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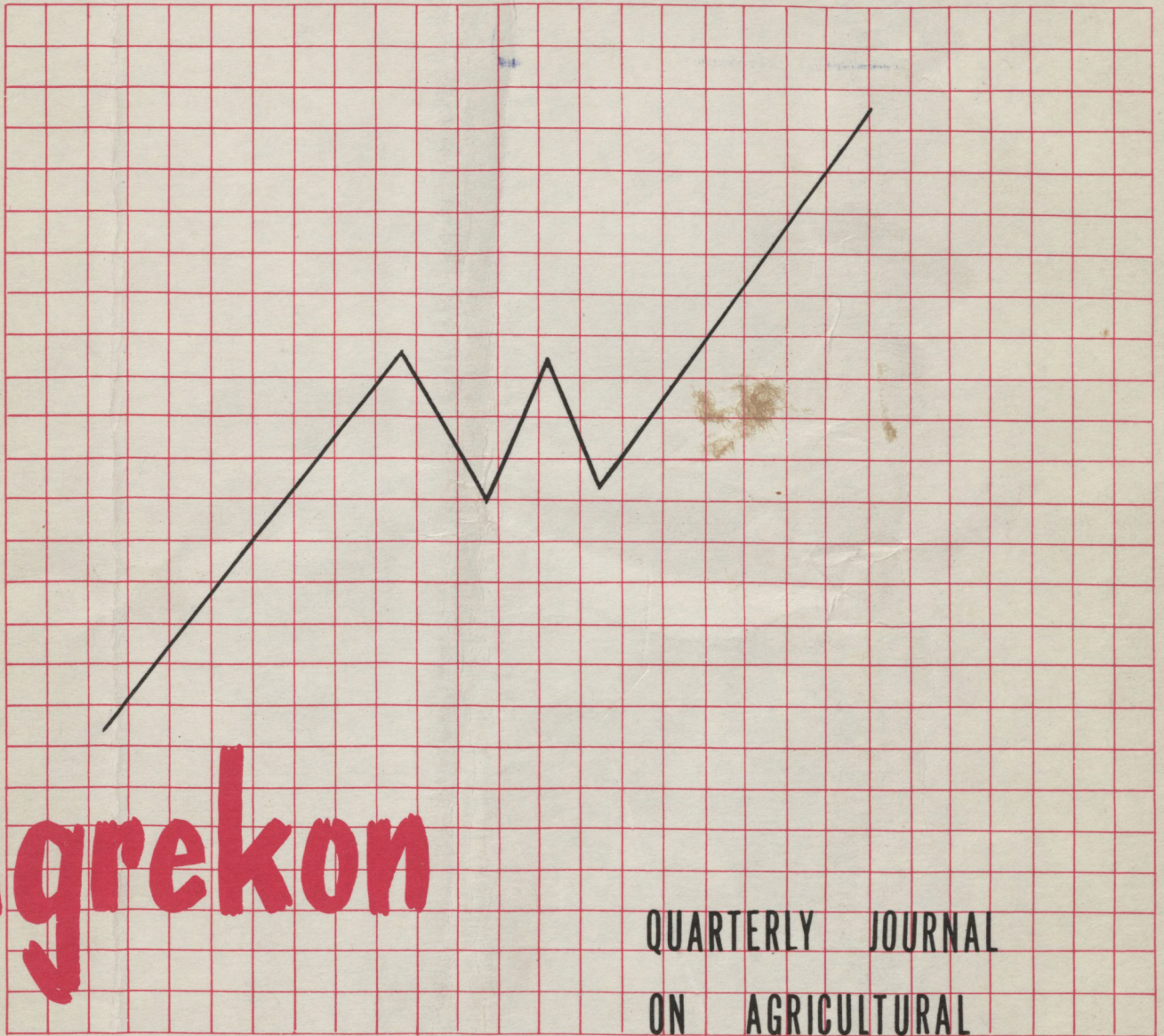
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THE DILEMMA OF THE ACADEMIC

by

J.A. GROENEWALD,
University of Pretoria

and

P.H. SPIES,
University of Stellenbosch

1. AGRICULTURAL ECONOMICS: THE DISCIPLINE

A few decades ago the American economist, Viner, stated:

"Economics is what economists do."

What is agricultural economics? It is doubtful whether agricultural economists today restrict their activities exclusively to the discipline of agricultural economics. The agricultural economist of today is concerned with a wide spectrum of economic problems. He examines the theoretical principles of economics and experiments with applications and techniques. Due to a versatile academic background which includes training in the natural as well as social sciences, his field of interest in applied economics ranges beyond the bounds of agriculture. He becomes involved with problems concerning the environment and natural resources. Problems concerning underdeveloped or slowly developing communities have involved him in macro-economic planning. The socio-economic perspective of rural communities attracts the agricultural economist. He has a natural concern with economic farm problems. Then, also, he has to devote attention to the fiscal and monetary problems of a country. If agricultural economics is what agricultural economists do, then it has indeed become necessary to once again ponder the question: "What is agricultural economics?"

