

News Letter

Foreign Student Service, Agriculture



もう一度学生時代に戻れるのなら

上野民夫

〔前評議員・京都大学名誉教授〕
応用生命科学専攻

三十余年奉職した京都大学農学部・研究科での教育・研究生活を振り返って、もしもう一度学生時代から出直せるなら、どのような目標を持って人生を送るかを考えてみた。

私たちの世代は、まさに日本の高度経済成長期に生きてきた。すなわち、大量生産・大量消費を基盤とする工業立国時代である。電気・自動車工業がもたらした利便性、農学の発展による食糧の安定供給と医療産業の興隆に由来する長寿社会は今後もそう簡単には変わりそうもない。

このように、二十世紀後半に先進諸国が一方的に消費文明の拡大を指向し、経済的発展を最重視してきたのは一つの歴史的必然と受け取れるが、世紀末に至って種々の矛盾が露呈してきたのはその指向が統合的な視点を欠いた一面的なものであったことに起因すると考えている。

多くの同輩が欧米諸国に留学して、先進諸国の文明が指向する方向に鋭敏に反応したのは、当時の若い学徒としては極めて自然な生き方であった。彼らの多くが留学で得た体験を帰国後に展開し、日本の学術の発展に多大の貢献をした。したがって、以後の日本の学術の興隆の主因が、世界から欧米への留学の結実と見なされるのもある程度納得のいくところである。しかし、現在の若手研究者に当時と同じ考えでの留学を期待するのは、以下の理由から、歴史の変遷を無視した暴論と考える。

二十世紀の社会が達成した高度な物質文明の起源は、19世紀後半からの第二次産業革命にあり、その技術基盤を支えたのは物理学と化学を主体とする規範(Discipline)科学である。二十世紀の工業生産の向上と消費文明社会をこの規範科学体制の恒常的な発展の線上に位置づけることには異論はないはずである。その文明が露呈する現在の矛盾に若い世代は私たちの世代よりもはるかに敏感であり、ある場合には彼らは矛盾が露呈するまで無関心でいた私たちの世代の責任を問う立場にある。ここで、現在反省も含めて人生の目標をもう一度設定するなら、目前の課題は「現在の社会が露呈する矛盾を解決すること」であり、「消費文明を脱皮した新たな価値判断に基づく行動規範を策定すること」が必要になってくる。その具体的な行動規範は、例えば、現在提唱されている「持続的・循環型社会の構築」に参画することから体得されるだろう。

では、「持続的・循環型社会の構築」はどのようにした

ら達成できるのだろうか？例えば、現在進行中の「国立大学の独立行政法人化」と「科学研究費の領域・分科・細目の見直し」をはじめとして、教育・学術体制に抜本的な変革が求められていることもこれとは無縁ではない。むしろ、変革を必要とする最も本質的な要因は、現代社会が抱える諸問題を統合的な解決へと導く新しい教育・学術体系を提案し、それをどのように活用するかにあると理解すべきであろう。従って、その主役を担う国立大学ではこの提案と活動に対してより大きな関心が払われるべきである。

一方、教育・学術体制の改革だけでは新たな行動規範は誕生しない。「持続的・循環型社会の構築」には、現代社会が当面している資源・エネルギー・環境・倫理などの諸問題に対して、関連学術諸分野からの多面的かつ統合的な研究成果が求められているのである。すなわち、新しい学術は、社会・フィールドを対象とし、その成果は一体となって社会・フィールドに還元されるべきものである。このような状況を考えるとき、規範的科学のみを主体とする旧来の学術体系に加えて、現在日本学術会議が提唱する「俯瞰的研究」、すなわち「現代社会が抱える諸問題を統合的に解決することを目標とする研究」を推進するために、新たな学術体系の構築が求められていることは十分納得のいくところである。ここで、これからの「新しい学術体系の一つの典型を農学に求めてみてはどうか」と提案したい。農学の目的は、「恒久的な太陽エネルギーによって循環型資源である水と炭酸ガスを高度に利用して、生物資源を確保し、かつ安定に供給すること」である。また、農学は本来、衣・食・住を包含する人文・社会・自然科学を統合する人類存続の基盤を培う総合科学である。

このように考えるとき、もう一度学生時代から出直しても、農学を指向したであろうことは自明である。けれども、その目標は「消費文明の拡大」ではなく「持続的・循環型社会の構築」に向けての学術活動に貢献することである。

国際化の中にあって、現在の学術政策は、依然として経済活動の高揚に最重点が置かれているが、長期的展望すなわち持続的・循環型社会に向けての学術成果の高揚を求めて、大学＝ユニバーシティすなわち「科学を統合する場」としての機能をより高度に発揮できる方策を農学部・研究科から提示できないものかと考えている。



Aspects of Agricultural Education and Research in Australia

Robert A. McIntosh

(Visiting Professor, Plant Breeding Institute, The University of Sydney, Australia)

My first duty is to thank Professor T.R. Endo and the Faculty of Agriculture for the invitation and privilege to spend several months as a Visiting Professor in this esteemed University, located in such a historic and beautiful city. This is a particularly interesting experience for my wife and me as we come from a multicultural society in a large sparsely populated country settled by Europeans only 200 years ago.

