Towards More Effective Meat Training in Europe: The ECCEAMST Approach

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INTRODUCTION

The fact that, in the framework of this presentation, if scientists are to be addressed on the issue of training in meat science and technology, this would seem to dictate a discussion on academic knowledge transfer. Yet the realization that many participants of this conference are university-employed and thus involved in preparing graduates for a career in meat industry practice, and the fact that other professionals are already in the thick of industrial activities, necessitates a more general approach. Although for an industry on a survival course, it is generally unfavorable to discuss investments altogether, I hope to make sufficiently clear in the following, why particularly investments in training are essential. For this purpose, I will freely cite from various contributions to conferences in Utrecht (Smulders, 1991) and Vienna (Smulders and Weijtens, 1995) organized by the European Consortium for Continuing Education in Advanced Meat Science and Technology (ECCEAMST). In addition, the infrastructure of the Consortium, its major activities, experiences and new initiatives will be discussed.

SOME INCENTIVES FOR FOCUSSING MORE ON TRAINING

Today's meat industry is under pressure. Over the past few decades, economy has changed from supply- to market-led and there are definite signs of market saturation; also, consumer attitudes have changed (Claus, 1991), the public image of the meat industry is suffering (Spitters et al., 1991), which is related to issues such as the ethics of production methods (Lister, 1991; Kauffman and Rutgers, 1991) and environmental protection (Skjerve et al., 1991). Vegetarianism is on the rise and in the industrial world, it becomes increasingly difficult to recruit a motivated work force. Whilst major meat exporting countries in the Western world suffer from this situation, it is becoming clearer that less-developed areas (such as China) might become self-sufficient (and possibly become significant competitors) in the not-too-distant future (Olesen, 1995). If the meat industry in the industrialized world hopes to remain successful, excellence in performance is required as a counterbalance mechanism.

To assure market competitiveness, quality strategies in the broadest sense of the word must be pursued. This implies that the quality of management and processing technologies (with keywords such as innovation and cost-efficiency) is very important. Particularly in countries with a large potential work force, it is sometimes argued that a 'defensive flexibility' approach relying on low wages, low skills and tight control of the labor population might be rather effective in ensuring continuation of high profits. If and when, however, such circumstances do not exist and/or the satisfaction of the individual worker is being taken into consideration (Tazelaar, 1987), it appears that survival and profitability in the meat industry hinges upon skillful personnel (Kempster, 1995).

On a European level, the afore-mentioned considerations have led to targeted initiatives. Answering the objectives of its third framework program, the EU set out to enforce the necessary scientific and technological basis for the European industry, to break down trade barriers, to bridge the gap between developed and less-developed areas within the EU (the 'cohesion' issue), to protect the environment and the quality of life, to initiate transnational activities in industry, and finally, to create a European dimension in the education and training in science and technology. Addressing the latter element, considerable 'pump-priming' grants were made available for networks of universities and training institutions on the one hand and enterprises (particularly of small and medium size) on the other, who committed themselves to the cause of effective knowledge transfer. In one such program, the COMmunity program for Education and Training in Technology (COMETT), special emphasis was laid upon the introduction of innovative (advanced) technologies. Under this program, ECCEAMST was called into being.

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TABLE 1 – ECCEAMST National Representatives.

Country	Contact Person	Organization	Phone No.	Fax No.
Austria	Dr. F. Bauer	University of Veterinary Medicine, Vienna	int-43-1-71155296	int-43-1-7149114
Belgium	Ir. F. Vanderdriessche	N.V. Imperial, Lovendegem	int-32-9-3700211	int-32-9-3725000
Denmark	Dr. A.J. Møller	Royal Veterinary and Agricultural University, Copenhagen	int-45-35283246	int-45-31870441
Finland	Prof.dr. H. Korkeala	College of Veterinary Medicine, Helsinki	int-358-0-3931702	int-358-0-3931718
France	Dr. C. Touraille	Nat. Inst. for Agro Research (INRA), Theix	int-33-73624000	int-33-73624450
Germany	Prof.dr. K.O. Honikel	Federal Meat Research Inst., Kulmbach	int-49-9221-8031	int-49-9221-803303
Greece	Prof.dr. C. Genigeorgis	Aristotelian University, Thessaloniki	int-30-31-999821	int-30-31-342143
Ireland	Prof.dr. J.D. Buckley	Univeristy College, Cork	int-353-21-276871	int-353-21-270213
Italy	Prof.dr. M. Severini	University of Perugia, Perugia	int-39-75-5853929	int-39-75-5853928
Norway	Ms. E. Hemmer	Polytechnic School for Food Trade	int-47-73914625	int-47-73902044
Portugal	Dr. A. Raimundo	Agricultural College of Santarém, Santerém	int-351-43-22087	int-351-43-20742
Spain	Dr. M. Prieto	University of León, León	int-34-87-291283	int-34-87-291284
Sweden	Dr. I. Hansson Dr. C. Lundström	Swedish University of Agricultural Sciences, Uppsala	int-46-18-671000	int-46-18-672995
The Netherlands	Drs. F. van Rossem	Bureau Van Rossem, Rijssen	int-31-5480-20789	int-31-5480-21834
United Kingdom	A.A. Taylor	University of Bristol	int-44-1934-852581	int-44-1934-852741