A perspective on agricultural economics as discipline may possibly be found in its foundation character and the reasons for its foundation. This does, however, provide only a "genotypic basis" for the discipline. Professional linkages with other disciplines, development within these disciplines and in analytical techniques, and the challenges of other new disciplines in which the skills of the agricultural economist can gainfully be employed, yielded to modern agricultural economics its "phenotypic gestalt."

Thus, an identification of its disciplinary boundaries should precede any critical analysis of agricultural economics education. A distinction must be drawn between that which an agricultural economist should do, what he can do and what he

should not do. A first step in this identification is a perception of the genotypic basis and the phenotypic gestalt of this discipline.

2. THE GENOTYPIC BASIS OF AGRICULTURAL ECONOMICS

2.1 The origin

Versatility characterised earliest developments of agricultural economics. Agronomists such as Spillman worked on response functions and thus laid down the foundations of agricultural production economics. Economists such as Thorstein Veblen, toward the end of the 19th century in the USA, and Grosskopf in South Africa during the nineteen-twenties and thirties gave to agricultural economics the aura of a social science. The first two professors in Agricultural economics in South Africa were Prof Leppan, an agronomist, and Prof Grosskopf, a jurist. The oldest agricultural economics association, namely the "American Agricultural Economics Association" has already twice changed its name. When founded in 1910 it was known as: "American Farm Management Association", by 1920 it was the "American Farm Economics Association" and more recently it adopted its present name. The earliest developments in the study of economic and managerial problems in agriculture must, however, be distinguished from the foundation of the discipline of agricultural economics. Agricultural economics originated due to managerial and administrative problems in agriculture, and the endeavour of governments to be agriculturally as self-sufficient as possible. Initial research in agricultural economics was directed mainly to production economics and financial problems in agriculture. The managerial problems as perceived by agricultural experts indicated the *possibilities* for economic and financial analyses in agriculture. This in itself would not provide sufficient impetus for the development of a fully-fledged agricultural economics discipline. The rather limited circumscription of investigations on farm level and the initial technical orientation of farmers would inhibit such a development. The authorities actively

supported specialised aptitudes in agricultural economics as part of a general strategem towards agricultural professional skills. Consequently the training of agricultural economists in this country as well as in other countries such as the USA, was closely linked with the government departments of agriculture and was handled administratively as agricultural training rather than training in economics.

2.2 The role of the State

The history of agricultural economics education in South Africa is a typical example of the above-mentioned developments^{1, 2}. It is no coincidence that the first degrees in agricultural economics were awarded only after the formation of the then Division of Economics and Markets in 1925. The first fully-fledged agricultural economists in South Africa were public servants. The State has over the years made active contributions to agricultural economics training, by means of, (inter alia) local and foreign scholarship grants. Professionally-inclined graduates have, until fairly recently found their main avenue of employment in the Departments of Agriculture. The greater majority of the present academic staff in agricultural economics at South African Universities are past full-time officers in the Department of Agriculture - later the Department of Agricultural Technical Services. The involvement of the State has left its mark on this discipline both here and overseas. Carstenson³ commented as follows on the situation in the USA.:

"Practically all of us farm economists are sons of the soil, graduates of Land Grant Colleges, closely identified with the Federal and State Governments. Without our knowing it, probably our academic liberty and inventive initiative are conditioned appreciably by government and public opinion".

Campbell⁴ refers to the development of agricultural economics as "nurtured in a bureaucratic rather than academic environment". It would however be erroneous to condemn this situation without deeper reflection. Agricultural economics education has, from the inception, been directed vocational training. The agricultural economist had to acquire certain vocational skills whereafter, in his profession, he concerned himself mainly with government projects. Within this framework a professional agricultural economist would be employed by the State either in a teaching, an administrative or a research capacity. He had to be able to conduct enterprise or production cost investigations and to provide guidance on agricultural marketing policy as well as price-income policy.

3. THE PHENOTYPIC GESTALT OF AGRICULTURAL ECONOMICS

3.1 The changed environment

Since the foundation of a speciality of economics for agriculture, conditions for the agricultural economist have changed considerably.

New theories, new techniques, new problems, new employment opportunities and new fields of application have resulted in the development of new forms in the discipline. It has changed the conditions as to what the agricultural economist can and should do. It has also provided attractive temptations for directed courses in areas which sometimes tend to range outside the supposed area of specialisation.