This is my fourth visit to Japan and my third to Kyoto, but it is the first for my wife. My previous visits were for short stays of 1 to 2 weeks when a realistic impression of Japan and its people was not possible because, as at most international conferences, the local people were either very busy organizing the conference and comfort of the delegates, or were returning to their homes during the social periods when many friendships are made.

I am a wheat researcher from a major wheat-producing country. In Kyoto the only wheat plants one encounters are those in a small plot and greenhouse area in the Faculty of Agriculture. Nevertheless, wheat research and the researchers at Kyoto have had an unblemished record for the last 60 years with the very considerable contributions to wheat genetics made by Professors H. Kihara, K.S. Tsunewaki and more recently, T.R. Endo. It is indeed an honour to be asked to work and teach in a laboratory with such a long and established record.

Since I am still at the beginning of my stay in Japan and cannot profess to have a wide experience of the country or knowledge of the culture, I propose to tell you a little of agriculture in my country and of the University where I have been an undergraduate, postgraduate and researcher for the last 47 years.

As I write this article Japanese students are sitting their National Entrance Examinations. In Australia there is no similar procedure. In my state of New South Wales (and I believe all other states) entrance qualifications are based on the results of the Higher School Certificate — the statewide public examination taken by all students when they complete the 12th grade. Following some mathematical wizardry each student receives a single weighted score that is used by the universities for selection. Acceptance for enrolment at a particular University and a particular discipline is based on the examination score, the expected number of applicants, and the student quota set by that University. At the University of Sydney, entrance levels for faculties such as medicine and veterinary science are extremely high (98 or higher on a scale of 0 to 100) whereas those for science and agriculture are comparatively low (65–70). At some Universities and in some faculties the process of selection may also involve an interview in an attempt to assess the student's personal interest in the future profession rather than being driven entirely by potential earnings or parental coercion. Thus it is the final school examination that is the major hurdle for the student wishing to enter our universities. Of course other criteria must be assessed when selecting students from other states and countries as well as so called mature age students. For Australian students taking their first degree, the fees are fairly minimal and can be paid by themselves or families, or by government loans repaid through the Taxation Office from future earnings. For others, and for those without Australian Residents status, the fees are more substantial.

The Faculty of Agriculture at the University of Sydney has about 250 undergraduate students enrolled in several degree courses but the most important are Agricultural Science and Agricultural Economics. The departments of the Faculty include Agricultural Economics, Agricultural Chemistry and Soil Science, Agronomy (including the fields of broad-acre crop and pasture production, horticulture, biometry, entomology and plant pathology), a Plant Breeding Institute responsible for teaching agricultural genetics and plant breeding, and a Department of Animal Husbandry administered by the Faculty of Veterinary Science. The Faculty of Agriculture does not include forestry and fisheries.

The major bachelor's degrees within Agriculture are 4 years with the award of Honours based on academic record over the last 3 years. Suitably qualified students (for example, those with Honours degrees, or an assessed equivalent) may be accepted for PhD programs usually based solely on research. Some students may undertake Masters degrees and these can be done by research or, in some cases, by coursework with a reduced research component. The latter is attractive to students from overseas or to students with other qualifications wishing to enhance their knowledge in agriculture. Masters degrees usually take 2 years and PhD programs, 3 to 4 years.

Within the universities there are 5 levels of academic staff, A, B, C, D and E, probably better described as Demonstrator/Instructor, Lecturer, Senior Lecturer, Associate Professor and Professor, respectively. Most tenured academic staff progress to levels C and D and relatively few reach level E—a level retained for some department heads, endowed chairs or merit promotion (personal chairs) based on teaching, research and administration.