**Associated member-countries in Central and Eastern Europe are Hungary, Poland, Czechoslovakia*

A BRIEF HISTORY OF ECCEAMST AND DESCRIPTION OF ITS ACTIVITIES

Following a meeting in Paris in 1989, in which it was recognized that within the European programs for the Agrofood sector, the meat industry had failed in many ways to secure federal support (the literal phrase was 'the case of meat has not been well-presented'), representatives from six different countries investigated the possibilities to organize. Realizing the heterogeneity of the various European cultures in terms of language, regional attitudes and industrial achievement, it was nothing short of a miracle that agreement was reached so fast.

Consequently, in 1990 the European Consortium for Continuing Education in Advanced Meat Science and Technology (ECCEAMST) came into being. Inspired by the idealism of the founders, all 12 European member states, as well as 4 EFTA countries (Norway, Sweden, Finland and Austria) joined forces and the managerial infrastructure was decided upon. ECCEAMST is headquartered at Utrecht, where a team operates consisting of a general manager, a deputy-, and finance-manager, a European course coordinator, a secretary and a bookkeeper. ECCEAMST policies are decided upon by a Plenary Assembly of 16 National Representatives who meet regularly and who manage, on a national level, a European network of currently more than 350 partners from universities, research and training institutions, industry organizations and individual enterprises. A list of ECCEAMST National Representatives is included in Table 1.

ECCEAMST's endeavors in the field of knowledge transfer were subsequently recognized by the EU, which granted significant subsidies under the COMETT program. The following activities were focussed upon: i) a modest program of transnational exchange of students and personnel between

TABLE 2 – ECCEAMST Student/Personnel Exchanges 1991-1995.

Year	No. of Staff	No. of Students	Total
1991		3	3
1992		4	4
1993	1	16	17
1994		19	19
1995		13	13
Total	**1**	**54**	**55**

Country	Student/Pers. sent	Students/Pers. received
Austria	3	5
Belgium	–	3
Denmark	9	3
Finland	19	–
France	2	6 + 1 Pers.
Germany	1 + 1 Pers.	3
Greece	1	2
Ireland	2	5
Italy	2	4
Norway	–	–
Netherlands	5	16
Portugal	4	2
Spain	2	2
Sweden	–	1
UK	4	2
Total	**55**	**55**

TABLE 3 – Summary of Training Needs in Meat Science and Technology in Europe (December 1991).

	PRIORITY AREAS					
Priority*	**Primary Production**	**Slaughtering and Fresh Meat Technology**	**Meat Products Manufacture**	**Quality Assurance**	**Microbiology and Hygiene**	**Marketing and Trade, etc.**
1	Breeding/selection pigs	Refrigeration	New products development	Shelf life of meat products (microbial/ chemical)	Cleaning and disinfection	EU legislation
2	Breeding/selection cattle	Packaging technologies	Use/non-use of additives	HACCP (microbiological and sensory)	Rapid methods etc.	Marketing strategies (lean, convenience foods etc.)
3	Transgenic animal	Production control/plant logistics	Curing technology update	Raw materials: composition and hygiene	Building in safety etc.	Labelling (inform consumer of cholesterol, fat etc.)
4	Transport of animals over long distances	Automation/ robotics	Functional properties	Early prediction of carcass and meat quality	Elimination of pathogens etc (beef)	Cost optimization (farm through meat plant)
5	Advanced animal husbandry systems	Byproducts	Designing of shelf-table foods	Standardized methods of analysis (residue, species analysis, rapid methods)	Sanitation programs farm-processing	Environmental issues

**Priority assessed by more than 350 respondents from a list of 10 possible topics per problem area (1 = high, 5 = lower priority)*

universities and industry (Table 2), ii) conducting a training needs analysis (TNA) across Europe (Table 3), iii) the development and organizing of a coherent series of 'face-to-face' advanced courses in meat science and technology, addressing those training needs (The so-called CB courses; Table 4), iv) the development of long-distance training modules on selected issues (Table 5), and finally, v) organizing specific courses addressing issues of a more regional nature with the aim to bridge knowledge gaps (The so-called CA courses; Table 6). To secure dissemination of the developed course material, a series of five hardcover reference books and 14 soft-cover course proceedings were prepared or are in press (Table 7).