During the nineteen-thirties and fifties economic theory experienced a revolution. Contributions by Keynes and later Tinbergen have attributed to central authorities new capacities for economic manipulation. In-depth investigations into the character and nature of positive and welfare economics by thinkers such as Hicks, Kaldor, Scitovsky, Samuelson, Little and Graaff disturbed the philosophical basis of economics. Under the aegis of thinkers such as Schultz, Heady and Shepherd agricultural economists have entered similar paths. The more general use of abstract and algebraical procedures in economics, rather than verbal and geometrical approaches, has enhanced the analytical powers of economists.

Over and above the developments in economic theory, the analytical and planning abilities of the economist entered a new era during the nineteen forties. Electronic computers have enhanced the possibilities of executing complex calculations within a short time. Together with this instrument new techniques have been developed. Linear programming, simulation and a variety of other mathematical techniques have taken hold of the economist's imagination. Multi-dimensional activity analysis has made an impact on economics and its related fields which has even brought in its wake a revision of postulates of the nineteen-forties and early fifties. Developments in econometrics have instilled a new sense of scientific self-control among economists.

3.2 Occupational and educational implications: Identity crisis

Against this background of developments, university training in agricultural economics is at present involved in a two-sided identity crisis. Firstly, a conflict between professional excellence and practical applicability. Secondly, a conflict between occupationally and professionally directed training. The first identity crisis is linked to the rapid developments in economics and techniques as set forth. An inclination to problematics developed among agricultural economists. Practical farming problems started to play second fiddle because agricultural economists were confronted with an over choice in approaches. New approaches and new techniques must be tried. Academic and occupational demands on agricultural economists have required of them to remain in the front line of new developments. It has become an aspiration to put a certain advanced shoe on to the same practical foot or other. This problem was already present at an early stage. Jesness⁵ expressed this situation as follows:

"How sure are we that there is not some truth in the charge that at times we become so absorbed in tools and mechanics that we lose sight of the real objectives? There was a period in which the survey method of assembling data seemed more important than the data themselves. For a time, correlation analysis was a *sine qua non*. It took time for some to realize that coefficients by themselves established no relationship but merely gave some indication of the extent of the relationship after its existence had been arrived at by reasoning and logic".

The second identity crisis is linked with the choice between a narrow objective of professionally directed training and a broad objective of occupationally directed training. The independent and dependent variables in this identity crisis are the lecturer, the student, the employer and the discipline.

Because of his academic orientation the lecturer has an inclination towards professionally directed training. He feels duty-bound to the discipline and wants to expound an unpolluted doctrine. He may, however, elevate his personal views on the discipline to a dogma and thus determine the nature and the standard of education in agricultural economics. He can teach students to slay dragons if dragons are defined within his dogmatic view of the discipline. Professionally directed education does have a stabilising influence on the discipline but may, in an extreme form, lead to rigidity and unrealism in education. Agricultural economics is, as previously stated an occupationally directed discipline. The modern university is not isolated from the community and its need⁶. Professionally directed training is tempered with occupation-mindedness. The lecturer is looking for students. The modern student is looking for courses which will prepare him for a remunerative occupation. The employer prefers trained manpower who can, at times, meet unique needs. These forces are in constant interaction with one another, and form a source of adaptation in subject matter and discipline. These adaptations have an inclination to move toward a centre of gravity as dictated by employment opportunities.

Thus, the second identity crisis resides in the preservation of a critical scientific basis in education for a professionally-minded agricultural economics, as opposed to a more practically applicable basis of an occupationally directed agricultural economics. Agricultural economics is now in a state of anarchy because of these two identity crises. The phenotypic gestalt of agricultural economics has assumed the nature of a formless amoeba which changes its shape according to conditions and opportunities. Agricultural economics is presently without universally accepted goals, and the obligations as well as responsibilities of the discipline are accordingly vague. Possible responsibilities of the agricultural economist will therefore be expounded more fully in the next section.

4. A PARADIGM FOR AGRICULTURAL ECONOMICS

4.1 Definition

At its early inception as a discipline agricultural economics had a well-defined responsibility, but the new opportunities involved with its development process blurred these responsibilities. Greener pastures lured the discipline away from what it should have been. It has now become necessary to assume a position and define a paradigm for agricultural economics.

A paradigm is a form, example or model of a doctrine which serves as a guide in the study thereof. It presents and defines the problem to be solved and is instrumental in the development of methods and techniques to solve the problem. It is the symbol through which members of a discipline communicate with each other and provides the structure for their arguments⁷. Aspects of a paradigm include the logical framework, symbolic generalisations, value, judgements and feature forms of a doctrine.

