TO CONVINCE A MULTITUDE

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Professor Soulsby, who was President of the Royal College of Veterinary Surgeons, 1984-85, is a distinguished veterinary scientist whose career has been divided between Great Britain and the United States. His 15 years as professor of parasitology at the University of Pennsylvania were sandwiched between two periods at Cambridge, whose veterinary school he now heads. Lord Soulsby is professor of animal pathology and Head of the Department of Clinical Veterinary Medicine, and he is active in identifying the potential for the role of veterinary medicine in society in the coming decade and into the 21st century. He is the first veterinary surgeon to be raised to the peerage.

Brevity is the soul of wit
Spinning out the time is but the weaving of a new sorrow
(Shakespeare, Hamlet II, 2.)

It would seem these days we have lost the art of brevity with well chosen words and we take longer and longer to get our message across to the multitude. A wise old man recently observed that the Lord’s Prayer has 56 words. Abraham Lincoln’s Gettysburg address took 270 words, the United States Declaration of Independence consisted of 1,322 to set off that nation on the right road and the Sermon on the Mount took some 2,600 words. One only need look at some minor government regulations, particularly one coming from the European Commission, to wonder just where we have gone wrong in clarity and conciseness of the written and spoken word and a resulting lack of conviction.

This conference is on animal health information and how to get it across to your disciples - how about a prize for brevity and eloquence? Lincoln said much by saying little, most politicians say little by speaking too much!!

I shall view with great interest the conclusions of the conference. The issues are so enormous and diverse in “Animal Health” one wonders just how one can convey, to the multitudes you serve, a proportionate impression of the information generated in this particular field.

A few years ago it was estimated that all knowledge doubled every 8.5 years. When we think about that statement, and it is now probably every 6 years or so that knowledge doubles, it is an awesome fact that in the span of all our individual lives more totally new information has been generated than ever existed and in a few years time completely new facts will dominate the spectrum of knowledge, not just a few but more than we have ever known!

May I begin with a consideration of teaching, teaching at all levels, but I am concerned particularly with University teaching, since here one is faced not only with the task of providing an excellent grounding in present knowledge, in order that individuals may be efficient veterinarians or livestock specialists but also to prepare them for the unknown or at least the semi-unknown. This is where basic science teaching comes into play. We must prepare people, students, for the unknown by teaching them how to assemble facts, handle data and make logical deductions. We need to produce graduates who are, amongst other things, numerate biologists and competent in information management.

We perceive this need against a general decline in book and journal expenditure in Universities in the United Kingdom. This is down some 30% per student in real terms over the last few years and students now purchase less books, down from an average of 7.4 to 5.8. An important reason given is that students can no longer afford to purchase books! Should this be remedied by expanding libraries? Libraries today serve mostly passive sources of information; they guide users to physical documents. But libraries of tomorrow will be able to ascertain the specific needs of users and then extract, assemble and assimilate relevant information and present it in an interactive manner.

But perhaps I am getting ahead of myself. I suppose the first question is whether we need animal health information specialists? I think we can conclude firmly that animals will be an important part of the agriculture and environmental scenes for several decades to come. In the United Kingdom 60% of all cultivated plant food, including grass, is fed to animals to be converted to milk or meat, and this is not too different elsewhere in Europe. Melby in the U.S.A., considering the future of veterinary science with respect to farm livestock, estimated that animal products supplied 2/3 of the protein, 1/3 of the energy and 1/2 of the fat of the nourishment of the 260 million people of the U.S.A. This is
not likely to change dramatically in the next 50 years.

In the Third World, the animal continues to play a crucial role in the total welfare of the community. It provides something in the order of 85% of energy inputs to agriculture by providing draught power in addition to being a provider of milk, meat and fuel. In these circumstances, the health of animals is imperative to the family unit and community. Neither, unfortunately, is this likely to change in the next 50 years!

What will change, must change, however, in the coming decades, is the way information is delivered to the animal health specialists.

Miss Benita Horder, Librarian of the Royal College of Veterinary Surgeons, has been kind enough to provide me with some idea of the database size for various agencies. For example, AGRICOLA from the U.S. National Agricultural Library at Beltsville has a database from 1970 to the present of 2.8 million records while BIOSIS Previews, 1969 to present, has 7.7 million records from 9,000 primary journals producing approximately 1/3 million items of original research. The CAB Abstracts has 4.7 million records from 1972 to present. CAB covers 8,500 journals and about 130,000 items indexed each year. Excerpta Medica 4.7 million items from 1974 to present covering 3,500 biomedical journals with 350,000 items per year.

Putting this in more simplified terms it means that approximately 1,000 publications are made daily in the biological sciences and assuming the various databases do not completely overlap it is possible that that figure is much higher, say 2,000 publications daily. Nor are we the only pebble on the database beach. There are many others. For example, the Motor Industry Research Association has a database of 35,000 documents. I fear to think what the total database is for all subjects. No wonder we say all knowledge doubles every 8 1/2 years!

How does one begin to handle such vast quantities of data?