Over recent years there has been increasing pressure on all academic staff to obtain external funding to support their research activities. Some of the funding sources are extremely competitive and the likelihood of a successful outcome for an application may be as low as 10%. Agricultural research in Australia has been extremely well served by funding obtained from point-of-sale levies placed on virtually all crop and animal production with similar amounts provided by the federal government. For grains research and development, for example, this provides an annual pool of about Aus\$100 million (US\$60 million). The grain crops include wheat, barley, oats, sorghum, sunflower, maize, and grain legumes such as lupins, field peas, faba beans, chick peas and lentils. Some of the rural research and development organizations have attempted to reduce overall time spent on research applications by use of a 2-tier application process; firstly a preliminary application with a brief description and budget estimate and then if successful at this level, the applicant is invited to submit a full detailed application. This greatly reduces the likelihood of failure following considerable effort in the preparatory process. Other significant sources of funding for agricultural research come from the Australian Centre for International Agricultural Research (ACIAR) with a major focus on Oceania and southeast and east Asia, and from the Australian Research Council (ARC) by way of multi-institutional Co-operative Research Centres (CRCs) which are based on co-operative government and industry funding. CRCs are funded for 7 years in the first instance, but some have been continued for a second period either with the same name or with a modified name and emphasis, and perhaps with other or additional industry partners. Some of the agriculturally oriented CRCs that were established focused on cotton, rice, sugar (based on sugarcane as the source), legumes, weeds research, grain quality, tropical plant pathology and pest management, molecular plant breeding, beef cattle, wool technology and greenhouse.

In comparing agriculture in Australia and Japan we can think of Australia as a food-producing nation and Japan as a food-consuming nation. For example, average wheat production in Australia approaches 20 million tonnes which is not high by world standards. Local needs are about 4 million tonnes and the re-

mainder must be exported. Agricultural production is not significantly subsidized and much of what is produced must be sold on competitive world markets. To do this there has been an emphasis on quality for achieving top prices, continuity of supply despite a difficult and variable production environment, and constant monitoring of markets for changes in consumer preferences. I will discuss briefly three examples.

Certain grades of Australian wheat are favoured in Japan because of their suitability for noodle production. Recent research in Japan and Australia has shown that this advantage is conferred by certain mutant ('waxy') genes that are present in the particular wheat varieties earlier recognized as having distinctive quality attributes. This knowledge allows not only ourselves but also our main competitors in the USA, Canada and Argentina to produce new varieties in the same quality grade. We still have an advantage with grain soundness, cleanliness and white colour that our relatively dry production environment permits in most years. But these are features being targeted by our competitors.

With barley the situation is reversed. Australia had an established market for malting barley in Japan and China, but with the changing emphasis to dry and filtered beers certain Canadian barleys were preferred. Our researchers and plant breeders then had to give more emphasis to the genetic criteria, such as diastatic activity, that make the Canadian varieties superior in contemporary beer production.

A third example is the grape and wine industry. Over the past 20 years Australia has become a significant producer, exporter and marketer of wine and has been particularly successful in expanding markets in Europe and, more recently, Asia. The basis for this success was improved varieties established during the 1980s, industry-supported research and development of scientifically based production methods permitting better and more uniform quality from year to year, improved marketing strategies and, of course, relatively low cost to the consumer. Grape and wine production in Australia has become a major export earner and rapid expansion is expected to continue. But as I have travelled and witnessed similar expansions of grape production in South Africa, Chile and Argentina — and undoubtedly elsewhere — I can only wonder whether such expansion is sustainable. Market expansion in east Asia will be a significant determinant of this.

My career with the University of Sydney has been with the Plant Breeding Institute in a group responsible for the national control of the three wheat rust diseases by genetic means. Whereas this work has been well removed from the problems of international marketing, it has been necessary to have an awareness of changing market demands. Most importantly, our research has had to maintain relevance to those needs as the funding was largely provided and controlled by farmers. I treasure opportunities to visit farms and farmers to witness and discuss ongoing problems of sustainable farm management and production.

外国人留学生（研究者）の博士号取得状況 （平成12年1月～12月）

当該1年間に京都大学農学研究科に博士論文を提出し、京大博（農）の学位を授与された外国人留学生（研究者）は18名です。取得者の名前と論文テーマは以下の通りです。

Nimfa K. Torreta（地域環境科学専攻）

Dynamics of Nitrogen and Organic Chemical Components During Leaf Litter Decomposition in a Tropical Evergreen Forest

Mustafa Kemal Yalinkilic（森林科学専攻）

Improvement of Boron Immobility in the Borate-Treated Wood and Composite Materials

Wichan Eiadthong（農学専攻）

Phylogenetic Relationships of some Mangifera Species and Mango Cultivars in Thailand

Chee-Leong Soon（応用生命科学専攻）

Biochemical and applied studies of microbial cyclic-amide-transformation

Ljudmila Borisovna Kulakova（応用生命科学専攻）

Studies of Cold-active Enzymes from Cold-adapted Microorganisms

李 承桓（森林科学専攻）

Preparation of Novel Polymeric Materials From Biomass and their Characterization

施 芳（応用生物科学専攻）

A Genetic Study on the Introduction of Barley Genes into Wheat Using the Genetic Rearrangement System