4.2 Paradigm and training

Kendrick⁸ expressed the refreshing view that an agricultural economist is an applied system-directed problem solver. A system is a compilation of parts or events which may be seen as a whole in the light of interaction and interdependence between the parts or events⁹. A system is a mental pattern for problem solving according to which complex structures can be investigated as a whole. According to Kendrick, agricultural economists are neither general practitioners nor specialists.

System-directed problem solving should be the aim of any critical professional activity. This goal is often brushed aside in order to train practising technocrats who, although immediately employable after their studies, sometimes exhibit an inability to reason adaptively and innovatively. One of the main contributory causes for rigidity among modern university-trained professionals can be found in the increasing specialisation in course material, linked to an institutional definition of speciality areas; universities can, for example, be divided into faculties and departments which ignore mutual needs and severe relationships between and within the different academic disciplines. The tradition of academic freedom may cause co-operation to be based more on amiable relationships and university politics than on formal organisation. Specialisation in and fragmentation of disciplines have made academics mutually more interdependent if the goal is one of comprehensive scientific education. A redefinition of academic freedom has become necessary in order to ensure more holistic planning in university education.

The present organisation in universities is not the only cause for a lack of system-directed training for agricultural economists. Within the discipline tuition methods have sometime stimulated fragmentation in the thinking processes of students. Curricula in agricultural economics have

traditionally included courses such as production economics, price analysis, marketing, policy and development, farm management and planning without emphasising their interrelationships within the curriculum. The training of agricultural economists therefore consisted of a collection of courses which, when listed on the same page, would give a *gestalt* for agricultural economic training.

According to Kendrick¹⁰, an agricultural economist is an applied problem solver. Problem-solving ought to be taught to students not as a technique but rather as a philosophical approach. Scientific directed problem-solving consists of identification of problems, their causes and the consideration of alternative methods and techniques in their solution. This approach can be instilled effectively in students only if they have received comprehensive training in the deductive scientific method¹¹, and if they have had the opportunity to apply those approaches derived therefrom to solve problems in practice. Instruction in the deductive scientific method and case studies should therefore constitute a central part of courses in agricultural economics.

System-directed problem-solving may, as a point of departure, be regarded as a constitution for agricultural economic activities. The approaches within this structure include managerial aspects on firm, subnational and national level. The activities of agricultural economics include decision making, planning, activation, organising and control with respect to the system within which they function. Professional training of agricultural economists should accept it as a goal to inculcate responsibility for the constitution and skills regarding the activities of agricultural economists.

4.3 System framework

What is the framework of the system in which agricultural economists operate? Dent¹² identifies four levels of agricultural systems. The first level deals with biochemical and physical systems existing, for example of nutrient - growth relationships in plants and animals. The second level consists of plant and animal systems which amongst others concentrate on the animal-pasture relationship and on crop relationships such as rotation systems. The third level is concerned with farming systems which include financial parameters and concentrate on specific enterprises or the whole farm. The fourth level consists of national and international systems which envelop industrial sectoral relationships as well as supply and demand situations. Clearly, the main emphasis in the training of an agricultural economist shall be centred in the economic-financial relationships of the third and fourth levels.

The systems approach requires however that all the important interactions must be considered in an analytical process. Although a particular system level may be the focal point of interest, it is necessary to identify and evaluate relationships between systems levels. Different approaches may be used in this regard. For example, agricultural curricula may include a general course called "Agricultural Science" which can holistically concentrate on the interaction between different organisations and processes of interest to agricultural activities. Another example could possibly be a course on "Man: his environment and his nutrition". The relationships between system levels and major areas are depicted in the following scheme:

Example:

Production response and crop rotation system

Example:

Farm planning model

Example:

Price and cost structure as influenced by the trade cycle and secular trends in an economy

Lower order system level

Linkage

System level in major area

Linkage

Higher order system level

Object:

To identify, quantify and evaluate micro-parameters

Object:

Verification of a model

Object:

To identify, quantify and evaluate macro-parameters

A specialised course can, with the right educational approach, fully comply with the objective of system-directed education. Broad training does not, on the other hand, necessarily cause students to develop an understanding of related systems. System-directed training is an educational philosophy which calls for careful comprehensive planning.

Specialisation can shorten the period of professional training. This is an obvious reason for the current structure of university courses. Specialisation, if coupled with disciplinary isolation of the trained person can, however, have long-run detrimental effects for society. For a discipline such as agricultural economics it can be disastrous, because good problem-solving presupposes a comprehension of alternatives. A comprehension of alternatives does not imply a knowledge of alternatives but it does imply an ability to identify relationships and to utilise effectively specialised knowledge within each relationship.

