.06	2.16	2.27	2.38	2.48	2.59	2.70	2.80	2.91
83	1.69	1.79	1.90	2.01	2.11	2.22	2.33	2.43	2.54	2.65	2.75
72	1.53	1.63	1.74	1.85	1.95	2.06	2.17	2.27	2.38	2.49	2.59
59	1.37	1.47	1.58	1.69	1.80	1.90	2.01	2.12	2.22	2.33	2.44
46	1.21	1.32	1.42	1.53	1.64	1.74	1.85	1.96	2.06	2.17	2.28
34	1.05	1.16	1.26	1.37	1.48	1.58	1.69	1.80	1.91	2.01	2.12
22	.89	1.00	1.11	1.21	1.32	1.43	1.53	1.64	1.75	1.85	1.96
13	.73	.84	.95	1.05	1.16	1.27	1.37	1.48	1.59	1.69	1.80

* Chances are about two out of three that a student's actual first semester grade point average will be within .60 units of the predicted grade point average.

For example, to use the table, John Doe has an accumulative high school grade average which places him nineteenth from the top in a class of 150 students. 150 - 19 = 131, 131 ÷150 = .87 x 100 = a rank of 87. John's OSUPT raw score is 107. Turn to the table and find the high school percentile rank at the left, and the OSUPT raw score at the top which is nearest to the student's score. Reading down and across the table find where the columns intersect. John's predicted GPA would be 2.86. Since the ability to predict by GPA is not absolute a prediction would be more accurate if a range in the score was given. Note therefore the underlined number in the footnote at the bottom of the table is .60. This means that John actually has about two out of three chances for a first semester GPA between 2.86 + .60 = 3.46 and 2.86 - .60 = 2.26. The predicted range therefore would be between 2.26 and 3.46. These data then give some indication of the student's chances for success in college.

A student with a high OSUPT score and a low class rank indicates that the student probably has the ability to do acceptable work in college but has not learned how to apply himself toward his studies. A lazy attitude established in high school, more often than not, carries through to his college work. He therefore does rather poorly in college. When the opposite is true, i.e. a low OSUPT score and a high class rank, the student has learned how to use his time and has made exceptional effort toward his assignments. Few students change work and study habits formed in high school or before. (Figures at the Southeast Missouri State College show, however, that a very small percent make a C or better in college if they have low scores on either or both of these measuring devices.)

Since 1958 the Southeast Missouri State College has kept accurate comparison records of high school students scores and their performance in college. The OSUPT scores and class rank were divided into quintiles as shown in Chart I.

CHART I

Southeast Missouri State College — Fall 1958

The High School Senior's Background in Intelligence and Scholarship in the High School as a Basis for Predicting His Chances for Making an Average Grade of "C" in the Freshman Fall Term in College
(Based on 802 Freshmen)

Vertical Scale Ohio Test P.R. Ratings in the High School

The figure in each area represents the percent of students in the group making an average grade of "C" for one year.

P. R. 81-100 Scores 70-150	Area A 1/3 33%	Area B 7/10 70%	Area C 12/20 61%	Area D 20/33 61%	Area E 116/122 95%
P. R. 61-80 Scores 52-69	Area F 7/22 32%	Area G 8/27 30%	Area H 22/48 46%	Area I 42/67 63%	Area J 69/78 88%
P. R. 41-60 Scores 42-51	Area K 3/21 14%	Area L 9/33 27%	Area M 19/43 44%	Area N 29/58 50%	Area O 13/17 76%
P. R. 21-40 Scores 32-41	Area P 1/19 5%	Area Q 5/27 19%	Area R 6/36 17%	Area S 11/27 41%	Area T 14/19 74%
P. R. 1-20 Scores 1-31	Area U 0/20 0%	Area V 2/21 10%	Area W 2/15 13%	Area X 2/12 17%	Area Y 4/5 80%
	1-20	21-40	41-60	61-80	81-100

Horizontal Scale: High School Centile Rank Groups in Scholarship

Areas A,B,C,D,E represent students who were among the highest one-fifth in intelligence as seniors in high school (State Norms)

Areas E,J,O,T,Y represent students who ranked in the highest one-fifth in scholarship in the high school (Local Group)

Area A reads: "About 33 percent of a group of college Freshmen with the background of intelligence and scholarship in the high school which placed them in the highest one-fifth in intelligence but in the lowest one-fifth in scholarships maintained an average grade of "C" for one term as college freshmen."