EXPERIENCES AND OBSERVATIONS, 1990-1995

Over the past few years, ECCEAMST has built up a sound managerial infrastructure, has developed a good reputation in Brussels, largely because of the performance of the various partners. Yet some of the partners are still 'silent' as opposed to the 'active' ones, who have engaged intensively in the knowledge transfer activities. There are various reasons for this. The economical circumstances in some European countries have resulted in lay-offs, for which reason enterprises were reluctant to receive exchange students or personnel. Also, some partner countries were afraid to lose their 'competitive edge' as knowledge was exported. Only gradually this attitude is changing, as one has come to realize that, by the same token, much valuable knowledge is imported. As far as financing the ECCEAMST activities is concerned, more than 60% of the costs are covered by the network partners themselves - in cash or in kind. In addition, to secure a more continuous financial basis, a membership fee has been introduced, which gives a partner the right to certain specific services (consultancy, advice on federal European 'subsidiology', membership conferences, quarterly newsletters, etc.). Still, national and federal European funding remains absolutely necessary to maintain the activities at the desired level. Incidentally, the arguments for continuing government support are abundant as discussed by Leemon (1995).

Courses were generally well-received, primarily as they addressed the training needs identified. Yet it must be realized that these may change rapidly, dependent as they are on European Agrofood policies and on the economy. One of ECCEAMST's major strategies is therefore to continuously monitor training needs. Unlike the situation in the US, Australia and New Zealand, the success of transnational European training efforts is quite dependent of the language problems. Even if the level aimed for over the past years was 'post-secondary' (BSc-level and up), suggesting sufficient knowledge of English (the chosen vehicle for ECCEAMST knowledge transfer), there is still reluctancy in some countries to communicate. Especially for the middle management levels now used to speaking a foreign language full of jargon, the chosen approach was sometimes experienced as an 'overshoot'. Simultaneous translations during ECCEAMST exercises could only partly solve the problem. As future ECCEAMST activities will cover all levels of training, new strategies are currently being developed. To accommodate the wishes of some enterprises, and the fact that they lack time, money or personnel to participate in 'face-to-face' course activities, long-distance training modules (books and

TABLE 4 – The ECCEAMST International CB-Course Program 1993-1995.

Country	Town	Date	Subject
Ireland	Dublin	January 28-29, 1993	New Meat Products
UK	Langford	September 7-8, 1993	Meat Quality Assurance
UK	Langford	September 9-10, 1993	New Developments in Meat Packaging
Netherlands	Utrecht	November 15-16, 1993	Cleaning and Disinfection Technologies
Germany	Kulmbach	November 29-Dec. 1, 1995	Additives: Legislation
Netherlands	Utrecht	April 6-7, 1994	Training the Trainers: Theoretical Issues
Denmark	Copenhagen	May 17-18, 1994	Advances in Meat Microbiology
France	Paris	June 27-29, 1994	New Developments in Meat Refrigeration
Netherlands	Zeist	September 5-6, 1995	Production Control: Plant Logistics
Austria	Vienna	October 3-6, 1994	Shelf Life of Meat
Belgium	Brussels	November 17-18, 1994	Curing Technology: An Update
UK	Warwickshire	January 17-18, 1995	Robotics and Automation
Sweden	Uppsala	March 24-25, 1995	Composition of Meat
Austria	Vienna	June 1-2, 1995	Meat Training for Europe
Denmark	Roskilde	June 9-10, 1995	Primary Production and Meat Quality
Italy	Parma	June 16-17, 1995	Functional Muscle Properties
Netherlands	Amersfoort	June 19-20, 1995	Meat Marketing Issues in Europe
Greece	Athens	June 25-27, 1995	Production of Meat Products and Convenience Food: Safety

video) have recently been developed in an English (pilot-) version, and specifically edited for use by middle-management. Several partners have already expressed interest to have these translated in their native language, provided additional European funding can be secured for this purpose.