4.4 A new paradigm

A new paradigm for agricultural economics is now put forward. The structure of this paradigm consists of systems analysis with a logical point of departure based on deductive problem-solving. Professional symbols, value judgements and generalisations are based on developments in economic theory and managerial theory on the firm as well as national level. This point of departure should also be predominant when and where agricultural economics is included as a minor subject with other courses.

Subsequent attention should be bestowed on the objectives of university training in agricultural economics. This should form the basis for the consideration of syllabuses and curricula.

5. UNIVERSITY TRAINING IN AGRICULTURAL ECONOMICS: OBJECTIVES

5.1 The university

The history of university training in its present form goes back to the middle of the twelfth century. Nothing really comparable to modern universities existed in ancient Greece or Rome. Although groups of students gathered there around certain famous teachers there were apparently no continuous organisation equivalent to those found in Bologna, Paris and Oxford¹³.

The establishment of university institutions resulted in the granting of charters by the Pope or temporal rulers. These charters gave status to the assemblies of students and teachers, laid down rules or statutes according to which they had to conduct their affairs, and gave recognition to the qualifications or degrees awarded - a type of guarantee of standards. The early charters were largely an acknowledgement of conditions which

had already developed, but with the passage of time papal, royal and other authorities also took the initiative to establish such study communities or universities. The interest of the early authorities (as those of present ones) did not stem from an abstract interest in knowledge for its own sake; the universities were expected to be the training centres of priests, medical practitioners and lawyers. During the thirteenth and fourteenth centuries the development of universities had a close relationship with that of the State. Inevitably, however, studies with less of an occupational emphasis also developed, and faculties of arts, "pure" philosophy, logics and the predecessors of natural sciences came into being. After the Middle Ages the position of universities as centres for professional training, (except for priests and medical practitioners) gradually deteriorated and particularly in England, they did not distinguish themselves as centres for new ideas or discoveries¹⁴. They did, however, maintain and strengthen their position as dominant centres of study and knowledge, especially in humanities, and they enhanced their status as centres which the elite, especially the ruling elite, would pass through. Throughout the ages humanism had a large impact on university life. This gradually led to more unfettered thought.

Since early in the nineteenth century, particularly after the University of Berlin started to devote more purposive attention to research, and to lay more stress on the use value of knowledge, a change in the emphasis in university education became apparent. Particularly in German universities, and later also in other parts of the world, a larger degree of an occupational approach developed. At one stage the approach was largely to establish special university institutions - for example, for agriculture, medicine or engineering. Among others this was the most important motivation for the Morrill Act in the USA, which in that country provided the main impetus for the establishment of the land-grant colleges and universities, which initially concentrated on agriculture and engineering. The increasing realisation of the interdependence among different sciences and Science groups have gradually caused the sharp distinction between the so-called technologically orientated and the more traditional universities to become blurred; consequently, the existence of quite a number of faculties, each offering a particular group of sciences at the same university, has by now become a general phenomenon.

The university of today exists within a broader community, and it is accepted that the university must serve the community by producing useful human material and by generating knowledge through research. The community of today also has a substantial financial investment in universities. In South Africa, for example, State subsidies form by far the most important component of University finance. The community or government also has a say in the management of universities. The amount of control over, or conversely stated, the degree of autonomy of universities differs appreciably among different

parts of the world or sometimes even among universities within the same country. According to Schwarz¹⁵ three main types of universities exist in the western world today.

1. The English type is independent of the State, has its own constitution and statutes, the college system and offers tradition-committed scholastic education. This type of university sees its primary task not in supplying skilled intellectuals, but rather in comprehensive human development.
2. The French type has an extended faculty system for scientific occupational preparation in which the state provides the funds, fills chairs and prescribes plans of study (syllabuses and curricula).
3. The German type falls between the English and the French types. Special present features are the symbiosis of research and training, academic freedom of lecturers and students, as well as a large degree of internal autonomy.

It can be said that although the South African universities were originally modelled on the English type they now resemble in many respects, conceptually at least, the German type.

The mere fact that the community has a considerable financial interest in the university causes it to have the right, short of interfering with the internal autonomy of the university, to expect that results are obtained.

In agricultural economics education this is of crucial importance regarding, inter alia, the composition of syllabuses and curricula.

5.2 The requirements

Seen in the light that, today, the community makes certain demands of the university - also on the departments of agricultural economics - it is only wise to examine the market for which academics in our discipline have to deliver products. Unfortunately, however, this subject does not lend itself to conventional market research. The reason is a communication gap between academic and employer, as well as differences in their respective knowledge environments. In this respect French¹⁶ made an interesting classification of their knowledge situations:

What the average employer knows:

1. In-depth knowledge of what makes his own organisation tick.
2. The type of person who has made progress in his organisation.
3. What the university was like when he was a student.
4. Possibly, which university delivers good products today.
5. The discipline of meeting short-term deadlines.
6. The value of at least a minimum amount of knowledge concerning many things.
7. The value of common sense.
8. The value of organisational political feel.