Area E shows that 95 percent of freshmen in the fall term of 1958 who ranked in the top quintile in both measures made a C or better. Area U shows that no freshmen in the fall term of 1958 who ranked in the lowest percentile on both measures made a C or better. Each area in Chart I shows the percent of freshmen making a C or better in college for the fall term of 1958.

Chart II shows the cumulative quintile ranking of 15,996 freshmen entering the Southeast Missouri State College, Cape Girardeau, Missouri.

CHART II

Office of the President
Southeast Missouri State College

Fall Term 1958
First Semester 1959-60
First Semester 1960-61
First Semester 1961-62
First Semester 1962-63
First Semester 1963-64
First Semester 1964-65
First Semester 1965-66
First Semester 1966-67
First Semester 1967-68
First Semester 1968-69
First Semester 1969-70
First Semester 1970-71

The High School Senior's Background in Intelligence and Scholarship in the High School as a Basis for Predicting His Chances for Making An Average Grade of "C" or Better in the Freshman's First Semester in the College (Based on 15,996 Freshmen) (Excludes Local Tests)

Vertical Scale
Ohio Test Percentile Ratings in the High School

	1273 8%	2214 14%	3424 21%	4174 26%	4911 31%	
P.R. 81-100 Scores 74-124	Area A 120	Area B 272	Area C 577	Area D 1168	Area E 2776	4913 31%
P.R. 61-80 Scores 53-73	Area F 366	Area G 610	Area H 1114	Area I 1600	Area J 1435	5125 32%
P.R. 41-60 Scores 40-52	Area K 359	Area L 664	Area M 1021	Area N 964	Area O 504	3512 22%
P.R. 21-40 Scores 32-39	Area P 269	Area Q 461	Area R 523	Area S 339	Area T 162	1754 11%
P.R. 1-20 Scores 20-31	Area U 159	Area V 207	Area W 189	Area X 103	Area Y 34	692 4%
	1-20	21-40	41-60	61-80	81-100	

Horizontal Scale: High School Centile Rank Groups in Scholarship.
Areas A,B,C,D,E represent students who were among the highest one-fifth in intelligence as seniors in high school (State Norms).
Areas E,J,O,T,Y represent students who ranked in the highest one-fifth in scholarship in the high school (Local Group).
Precentages shown represent portions of classes in various quintile areas.

Areas A,B,C,D,E, represent students who were among the highest one-fifth in intelligence as seniors in high school (state norms). Note that 4,913 out of 15,996 freshmen, or 31 percent of the students at Southeast Missouri State College fall in this category. Areas A,F,K,P,U represent students who ranked in the lowest one-fifth in scholarship in high school. In this case 1,273 out of the 15,996 students, less than 8 percent, were in this group. When area U which represents the lowest ranking students by both measures is considered, slightly less than 1 percent were in the lowest quintile by both measures.

Data presented thus far in this paper show that students with low ranks in OSUPT scores and high school class have little or no chance to succeed in college. It would seem fruitless, therefore, to admit these students to college only to have them fail in their efforts.

In the fall semester of 1967 the Southeast Missouri State College (as did other Missouri colleges) put an admissions rule into effect which required all high school graduates who ranked below the 40th percentile on OSUPT score and class rank to either enter college in the summer session or the spring semester. The fall semester then contained freshmen who ranked above the 60th percentile on both measures. This entrance requirement did not prevent low ranking students from attempting a college education, but did eliminate considerable overcrowding in the fall semester.

Chart III shows a five year comparison of OSUPT examination percent rank and percent rank in high school graduating classes for students admitted to the Southeast Missouri State College fall semester 1966-70.

CHART III

A FIVE YEAR COMPARISON OF OHIO PSYCHOLOGICAL EXAMINATION PERCENTILE RANK AND PERCENTILE RANK IN HIGH SCHOOL GRADUATING CLASS FOR STUDENTS ADMITTED TO SOUTHESAT MISSOURI STATE COLLEGE, FALL SEMESTERS 1966-70