Dyah Iswantini（応用生命科学専攻）

Kinetics and Thermodynamics of in vivo Holoenzyme Formation

and Catalysis of Quinoprotein Glucose Dehydrogenase in E. Coli Cells

張 玉林（生物資源経済学専攻）

転換期の中国における国家、基層幹部と農民

張 国艶（応用生命科学専攻）

Studies on Enzymatic Cross-Linking of Soybean Glycinins by Mammalian and Microbial Transglutaminases

Lilibeth Pulido Novicio（森林科学専攻）

Characterization of Carbonized Wood and its Application to the Adsorption of Heavy Metals

Pachanoor Subbian Devanand（農学専攻）

Analyses of Hybrid Sterility Problems in Hybrid Variety Breeding in Rice (*Oryza sativa* L.)

尹 惠珍（応用生命科学専攻）

Crystallographic Studies on Structure of Alginate Lyases of *Sphingomonas* Species A1

Nyange David Absalom（生物資源経済学専攻）

The Analysis of Food Insecurity and Malnutrition in Tanzania and its Policy Implications

Nguyen Canh Thai（地域環境科学専攻）

Experimental and Numerical Study of Soils Containing Large Particles

Khandaker Bayazid Hossain（応用生物科学専攻）

Statistical Genetic Study on Cattle Breeding for Dairy Productivity in Bangladesh

金 炯洙（生物資源経済学専攻）

高齢者の就農行動に関する研究—地域農業の活性化の視点から—

朴 雄烈（応用生物科学専攻）

Studies on the Availability of Phytate Phosphorus and Other Minerals with Rumen Bypass Treated Oilseed Meals in Sheep

外国人客員教授

平成13年度 外国人客員教授として6名の先生方を招聘しています。

氏名：**McINTOSH ROBERT ALEXANDER**
招聘期間：平成12年11月1日～平成13年8月31日
所属・職：シドニー大学・教授（オーストラリア）
研究題目：ライムギからコムギへの病害抵抗性遺伝子の導入
受入教官：遠藤 隆教授（応用生物科学専攻・植物遺伝学）

氏名：**HESTER RANDOLPH THOMPSON**
招聘期間：平成12年11月20日～平成13年4月15日
所属・職：カリフォルニア大学・パークレイ校・教授（アメリカ合衆国）
研究題目：生物生息環境の保全に関する研究
受入教官：吉田博宣教授（森林科学専攻・環境デザイン）

氏名：**DOHM LYNIS GERALD**
招聘期間：平成13年3月1日～平成13年6月10日
所属・職：イースト・カロライナ大学・教授（アメリカ合衆国）
研究題目：現代社会での生活圏における身体活動域が健康に及ぼす影響
受入教官：伏木 亨教授（応用生命科学専攻・栄養化学）

氏名：**BANDMAN EVERETT**
招聘期間：平成13年6月11日～平成13年10月31日
所属・職：カリフォルニア大学デーヴィス校・教授（アメリカ合衆国）
研究題目：食肉製品の環境における品質特性
受入教官：高橋 強教授（地域環境科学専攻・農村計画学）

氏名：**AULD BRUCE ARCHIBALD**
招聘期間：平成13年9月1日～平成14年3月31日
所属・職：ニューサウスウェールズ州オレンジ農業研究所・首席研究員（オーストラリア国）
研究題目：アジア・太平洋地域に優占する多年生雑草に関する生態的研究

受入教官：伊藤操子教授（農学専攻・雑草学）

氏名：**BARCLAY HUGH JOHON**
招聘期間：平成13年10月1日～平成14年9月30日
所属・職：カナダ森林局、カナダ森林研究所 研究官（カナダ国）
研究題目：森林における生態学的プロセスの理論研究
受入教官：武田博清教授（地域環境科学専攻・森林生態学）

講演会

演者 Nair Ramachandran Puthev-Krish 教授
（平成12年度客員教授）
演題 Directions in Agroforestry Research
日時 2000年10月24日

演者 Hester Randolph Thompson 教授
演題 Creating an Urban Greenbelt for Wildlife with People in Los Angeles
日時 2001年2月22日



Hester Randolph Thompson 教授

農学部国際交流ニュース

農学研究科博士後期課程編入学考査

平成13年度農学研究科博士後期課程編入学考査は、1月24・25日に行われ、21名が合格しました。このうち私費外国人留学生は、応用生命科学専攻1名（韓国）、応用生物科学専攻2名（韓国）、地域環境科学専攻3名（フィリピン・韓国）の合計6名でした。

農学部私費外国人特別選考試験

平成13年度私費外国人留学生特別選考試験は2月28日に行われ、5名の受験者があり、応用生命科学科（2名）と資源生物科学科（1名）に入学されることになりました。



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