9. How to meet a limited set of goals.
10. The value of organisational loyalty.
11. Differences between line and staff responsibilities.
12. The influence of external forces on his organisation.

What the average employer does not know:

1. The sophistication of university staff evaluation and knowledge.
2. The general high level, or differences in the potential of students.
3. The flexibility and adaptability of well-trained students.
4. How other organisations generally and specifically operate in personnel selection and management.
5. The latest techniques of analysis.
6. The long-run planning process.

What the average academic knows:

1. A superficial knowledge as to what makes organisations tick.
2. Which type of person generally make progress in organisations.
3. Educational philosophy, goals, techniques and methods.
4. A reasonable evaluation of different universities.
5. The discipline and value of scientific analysis.
6. The value and limitations of generalities.
7. The latest analytical techniques.
8. The discipline and humility of subject matter specialisation.
9. The macro-environment of many organisations.
10. The pleasure derived from new ideas generated in a neutral atmosphere.
11. How to work for many bosses.
12. The luxury of contemplating long-term aspects.

What the average academic does not know:

1. How to place his students.
2. What students really receive outside their own disciplines at university.
3. Actual recent organisational techniques and changes.
4. How to render concepts and tools operational.
5. Organisational politics and unique employment opportunities and limitations.
6. The short-run requirements and amenities of modern organisations.

The slogan "communicate with the business world and see what it needs" has its value but this value is limited. The academic will therefore adapt his educational decisions, inter alia, to what he thinks industry needs not only today, but also tomorrow. But industry is not homogeneous. Differences are large. This poses a dilemma for the academic. His judgement is not without limitations. Nevertheless he may be guided by a paradigm based on the systems approach.

In discussing the type of person preferred by a large group such as Cook Industries in the USA, it was averred that it is impossible to stereotype individuals as the only types suitable for a particular position, and that qualifications for different positions will vary. A much sought-after characteristic is an ability to let the right things happen, an involvement therewith, an ability to communicate, to make decisions, and an ability to function under persistent pressure. The ideal employee is analytic, a fast thinker who can manipulate figures and obtain the answers on a continual basis. He is inquisitive and can defend his point of view. In this way these characteristics are reduced to five main points:

1. The persons required must be able to grasp relevant situations.
2. They must sort out the major factors and immediately penetrate to the essence of the matter.
3. Objectivity is important.
4. Decision-making is extremely important.
5. The suitable person is dynamic¹⁷.

The meat-packing industry evidently has similar requirements¹⁸. It is evident that undertakings - whether farming, trade or industry, Public Service, educational institutions, research organisations, etc. need, firstly, people who can think. This is the most important challenge. Knowledge is also important, but mainly as background, as point of departure for reasoning and decision-making. As Sparks puts it: "What he learns in college may have a fairly short shelf life, but if he has learned to think, he can cope with new situations and continue to apply what he has learned in college and on the job to new situations. When we find a young person who can think we will make a job for him if there is not already a job opening¹⁹". The same type of sentiment has been expressed by other writers such as Luby²⁰, Kendrick²¹ and Schultz²².

According to Schultz knowledge becomes obsolete and only the ability to think and an eagerness and ability to renew knowledge will enable a student to fill a useful niche in society over the long run²³.

6. SYLLABUSES AND CURRICULA

6.1 Syllabuses

When syllabuses for agricultural economic courses are drawn up, the type of students taking these course must be considered. At undergraduate level a distinction may be drawn among the following four groups:

1. Students with other agricultural sciences as majors and who include a limited number of agricultural economics courses in their curricula.
2. Students majoring in general economic sciences who include some agricultural economics courses in their curricula²⁴.
3. Students majoring in agricultural economics or management for whom the bachelor's degree will be a terminal qualification.

4. Students majoring in agricultural economics or management and who will later enrol for postgraduate study.

The requirements of these four groups of students are divergent. Nevertheless, for practical as well as educational reasons it is not advisable to separate these groups insofar as formal training is concerned. In the courses concerned, a relatively delicate balance must be struck between the uniqueness of agricultural economics and other disciplines.

It is necessary on the one hand, particularly in elementary courses, to repeat certain components of courses dealt with in other economic disciplines for the sake of agricultural students, who major in more biologically or technically orientated disciplines. It may also be advisable for the sake of students majoring in other economic disciplines, to supply a limited biological background. Thus a certain amount of overlapping, which by its nature is not very desirable, is unavoidable.

The needs of students majoring in other economic disciplines probably consist largely of exposition to an understanding of agricultural production and the agricultural system.