ECCEAMST's observations on training largely confirm the viewpoints presented by Leemon (1995) and Kempster (1995), first, that effective training should be focused on a particular group, should address a particular level, have clear objectives and be presented in an interesting manner. Running an 'international show' and the fact that there was only limited opportunity for 'hands-on' exercises made the training material less suitable for middle and lower management. This was an obvious consequence of the choice to operate under the COMETT program, which was primarily intended for the academic level. As actions to put new technologies into industrial practice necessarily include familiarizing the people on the shop floor, specific programs had to be designed. The long-distance training modules were developed as a first attempt to address lower levels of education. Although such packages can be used for self-instruction, better results are expected when these are applied by professional trainers having access to in-plant training facilities.

In the future, ECCEAMST will pursue an integrated approach, covering the needs of university and research institution staff, and other industry organization and industry top management, R&D staff, quality assurance officers and shop floor managers and personnel. For training of each of these levels, different EU programs exist, supporting continuing education on academic and vocational levels. By carefully identifying the most suitable EU program (e.g. LEONARDO, SOCRATES, ADAPT, IMPACT, TEMPUS etc.), funding can be secured to effectively execute ECCEAMST's mission.

TABLE 5 – ECCEAMST's CA-Course Program 1991-1995.

Country	Town	Date	Subject
Spain	Valencia	April 29-30, 1991	Biotechnology, Genetic Manipulation of Microbial Cultures
Spain	Valencia	May 2-3, 1991	Muscle Enzymology
Italy	Perugia	May 8-9, 1992	Packaging of Fresh Meat and Poultry
Portugal	Lisbon	Dec. 9-12, 1992	Integrated Meat Safety and Quality Assurance
France	Clermont-Ferrand	May 24-28, 1993	Role of Proteinases in Muscle Development
Greece	Athens	June 27-30, 1993	Manufacturing of Meat Products
Netherlands	Utrecht	Oct. 11-15, 1993	Vet. Aspects of Meat Processing, Production and Inspection
France	Lyon	Feb. 22-24, 1995	Upgrading of Slaughter By-Products for Animal Nutrition
Netherlands	Utrecht	May 30-31, 1995	Cleaning and Disinfection: Specific Problems
Belgium	Brussels	Sept. 11-14, 1995	European Veterinary Legislation

TABLE 6 – Contents of the First Module of the ECCEAMST Long-Distance Training Package Series.

Package Contents	Objectives
1. Know about Meat Processing	Self-training for managers
2. Advanced Hygiene for Meat Processing	Course book
3. Portioning and Packaging Meat Products	Course book
4. Trainer's Guide	For those new to instruction
5. Video	For use with course books
6. Summary booklets (1 to 5)	To introduce all topics above
7. Transparency masters	For training shop floor workers

A SNEAK PREVIEW OF NEW INITIATIVES

At this point, it is essential to realize that ECCEAMST relies on intensive collaboration with the various national training bodies. Our primary function is to serve as a broker, aiming to initiate transnational cooperation in training. By networking, unnecessary overlaps in training activities are avoided and the available EU funding is most efficiently utilized. This mission also extends to collaboration with general Agrofood networks operating under various European programs. On a global scale, 'networking of networks' may prove very useful from a cost-efficiency viewpoint. Currently, ECCEAMST already collaborates with the Australian Meat Technology Pty.Ltd., identifying possible areas for cooperation in an attempt to be even more training- and cost-efficient. Fortunately, the EU has recognized the benefits of such actions. For example, bilateral support programs for transatlantic cooperation have been called into being (Anon., 1995), through which collaborative EU and US training initiatives could be formalized, which might ultimately lead to mutual recognition of the various training programs.

TABLE 7 – The ECCEAMST Books, Series and Proceedings.