Not too many years ago this was done by card index systems and there were various refinements of this with perforated cards and long needles to help separate the various items. This was the basis of the U.S. Department of Agriculture Index Catalogue of Medical and Veterinary Zoology, first published in 1902-1912 and then republished in 1932 onwards. This was discontinued a few years ago in what I consider to be one of the saddest decisions to be determined by financial exigencies in the biological field in the U.S.A. It is ironic that an indexing service should close when we are most concerned about systematic biology and the reports on new species, new adaptations and new hosts and geographical distributions are essential to an understanding of the epidemiology of animal disease, especially exotic diseases and their spread owing to the "greenhouse" effect. The Index Catalogue was available free to all and no self respecting parasitologist would be without a set. Indeed it was the start of one's library and reprint collection. Reprints were traditionally an invaluable part of one's scientific base: somewhere I have 16,000 reprints carefully catalogued with appropriate index cards, but with the advent of databases on disc with immediate electronic access one needs a computer only. The days of reprint exchange and lovingly cataloguing them are like the quill pen, a fond and forlorn memory.

In addressing information specialists and how they do their work one needs to ask who generates all the information in the first place: research scientists largely with a sprinkling of other communicators. The recent reduction in research budgets has produced the concept of research selectivity now being used to determine funding in University departments. This has led to the new science of bibliometric analyses. There are many criteria capable of being used including the citation index-how many times your article is cited. It is a good idea to have a good supply of research students all of whom cite your seminal work many times!

The breadth of citation i.e. the citation outwith the immediate disciplinary journals, is an indication of the impact of specific journals on the discipline. For example, in 1980, of the total of 5.3 million citations by the Institute of Scientific Information, 44,000 or 0.8% were veterinary core and 5 journals accounted for 51% of these citations. These journals published 25% of all veterinary papers in 1980.

There are now indices and factors - impact factor, immediacy index, for example, - which can be used to assess quality of publication and some organisations can quantify in financial terms the cost of a publication. This in the AFRC is about £25,000 per paper. One should be careful, of course, not to spring the trap of knowing the cost of everything but the value of nothing!

The evaluation of research has included the item of "measure of esteem" one of which is that an invita-
The classical scene is the monographic series. In my own subject, the Soviet Union did it so well. Twenty-two volumes on the flukes, and similar volumes on the nematodes and tapeworms. The various series of "Advances in Veterinary Science" or other subjects, I believe, provides remarkable informative and important updates. I hope they will continue in some form since when well done they provide an excellent insight to a subject. Those in the Veterinary Bulletin I commend particularly for perusal.

The new developments in animal sciences identify particularly the need for individuals able to integrate vastly disparate information into a viable whole for both the scientist and the general public. Here one thinks of the environmental priorities, sustainable development, the role of agriculture and others in this multifactorial complexity. One of the criticisms of the directives from Brussels is that they show little evidence of integrative thinking of how for example in our own field, to put together modern trends in agriculture, nitrogen usage, methane production and various green issues.

But assessing consumer attitudes to new technologies in food production is an area not to be ignored. To the lay person scientific and technological advances increasingly are poorly understood and indeed misunderstood.

Psychometric studies of attitudes towards risks and benefits can be expressed in two dimensions - one the unknown or unfamiliar and the other the fear or dread. Some of the factors producing positive concern in both these dimensions are veterinary drug residues, genetic manipulation, hormone residues, etc.

There is clearly a need for animal health information specialists to consider not only the provision of information to the scientists, but also to the lay public to allay fears and properly to inform.

At a more scientific level there is the integrative area of biotechnology serving so many areas of science: biological genetic and otherwise. To comprehend such developments and to find useful and applicable information to ones own area of interest is difficult and could not readily be achieved by what one might call the standard methods.

It is here where new developments in information presentation and handling are essential and only the computer based systems will allow this. I am impressed by the interactive systems which allow access to supportive information by the use of a typewriter keyboard. Examples of such are Compact Disc - Read Only Memory (CD-ROM) technology which makes available 20 years abstracts and citations in a single format compatible with a personal computer. These interactive video systems are an essential future development in teaching and I believe they will become a regular and essential component of the working specialist.

Of course the labour intensive part of such developments is the programming of data. But that is likely to be solved by the author of research and development information doing the coding himself, perhaps by some form of barcode which will be inserted into a larger system once accepted for publication.

One area where the provision of animal health information in a timely and effective manner is needed is in the developing world. It is possible that with the marked developments in satellite transmission this will present no technical problem but there will always be one of the economic cost of such systems and the provision of them in a language known by the recipients and to the man on the spot. Indeed I perceive that one of the most effective overseas aid programmes may well be the provision of a communications system to permit ready access to knowledge on animal health and related matters.

As a concluding comment I observe that with all this new and wonderful gadgetry of computers, interactive systems etc., we have not developed new methods of learning. We have maximized the techniques available but we have not greatly improved the rate of learning. We still believe it takes 5 or 6 years to become a veterinarian, a doctor or whatever years to become an architect, lawyer or accountant. Why should it be limited? If a person can meet the requirements of 5 years in say, 3 years why should he/she not complete course requirements in that time.

Perhaps we are already at a maximum learning rate, not a capacity. But I do not believe this either is so or provides an answer to the question.

We still need to convince a multitude and perhaps brevity through well chosen words or electronic symbols will provide the way.