Students majoring in other agricultural disciplines may be divided into two broad categories: Those who will later become farmers or extension officers, and those who will later occupy research or other executive positions. The former group will probably have a relatively larger need of practical managerial aspects, whereas the latter groups' needs centre more about the theoretical aspects of production economics and the operation of the system.

The task with agricultural economics majors who do not intend to do postgraduate studies is, according to James²⁵, threefold in nature: Firstly, he should be taught to think and to use a logical approach in problem-solving and decision-making; secondly, to achieve a minimum attainment in specific fields of knowledge. The third goal is to give to him enough applied training to enable him to be a success in his first job. This underlines the essential need for a systems approach.

An important part of the task with prospective postgraduate students, is to shape their approach in such a way that they will be prepared to think and reason as research workers.

All four groups of students - at any rate in the elementary and sometimes middle group of courses, attend the same lectures, and the compilation of syllabuses that will purposively pursue these widely divergent objectives constitutes a source of despair for the academic. It does however appear that the aspects which should warrant the main emphasis consist of theory and use of certain analytical methods. As will be shown later this implies at least good support from other disciplines.

As far as postgraduate syllabuses are concerned, Mosher²⁶ points out that this study occupies in itself an intermediary position between the undergraduate and more mature stages. Three important questions particularly face the academic:

One is the scope and function of agricultural economics. A second is the sufficiency of present theory. The third is to what extent training in analytical methods must be econometrical/mathematical in nature. Mosher continues and states: "Important as these questions are, they do not get settled. Individual answers are innumerable. At certain times, interspersed among periods of hot debate, there seems to be a strong majority opinion within the profession with respect to each of them but there are always vociferous minority reports, to many of which more attention should be given than is often the case Nor does there seem to me to be a secular trend in the answers in any particular direction²⁷."

This again places the academic in a dilemma. This dilemma stretches further back than postgraduate study. In its turn it has an influence on the curricula and syllabuses to be offered for undergraduate study.

6.2 Curricula

The first basic requirement for a satisfactory university curriculum is that it must form a logical choice and combination of subjects which will form a meaningful whole and lead to the objectives set down for education.

Attention will mainly be given here to undergraduate curricula, and naturally to students majoring in agricultural economics.

There are potentially three types of students who will major in agricultural economics at undergraduate level:

1. Students basically trained as agricultural economists who may thus have a broad spectrum of future professions, both inside and outside agriculture - in its broader framework, as defined by Mosher²⁻, to choose from.
2. Students specialising within a more limited framework in farm management, and
3. Students specialising in agri-business management.

In the training of all such students, agricultural economics must obviously constitute the central theme. Furthermore, it would be inadvisable to neglect the second group with regard to marketing, policy and developmental aspects. It is indeed expected that some of these persons will in later life play leading roles.

Agri-business management students, will on the other hand, make enough contact in their future careers with the primary production industry, to render a knowledge of production economics essential.

Careful consideration must be given to the subjects that should be included in the curriculum together with agricultural economics. Basically these supplementary disciplines can be subdivided into three groups: nucleus, auxiliary and comprehension subjects. These three groups will now be briefly discussed:

6.2.1 Nucleus subjects

Nucleus subjects can be defined as those subjects which, together with agricultural economics, must of necessity form the nucleus of education. The inclusion of these subjects or courses in a curriculum for agricultural economics students is regarded not as supplementary, but as essential. Differences of opinion with regard to the depth at which each of these courses should be included do sometimes exist. Such differences of opinion do exist also between the two authors of this paper.

It may first be stated that theoretical economics, being the central theme of all economic sciences, must be regarded as a nucleus subject. It is indeed the source of development of economic thought and is thus indispensable to agricultural economists. Exposure to the mode of thought, the approach and the jargon of the so-called "pure" economist is essential.

Many facts in the modern development of agricultural economic thought, in marketing, farm management and even aspects of developmental planning - are closely related to or had their origin in business economics. Business economics has, because of developments within agricultural economics, developed into an essential subject during (particularly) the last decade.

6.2.2 Comprehension subjects

Comprehension subjects can be defined as those subjects that are essential to give to the student a basis to the ability to apply his knowledge of agricultural economics and other nucleus subjects in the identification and solution of problem situations.

Firstly, it is imperative to note that in certain aspects the agricultural industry differs quite radically from other industries. One such aspect is the fact that agricultural production is a biological production process. Therefore students must also be provided with a background of biological agricultural disciplines such as animal science (animal production), horticultural science, soil science, plant production (agronomy and/or pasture science), dairy technology, etc. In their turn these disciplines require introductory courses in some of the natural sciences. Seen in the light of the importance of capital items, courses in agricultural engineering must also receive serious consideration.