Percentile Rank in High School Graduating Class

Ohio Test Percentile Rank		0-19	20-39	40-59	60-79	80-99	
P.R. 80-99	1970	0.2	1.6	3.4	7.5	22.9	35.6
	1969	Area A 0.8	Area B 1.1	Area C 4.1	Area D 8.3	Area E 18.5	32.7
	1968	0.8	1.5	3.0	8.6	18.2	32.1
	1967	0.5	2.1	3.3	6.9	16.5	29.2
	1966	0.5	1.8	3.8	5.8	13.8	25.8
P.R. 60-79	1970	2.1	3.2	8.2	12.1	10.8	36.4
	1969	Area F 2.1	Area G 4.7	Area H 7.4	Area I 11.0	Area J 7.7	33.0
	1968	2.0	4.5	8.2	10.5	8.5	33.7
	1967	1.9	4.0	6.9	10.4	8.5	31.7
	1966	1.3	3.6	6.8	9.9	8.1	29.8
P.R. 40-59	1970	0.3	1.6	8.3	8.2	3.6	21.9
	1969	Area K 1.7	Area L 3.6	Area M 6.6	Area N 6.3	Area O 3.0	21.2
	1968	1.7	4.1	6.7	5.2	2.9	20.7
	1967	2.3	5.4	6.7	7.2	3.0	24.6
	1966	2.7	4.7	7.8	5.8	4.1	25.2
P.R. 20-39	1970	0.0	0.1	2.1	1.9	1.2	5.2
	1969	Area P 0.6	Area Q 2.6	Area R 4.2	Area S 2.5	Area T 0.9	10.7
	1968	0.8	2.8	4.1	2.6	0.6	11.0

CHART III (Continued)

Percentile rank in High School Graduating Class

Ohio Test Percentile Rank		0-19		20-39		40-59		60-79		80-99		
	1967		0.7		2.3		2.6		2.4		3.0	11.0
	1966		3.5		5.8		3.9		2.4		0.7	16.3
P.R. 0-19	1970		0.0		0.1		0.5		0.3		0.1	0.9
	1969	Area	0.1	Area	0.4	Area	1.6	Area	0.4	Area	0.0	2.4
	1968	U	0.1	V	0.4	W	1.0	X	0.8	Y	0.2	2.5
	1967		0.1		1.0		1.8		0.5		0.1	3.5
	1966		0.8		1.1		0.4		0.7		0.1	3.0
	1970		2.6		6.5		22.5		29.9		38.5	
	1969		5.2		12.4		23.9		28.5		30.1	
	1968		5.3		13.4		23.1		27.8		30.4	
	1967		5.5		14.7		21.3		27.5		31.0	
	1966		8.9		17.0		22.7		24.6		26.9	

Percentages shown represent portions of classes in various quintile areas. For example – Area "E" reveals that 22.9% of the freshmen in the Fall semester, 1970, ranked in the highest one-fifth in intelligence and in the highest one-fifth of their high school graduating classes.

An examination of the above chart will reveal several interesting facts:

1) There has been a constant upward trend in the quality of students who enter college. Note area E and see that while only 13.8 percent were in the top 20 percent by both class rank and test score in 1966, by 1970, 22.9 percent fell in this group. This improvement in quality of the student body is best shown in the accumulative averages in Column I (far right) and in Column II (bottom of the chart).

2) Fewer students are admitted who have low ability (see area P,Q,U and V) which has led to an improved retention rate in the freshmen, sophomore, junior and senior classes in the past five years.

3) These data should suggest to the faculty that having better quality students demands a better quality teaching; better preparations, course revisions, current subject matter material, updating curriculum and subject matter.

Chart IV shows essentially the same information as the preceeding charts, however it is based on grade point average (GPA) instead of OSUPT scores and class rank.

CHART IV

Office of the President
Southeast Missouri State College

First Semester 1969-70

The high school senior's background in intelligence and scholarship in the high school and his performance as a first semester freshman at Southeast Missouri State College (based on 1,533 Freshmen) (excludes local tests)

The first line in each area is the number and percentage of students making a 4.0 grade point average (gpa): the second line is the number and percentage making a gpa between 3.0 and 3.99; the third line bettween 2.0 and 2.99; the fourth line between 1.0 and 1.99; and the fifth line between 0.0 and 0.99. The gpa is based on the following scale: A = 4.0, B = 3.0, C = 2.0, D = 1.0, and F = 0.0.

