Gaelic poetry for deaf seagulls — encore¹

by G.L. Baskerville²

Despite a rapidly growing scientific literature, there are a host of forestry problems which beg better grounding in science. There is general agreement on the need for more cost-effective use of forest resources, while at the same time having lighter environmental impacts. Practitioners complain that existing research is not applicable, and researchers lament that managers are not making use of the science already available. This situation stems not from an absence of research, or from a resistance to using research, so much as it stems from a weak effort on the part of researchers, and on the part of practitioners, to establish a functional match between research and the operational issues and problems in the first instance.

Improving the functional linkage of research to the context of problems faced by the practitioner would improve the state of forestry, and, thereby the willingness of forestry agencies to support forest research. This problem of communication between scientists (especially those in universities) and funding agencies, has been characterized as being similar to "reading Gaelic poetry to deaf seagulls" (Larkin and Pallister 1976). It is a minor step to extend that notion to include communication between scientists and the people who must design and implement solutions to problems in the forest.

There is no lack of activity. Both the operational and the research elements of the Canadian forestry community are active. The operational side produces and markets quality products, in abundance. Out in the woods last year some 14,000 logging operations were conducted across the country, some 4600 plantations were created across the country, some 2000 spacing operations were undertaken in natural regeneration across the country.

The Canadian forest research community is also active — last year some 390 papers were published in the *Canadian Journal of Forest Research* and *The Forestry Chronicle*, last year a further 350 research notes/papers were issued by federal and provincial agencies, last year all that research reporting amounted to some 7000 pages.

Last year for every logging operation in Canada there was about 0.5 page of research reported in the Canadian research literature; for every plantation created there were about 1.5 pages of research reported in Canadian research literature; for every spacing operation undertaken in Canada there were about 3.5 pages of research in the Canadian research literature; for all kinds of operations combined last year, there was about one-third of a page in the Canadian research literature for each action in the woods.

While no one would suggest that all research can or should address all problems, those simple calculations must cause wonder about the frequent observations that the practice of forestry in Canada, whether by a provincial government, or by industry,

is not sufficiently informed by science. Particularly, it is rare that a research paper does not claim "this information is needed to manage the forests of Canada", and it is an equally rare practitioner who does not assert that "this is the best that can be done on this job given the current state of knowledge".

The problem. The paradox of having a rich literature, while still lacking usable answers, is related to the degree to which the worlds of the creators of forest research, and the users of forest research, are insular. Scientists work in an environment where it is possible to define a research problem without ever confronting the problem in its real operational form, or even talking to the people who must, in reality, solve the problem in its real world context. Once the problem has been chosen, it is customary to do a literature review, design the study, gather data, write it up, have it peer-reviewed, and published. All of this can be done without contact between the researcher and the practitioner who is supposed, ultimately, to use the information to solve the (somewhat) related problem in its real world context.

As a result, it is not uncommon for a research solution to a forestry problem to be published without ever having been subjected to *realistic* review at any stage by people who are expected to use the new science to solve their actual problem in their specific forest.

Practitioners also have a tendency to operate in their own job environment cocoon. Because timeliness of response tends to be an imperative in their world, practitioners attack each problem with whatever tools, of whatever scientific quality, are at hand — now. In practical settings, actions often must be taken when the situation is right, and if not taken then, cannot be taken at all. It is said there is no time to dig through the scientific literature in sufficient depth to interpret the pieces scattered in various papers into a usable whole in context for each real world problem. Not surprisingly, what passes as a cost-effective action in the forest often appears to be a less efficient solution than examination of the scientific literature indicates is possible.

If it is clear that most forest research is not used (not usable) in practice, it equally is clear this is because *neither the scientist, nor the practitioner*, took the necessary time and effort to arrive at an *operational statement* of the problem to be solved.

Perspectives on a problem. The mismatch of perspectives of research with those of practice can be characterized using an idea from Levins (1966). He suggested each model or research strategy has, to some degree, three properties in relation to the real subject. These are: generality of application, the degree of functional realism in the representation of the problem, and precision of expression. It was the contention of Levins, and it is my experience, that these three properties tend to be mutually exclusive in working with natural systems. That is, in any abstraction of nature it is not possible to maximize simultaneously the generality of application, the functional realism, and the precision of expression, for any particular problem. This is true whether one speaks of a research project, or the solution of a practical problem in the field.

¹Based on a presentation at a workshop on research funding, Vancouver, BC.

²Department of Forest Resources Management, Faculty of Forestry, University of British Columbia, Vancouver, British Columbia, Canada V6T 1Z4.

Figure 1. The conflicting properties of a problem and of its solution.

Figure 2. The trade-off amongst the three properties for a good solution as seen by researchers and by practitioners.

The problem is conveniently shown in a triangle with scales from "least" to "most" for each property (Fig. 1). In this framework, it is clear that any characterization of a practical problem, and any scientific solution to that problem, is in fact a trade-off amongst generality of application, functional realism, and precision of expression. There is a wide array of possible combinations of these properties for any issue, but each scientific solution has some limitation as to the set of situations to which it applies, the realism with which it mimics function in that set of situations, and the precision with which it reflects that set of situations. Similarly, each solution created by a practitioner has some limitation as to the set of situations to which it applies, its assumptions with respect to functional cause-effect connections, and the precision of its expression.

Bridging. The problem of creating a workable match between the research and operational perspectives on a forestry problem is easily seen (Fig. 2). For a given topic, the nature of the peer review system in the research community drives the communication of science into the shaded area indicated to the left in the figure. Here the trade-off generally is struck by giving up generality of application and functional realism in order to achieve greater precision of expression. By contrast, the practicalities of designing solutions in the forest result in the practitioner perspective on the same topic falling in the shaded area to the right in the figure. The emphasis sought by practitioners is for the applied cause to create the sought after effect, over the range of conditions in which their problem must be solved. To them, precision is more or less an academic issue.