Book/ Proc.	Title	Editor(s)	Year
Book 1	The European Meat Industry in the 1990's: Advanced Technologies, Product Quality and Consumer Acceptability	Frans J.M. Smulders	1991
Book 2	New Technologies for Meat and Meat Products: Fermentation and Starter Cultures, Muscle Enzymology and Meat Aging, Quality Control Systems	Frans J.M. Smulders, Fidel Toldrá, José Flores, Miguel Prieto	1992
Book 3	Expression of Tissue Proteinases and Regulation of Protein Degradation as Related to Meat Quality	Ahmed Ouali, Daniel I. Demeyer, Frans J.M. Smulders	1995
Book 4*	Meat Quality and Meat Packaging	Sandy A. Taylor, Antonio Raimundo, Maurizio Severini, Frans J.M. Smulders	1995
Book 5*	Veterinary Aspects of Meat Processing	Frans J.M. Smulders	1995
Proc.	Cleaning and Disinfection Technologies in the Meat Industry	Sara A. Burt	1995
Proc.	Upgrading of Slaughter By-Products for Animal Nutrition	Bert A.P. Urlings	1995
Proc.	New Challenges in Meat Hygiene: Specific Problems in Cleaning and Disinfection	Sara A. Burt and Friedrich Bauer	1995
Proc.	The Functionality of Meat Compounds	Joe D. Buickley and Karl O. Honikel	1995
Proc.	The Use of Additives in Meat Products Throughout Europe: Necessity, Customs, Legislation	Karl O. Honikel	1995
Proc.	Rapid Methods in Meat Microbiology	Niels Skovgaard, Mogens Jakobson	1995
Proc.	Meat and Refrigeration: New Developments	Jean-Dominique Daudin	1995
Proc.	Production Control and Plant Logistics	Michel W.H. den Reijer	1995
Proc.	Shelf Life of Meat and Meat Products: Quality Aspects, Chemistry, Microbiology, Technology	Friedrich Bauer and Sara A. Burt	1995
Proc.	Curing Technology for Cooked Pig Meat Products: An Update	Joseph Lenges, Marc Casteels, Liane Deweghe, Tim Nicolaï	1995
Proc.	Automation and Robotics in the Meat Industry	Tony J. Kempster	1995
Proc.	Composition of Meat in Relation to Processing, Nutritional and Sensory Quality: From Farm to Fork	Kerstin Lundström, Ingemar Hansson, Eva Wiklund	1995
Proc.	Meat Quality as Affected by Primary Production	Anders J. Møller, Martin M. Mielche, Patricia Barton-Gade	1995
Proc.	Meat Training for Europe: Making Training Effective	Frans J.M. Smulders, Martijn J.B.M. Weijtens	1995
Proc.	Marketing Meat in Europe: Strategies and Techniques for Today and Tomorrow	Pol L.C.M. Sala, Klaas C. Dijkstra	1995
Proc.	Production of Processed Meats and Convenience Foods	Constantin Genigeorgis	1995

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ECCEAMST has recently filed various applications under the LEONARDO program (1995). Activities suggested to the Brussels officials include, for instance, the provision of a new series of topical courses for various educational levels to be held across Europe, the development of a Hygiene and Safety training package for the work floor, the development of a highly interactive, internet-operated communication network ('MEATNET') with various useful elements (list services, various data-bases, 'who-is-who' guides etc.). It is expected that by the time these novel communication options have become common property, all parties in the meat trade (educators, scientists, industry) will come to rely on this service. Obviously, more traditional means for knowledge transfer (books, reference manuals, video etc.) will be provided when deemed necessary.

In conclusion, ECCEAMST is ready for the new challenges. If we can continue to rely on the idealism of its founders, the commitment of its partners, as well as on the continued support of national and federal European bodies, there is great hope that we can make meat training more effective. Should you be willing to be involved in our endeavors, please don't hesitate to contact us.

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COMMUNICATIONS SUMMARY

In recognition of the increasingly global nature of science and technology, this reciprocation session was held to illustrate the approach being taken to facilitate knowledge transfer on Meat Science and Technology within the European Union (EU). In addition, information was presented on an international directory of meat scientists which has recently been made available by the American Meat Science Association (AMSA).

ECCEAMST KNOWLEDGE TRANSFER ACTIVITIES

Much of the discussion focused on key attributes of a successful knowledge transfer program. These include having clearly defined objectives, tailoring instructional materials to a specified educational level and a particular group of employees (e.g. front-line managers versus line workers), and presenting the information in an interesting manner. In the case of the European Consortium for Continuing Education in Advanced Meat Science and Technology (ECCEAMST), the first step was to conduct an analysis of training needs across member countries. By targeting clearly-defined subjects identified by partners in the various member countries, it was possible to more effectively utilize limited resources. Further, the framework of the original EU program (COMETT) specified that knowledge transfer be aimed at individuals having an academic degree (Bachelor of Science or higher). This simplified the approach considerably, and allowed for the production of instructional materials in only one language (English). For instance, ECCEAMST has produced a series of hard-cover books covering proceedings from various symposia and meetings. These are designed principally for the post-graduate level senior R&D-type person and would be of little practical use to production foremen, for example.