Ohio Test Percentile Rank		71	5%	174	11%	355	23%	460	30%	473	31%	
		Area A		Area B		Area C		Area D		Area E		
	4.0	0	0%	0	0%	0	0%	0	0%	1	0.3%	
P.R. 80-99	3.0-3.99	0	0%	0	0%	5	7.4%	19	14.0%	135	45.5%	528
Scores 73-124	2.0-2.99	1	10%	10	58.8%	40	58.8%	92	67.6%	142	47.8%	
	1.0-1.99	7	70%	6	35.3%	20	29.4%	20	14.7%	15	5.1%	34%
	0.0-0.99	2	20%	1	5.9%	3	4.4%	5	3.7%	4	1.3%	
	Total	10		17		68		136		297		
		Area F		Area G		Area H		Area I		Area J		
	4.0	0	0%	0	0%	0	0%	0	0%	0	0%	
P.R. 60-79	3.0-3.99	1	3.3%	0	0%	5	4.5%	5	3.0%	19	16.1%	491
Scores 52-72	2.0-2.99	4	13.3%	18	27.7%	64	57.7%	113	67.7%	87	73.7%	
	1.0-1.99	14	46.8%	41	63.1%	39	35.1%	45	26.9%	10	8.5%	32%
	0.0-0.99	11	36.6%	6	9.2%	3	2.7%	4	2:4%	2	1.7%	
	Total	30		65		111		167		118		
		Area K		Area L		Area M		Area N		Area O		
	4.0	0	0%	0	0%	0	0%	0	0%	0	0%	
P.R. 40-59	3.0-3.99	0	0%	2	4.1%	2	2.1%	1	0.9%	3	7.0%	317
Scores 39-51	2.0-2.99	0	0%	15	30.6%	36	38.3%	58	53.2%	28	65.1%	
	1.0-1.99	15	68.2%	25	51.0%	46	48.9%	46	42.2%	10	23.3%	21%
	0.0-0.99	7	31.8%	7	14.3%	10	10.6%	4	3.7%	2	4.7%	
	Total	22		49		94		109		43		
		Area P		Area Q		Area R		Area S		Area T		
	4.0	0	0%	0	0%	0	0%	0	0%	0	0%	
P.R. 20-39	3.0-3.99	0	0%	0	0%	0	0%	1	2.5%	1	6.7%	161
Scores 31-38	2.0-2.99	1	12.5%	5	13.5%	10	16.4%	13	32.5%	10	66.7%	
	1.0-1.99	2	25.0%	24	64.9%	37	60.7%	20	50.0%	3	20%	11%
	0.0-0.99	5	62.5%	8	21.6%	14	23.0%	6	15.0%	1	6.7%	
	Total	8		37		61		40		15		
		Area U		Area V		Area W		Area X		Area Y		
	4.0	0	0%	0	0%	0	0%	0	0%	0	0%	
P.R. 0-19	3.0-3.99	0	0%	0	0%	0	0%	0	0%	0	0%	
Scores 20-30	2.0-2.99	0	0%	1	16.7%	4	19.0%	6	75.0%	0	0%	36
	1.0-1.99	1	100%	2	33.3%	13	61.9%	2	25.0%	0	0%	
	0.0-0.99	0	0%	3	50.0%	4	19.0%	0	0%	0	0%	2%
	Total	1		6		21		8		0		
		0-19		20-39		40-59		60-79		80-99		

Note: 1 or .07% had a 4.0 gpa
199 or 13.0% had a gpa between 3.0 and 3.999
758 or 49.4% had a gpa between 2.0 and 2.999
463 or 30.3% had a gpa between 1.0 and 1.999
112 or 7.3% had a gpa between 0.0 and 0.999

CHART IV (Continued)

Horizontal Scale: High School Percentile Rank
Areas A,B,C,D,E represent students who were among the highest one-fifth in intelligence as seniors in high school (State Norms).
Areas E,J,O,T,Y represent students who ranked in the highest one-fifth in scholarship in the high school (Local Group).
Area E reads: Of a group of high school freshmen with the background of intelligence and scholarship in the high school which placed them in the highest one-fifth in intelligence and the highest one-fifth in scholarship, 0.3% had a 4.0 gpa, 45.5% had a gpa between 3.0 and 3.99, 47.8% had a gpa between 2.0 and 2.99, 5.1% had a gpa between 1.0 and 1.99, and 1.3% had a gpa between 0.0 and 0.99.

Note here that students who ranked in areas D,E,I,J obtained the highest GPA. Areas P,Q,U,V show that the low ranking students seldom maintained a sufficient GPA to meet the minimum scholastic requirements. Each area in the chart shows the number and percent of students falling into the respective GPA groupings.

Summary

It should be obvious from the above data that:

1) Students who rank below the 40th percentile in either OSUPT score or class rank have little or no chance of meeting the academic requirements of an accredited college. Certainly the chances for success in college for those who rank below the 40th percentile on both measures is practically nil.

2) Students with low OSUPT scores and a high high school class rank have a better chance to succeed in college than if the reverse be true. These students evidently have learned how to make efficient use of their time and talent.