The message here is simple: a researcher, especially one who is seeking to publish in peer-reviewed literature, is unlikely to define a problem with respect to these three properties in a format usable by a practitioner, particularly one who is seeking to intervene in natural dynamics on a landscape to achieve a specified future condition for a specified cost. A practitioner reading the scientific literature will be frustrated by the absence of a context in terms of generality, functionality, and precision consistent with the way he faces these properties in his domain.

Traditional approaches to research funding may not contribute to the solution of real problems in our forests in the way we expect (Fig. 2). Indeed, the figure indicates why traditional research

and practical problem solving often seem to run on non-converging tracks. This leaves practitioners increasingly skeptical about funding research, or even about seriously discussing research needs. Yet, *a key ingredient in the identification of research for solving practical problems is the thoughtful participation of the person who ultimately must implement the sought after solution.*

Given the range of problems that bedevil the achievement of sustainability, there is an urgent need to establish an overlap of perspective on problems as seen by these two groups, who use *different contexts* to place value on research. There is unlikely to be either the desired increase in the applicability of research, or of the use of research, or the desired increase in industrial participation in research support until this happens. The way out of this conundrum involves a substantial shift in the *nature of communication* between researchers and the people who must solve the real problems in their real contexts. The *location of the problem*, and therefore of its solution, in the triangle is not a matter of choice. Thus, *to be effective*, research must match the problem, *even if that means having less than full scientific precision and elegance.* The location of a problem can be made to migrate in the triangle over time, *only* if usable science and technology facilitate actions *that change the problem*, thus leading to a "new improved" version of the problem requiring new improved science for a *workable* solution.

The message. Making research match real problems requires clear/honest/blunt communication. At present, both sides seem quick to demean the other as unknowing with respect to what is *really* important, and communication between the two perspectives is commonly perfunctory. To change this, researchers need to talk to the people with the problems long enough, and in enough detail, to discover what incremental piece of science *presented in what form* could actually assist the practitioner in solving a particular problem. At the outset, practitioners need to be (much) more honest in their appraisal of the applicability of results from proposed research, and they need to be more willing to devote the time necessary to reach, with the researcher, a practically appropriate trade-off amongst generality of application, functional realism, and precision of expression *before* the research is undertaken.

Making research match real problems requires substantive interaction between the scientist and the person who must solve the problem in its real form. For successful communication, the objectives of *both* parties must be to cast the real problem in a format where the *specific* limitations of knowledge that prevent a better solution with existing information are identified, and then systematically removed by research.

Scientists who want to remain above all the messy application stuff, and practitioners who do not want to deal with narrow scientists, will always be part of the community. They are, as well, part of the problem, and not part of the solution.

Making research match the problem requires researchers and practitioners to communicate, more or less continually, in

sufficient depth so that *it is possible to arrive at a science-based solution that is applicable*. In this case, application should lead to further intercourse as the problem changes over time in response to interventions to solve it. With each successful "solution", the problem will be partially solved, altered, and more defined, and the practitioner will be more willing to fund research.

References

- Larkin, P. and A.E. Pallister 1976.** Gaelic poetry for deaf seagulls — an essay on research funding. *Issues in Canadian Science Policy* 2: 3-11.
- Levins, R. 1966.** Strategy of model building in population biology. *Am. Sci.* 54: 421-431.

Frais d'adhésion 1994-1995

Membre actif

Première et deuxième année suivant la graduation (graduation de 1993 et de 1992) *(2.49 \$ de T.P.S. inclus)	89.00 \$
Nouveau membre pour une première année *(2.49 \$ de T.P.S. inclus)	89.00 \$
Marié ou équivalent Deuxième adhésion seulement *(2.49 \$ de T.P.S. inclus)	89.00 \$
Tout autre membre actif *(2.49 \$ de T.P.S. inclus)	125.00 \$

Autres catégories de membres

Membre à la retraite (afin d'obtenir le statut de membre à la retraite, ce dernier doit être membre de l'Institut depuis quinze ans) *(2.49 \$ de T.P.S. inclus)	40.00 \$
Membre étudiant *(1.31 \$ de T.P.S. inclus)	20.00 \$
Membre de soutien (membre de l'IFC/CIF)	42.00 \$
Membre corporatif *(4.98 \$ de T.P.S. inclus)	260.00 \$

Suite à une demande écrite, le conjoint d'un membre actif peut obtenir une réduction de ses frais d'adhésion en fonction d'un montant déterminé annuellement. Les membres conjoints sont membres d'une même section, demeurent ensemble en tant que conjoints et utilisent la même adresse postale.

L'année budgétaire de l'Institut débute le 1er juillet pour se terminer le 30 juin. Les demandes d'adhésion effectuées après le 1er janvier 1995, seront facturées à la moitié des frais d'adhésion de l'Institut pour l'année en cours. Aucun frais d'adhésion ne sera facturé au membre soumettant une demande après le 1er avril pour la durée de l'année en cours.

Le frais de section s'additionnent à ce montant et varient de 5.00 \$ à 30.00 \$ pour l'année budgétaire de l'Institut.

***N.B.:** La portion des frais d'adhésion couvrant les frais du Forestry Chronicle est assujettie à la T.P.S. Pour les fins de la taxe, ce coût est calculé sur une base de 38.00 \$ et correspond à 2.49 \$ de T.P.S. (sauf pour le taux étudiant de 20.00 \$, soit 1.31 \$ de T.P.S.)