More recently, ECCEAMST's activities have begun to address middle- and lower-level management. The development of training materials suitable for a multi-national group of such individuals having widely diverse cultural and educational backgrounds poses a considerable challenge. Production of "long-distance training modules" consisting of

video tapes and workbooks are one attempt to address the needs of individuals who are unlikely to attend multi-national symposia, due either to budgetary or work-related constraints. Video tapes are an especially promising means of knowledge transfer since one visual component can be produced and overlaid with "voice-overs" in various languages. It is felt that middle- and lower-level managers are a critical target audience for knowledge transfer since their opportunities for meat science-related training are often minimal, yet they are commonly called upon to explain things to subordinates. They are, in effect, the main conduit for routing science and technological information to the individuals actually engaged in producing meat and poultry products.

Provision of educational material to line workers must take into account not only varying educational backgrounds but also the fact that many workers are immigrants with limited command of the host country's language, especially in written form. In this case, and in the case of individuals who are functionally illiterate, we hope that a highly visually-oriented approach utilizing cartoons and other schematics, in conjunction with video tapes, may be capable of conveying the message.

One main focus of ECCEAMST has been to sponsor regional workshops to address "knowledge gaps" identified by Consortium partners. Tremendous effort is being expended across the EU to create a so-called "European dimension" in training and education. In this endeavor, it is desirable that Consortium partners freely share technical information. One means of doing this is to initiate exchanges between industry personnel and students in various EU countries. Thus far, 55 students have spent 3 to 12 months working in industry in another country. This not only works to the student's advantage, but also aids industry by providing a pool of well-trained students having practical experience under a variety of production conditions and a ready-made connection with industry in another EU country. Such inter-EU contacts are crucial in overcoming the perceived obstacle that sharing information puts one's company at a competitive disadvantage.

INTERNATIONAL DIRECTORY OF MEAT SCIENTISTS

The American Meat Science Association (AMSA) recently sponsored the development of an International Directory of Meat Scientists which is available on the Internet. For those meat scientists who do not have Internet access or who would like a printed copy of the directory, it is possible to obtain one for a minimal fee (see next column). It is hoped that the ready availability of this directory will facilitate communication between scientists working in different parts of the world and foster the exchange of ideas and information. Currently available via an Internet gopher, the directory may also be accessible via the World Wide Web in the future; this option would allow the directory to include photographs of meat scientists from around the world.

A brief introduction to the directory was presented during this reciprocation session. Discussion on the directory and other Internet resources centered on three main issues: privacy, widespread availability, and ways in which the Internet could be used to deliver information selectively to paying audiences.

The privacy issue revolved around a concern that anti-meat activists or similar individuals could easily download personal information (addresses, phone numbers, and so on) and subsequently target individual meat scientists identified via the electronic directory. While it was agreed that this was a potential problem, the fact remains that such information is already widely available to individuals outside the meat science community. A number of universities and research institutes conducting meat and animal science research already have staff directories (including specific research interests) accessible via the Internet. Further, computerized scanning capabilities already allow directories such as AMSA's to be digitized and widely distributed by any individuals so inclined. It was also emphasized that individuals providing information to the AMSA Directory do so voluntarily and are not obligated to provide any personal information unless they elect to do so.

While A.M.S.A. and the developers of the International Meat Scientist Directory recognize that not all meat scientists have access to Internet resources, the global nature of the Internet offers unique opportunities for making the directory accessible to everyone, regardless of Internet access. By placing the directory on Internet, it is possible for the directory to be continually updated as meat scientists change job positions, get new telephone numbers, etc. Keeping a directory current is always a challenge, and the Internet makes this process easy. Anyone desiring a printed copy need only contact Bob Kauffman at the address given below. Bob's colleagues at the University of Wisconsin-Madison (the organization responsible for developing and maintaining the directory) will provide a printed copy of the most current directory and arrange for shipping.

For more information, contact:

ECCEAMST
int-31-30-2534402 (phone), int-31-30-2511754 (fax), or by e-mail at u.e.t.p.ecceamst@pobox.ruu.nl

AMSA International Meat Scientist Directory

Internet access
Accessible by a gopher server with geographic access to other gopher servers: select "North America", then "U.S.A.," then "Wisconsin," then "University of Wisconsin-Madison (WiscINFO)." Now select "Access to WiscINFO Resources by Information Provider," then "Muscle Biology Laboratory," then the folder "A.M.S.A. International Meat Scientist Directory".

For a printed copy
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