3) Study and work habits formed in high school (or before) seldom change when the student attends college. There are some exceptions however.

4) The quality of the college student (at least at Southeast Missouri State College) has improved in the past five years (see Charts III and IV).

5) The retention rate of college classes, that is, freshmen, sophomore, junior and senior has increased in the past five years.

6) Quality students should receive quality teaching. These data extend a challenge to the faculty to update their courses and bring into play all available teaching resources. No longer are age worn notes and stale jokes fit for the modern classroom teacher. He must be informative, up to date, interesting, challenging and endowed with a goodly supply of common sense.

Acknowledgement

The author of this article wishes to express his thanks to Dr. Robert Foster, Assistant to the President, Southeast Missouri State College for furnishing the charts, reading the manuscript and for his helpful suggestions.

A GIFT TO SHARE

Agriculture's Unique Opportunity to Share It

Keith Justice, Abilene Christian College

In speaking of work Theodore Roosevelt said, "If a man does not have belief and enthusiasm, the chances are small indeed that he will ever do a man's work in the world; and the college which tends to eradicate this power of belief and enthusiasm, this desire for work, has rendered to the young man under its influence the worst service it could possibly render." One of the reasons that I am proud of my American heritage is because of the dignity that is placed on work! One of the reasons that I am proud of my vocation in agriculture is because it has always been symbolic of the American at work.

In agriculture it would seem to some that we have literally worked ourselves right out of a job. The American people are the best fed in the world, and we are paying farmers to reduce production. The American people spend less of their income for food than anyone else in the world – 19% of our private expenditures while in Russia it is 55%. One American farmer can produce for more people than any other farmer in the world; one farm worker feeds 45 people. Russia has a third of her work force tied up producing food. American farmers' output per man hour is increasing three times faster than in non-farm industries.[1] But we can no more afford to slow down the technological advances in agriculture than in other industries.

In discussing the need for continued agronomic research, Brady points out that crop varieties resistant to diseases and insect pests often lose their resistance as the genetic makeup of the pest changes. The use of herbicides and pesticides require continued research in the life cycle of pests and weeds, the control of disease, and the effect of these chemicals on the soil.[2] Every phase of agriculture has need for more research in the use and preservation of our environment.

Furthermore, we cannot limit our work to American soil – our vision must be world wide. In spite of some recent breakthroughs in production of food, "It is estimated that half the people living in the developing countries, not including Mainland China, are underfed or malnourished or both."[3] Using surplus foods to donate to the agriculturally underdeveloped countries of the world, except for short periods during emergencies, is not the solution to world hunger. Mehren points out that "gifts of field crops may be of greater short-term economic efficiency in poor countries than food and fiber self-sufficiency. But there may be over-riding criteria of security, stability, equity or growth of far greater import than economic efficiency."[4]

American agricultural scientists can play an important role in research planned to improve the agriculture production of the developing countries. Not all of this research can be done in the United States. In urging Americans to help other nations to effectively use their water and soil resources, Dr. Glenn W. Burton, former president of the American Society of Agronomy, said:

> The task calls for enthusiasm, creative ability, and self-sacrifice; but most of all it calls for work, hard work motivated by the conviction that men and institutions worth dying for in time of war are worth working for in time of peace.

The challenge is great, and it begins with education in the basic attitude toward work. The willingness to work is truly a part of our American heritage. A student from India noted that one of the most striking differences between his country and ours is the dignity and emphasis that we place on work.

An Abilene Christian College agriculture major in Korea wrote of the tragedy of Korean college-trained agriculturists failing to apply their knowledge to the problems at hand. They thought that their education prohibited their doing anything but paper work. Dr. Albert Schweitzer noted this same attitude in the educated African. A member of the Peace Corps in Africa said, "I think what impressed them most was that we worked right with them. We joined in every mean and dirty job that had to be done." These Peace Corps volunteers were demonstrating that a good citizen will do the task most needful however educated he may be.

When Dr. Wynn Thorne, Director of the Agricultural Experiment Station at Utah State University, returned from an exchange visit to Russia, he reported that one thing we had in common with the Russians was that we both held work to be honorable. In the agricultural sector he noted one major difference however – the women do most of the work!

There is a still greater and more important difference between the American and Russian systems in the motive for work. Our free enterprise system has always provided a strong incentive for work, and one of our greatest dangers in America today is the serious decline or possible loss of this incentive. In proposing changes in our welfare system, many have expressed concern