Similar arguments also apply for some of the humanistic sciences such as industrial psychology and rural sociology.

6.2.3 Auxiliary subjects

Auxiliary subjects can be defined as subjects which contribute to the student's skill in thought and analysis.

The inclusion of certain auxiliary subjects may be regarded as essential whereas it may not be so with some others.

No person can be regarded as being properly trained in agricultural economics if he is not able to

comprehend and interpret research results. In a modern world characterised by rapid technological change, such an inability will lead to an incapacity to institute dynamic adjustments and improvements. Thus a certain minimum level of instruction in statistics is imperative.

All agricultural economists do at times cope with pure income and cost accounting aspects. Accountancy is today an essential auxiliary subject.

Furthermore, the basic concepts of agricultural economics, especially rates of change and optima, which normally implies maxima and minima, are probably best described through differential calculus. This immediately implies the usefulness of mathematics as an auxiliary subject. Mathematics has, moreover, an additional advantage: Being an extremely strict form of logic, it has an incalculable effect on the student's reasoning ability. In addition it enhances self-confidence in the handling of figures.

The potential value of certain humanities as auxiliary subjects is self-evident. It is illuminating to note the opinions of some thinkers. A leading person in the American grain trade expressed himself as follows: "I recommend that universities strengthen and emphasise traditional liberal arts courses and that students avoid taking specialty courses such as 'grain marketing' in place of economics or other fundamental B.A. courses²⁹". Similar sentiments are expressed in the writing of, among others, Bishop³⁰, Manderscheid³¹, Witt³² and Schultz³³.

6.2.4 The balance

Determination of the desirable balance among all the possible disciplines is one of the most difficult facets of curriculum decisions. Basically, the objective was realistically expressed in the following terms:

1. The provision of a good general training which will encourage the student to:
 - (a) Develop an understanding and appreciation of his environment by studying the natural, biological, behavioural and humanitarian sciences.
 - (b) Develop an understanding as to how values and value systems develop and change.
 - (c) Cultivate the desire and capacity to study independently.
 - (d) Acquire analytical skills by the study of Mathematics, Logics and research methodology.
 - (e) Develop skills in communication by learning and practicing writing and talking.
2. The furnishing of a basis for professional education which will encourage the student to:
 - (a) Develop a desire to excel in his profession and comprehend its demands and rewards.
 - (b) Develop proficiency as an agricultural economist who can identify, analyse and propose solutions to economic and social problems.

- (c) Develop analytical skills which will be useful in his professional career.

Such a system obviously includes both the biophysical, the economic and the humanitarian sciences. As postulated by Schultz³⁴ there are great differences among students in their abilities, motivation, maturity and interests. This variation must be borne in mind.

The first basic decision is to decide which courses must be prescribed, and thus made compulsory. This will include the major subject, other nucleus subjects to a more or less advanced level, certain comprehension subjects and certain auxiliary subjects. Room must, however, be allowed for the variation among students. This is naturally accomplished by means of elective subjects.

The relative loads of elective and prescribed subjects have often been and will in future be the subject of much debate. However, if one allows oneself to be guided by the interest of the student, it must be accepted that the typical undergraduate student's expectations as to his possible career, and his supposed knowledge on course requirements for that purpose tend to be rather at variance with reality. Thus, in view of the limited available time, prescribed subjects will have to be preponderate.

7. CERTAIN ADDITIONAL PROBLEMS

There are certain additional problems which complicate university training in agricultural economics. Only a few will be briefly mentioned.

There is, firstly, a very unfortunate dearth of knowledge among new students (recently matriculated) about careers in general, and specifically, what agricultural economics can offer them. A further serious problem stems from subject options at high school. The importance of numerical calculations entails that Mathematics at matriculation level must be regarded as a minimum entrance requirement. Apparently, however, there is a lack of guidance in this respect. Only a generally lowering of standards will make it possible to accommodate prospective students without mathematics at matriculation level. Such a lowering of standards will inevitably amount to discrimination against the better student.

Other differences among latent abilities of different students give rise to a further complication factor. The question may well be posed whether it would not be more economical to permit the really talented student to complete a four year degree over a period of three years. Certain practical problems would pose a hindrance, but institutional factors are likewise stumbling blocks - including the attitude of many employers. The present situation does, however, cause the same course structure to represent over-occupation of some students' time, and under-utilisation of the time of others.

Whatever the academic's view about his role, it remains a partial view. The only real certainty is that the demands that society makes of him will change, as these have already changed in the past. An increase in the rate of change can be expected.

The traditional view of a peaceful academic existence has already passed into oblivion. The academic will have to start to accept his own advice to others, namely increasingly dynamic adjustments to a changing environment.

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