Canada has tremendous forest wealth. I think we should always bear this in mind, before considering the recommendation of any silvicultural policy, which might, among other things, impose increasing costs upon our industry, and which, in view of this wealth, might hardly be considered as justifiable.

I have a dim recollection of an article which was published in the Canadian Pulp & Paper Magazine a few years ago; it was written by the late Professor N. M. Millar, and was entitled "Let's Beat the Bugs to It." It seems to me that there was a wealth of good advice in that title, let alone the article itself.

I myself have heard the following, addressed to foresters or would-be foresters: "I would have you go forth as John the Baptist crying in the wilderness." When one sees the mass of regeneration struggling for release in these northern forests, one thinks more of Moses who delivered the children of Israel out of the house of bondage.

Moderation must be one of our guiding principles, and Mr. Roy points this out admirably, as he checkmates any tendency towards technical fanaticism. I will quote from Mr. Roy's paper:—

"Laying hard and fast rules to apply to extensive and non-uniform areas will never do, either from the point of view of extraction or of silviculture."

In conclusion, it is only fair to point out that in this northern forest, there is one fact which acts as a cooling balm to any harassed forester, who is attempting to apply some method of silviculture. I can do no better than to quote again from Mr. Roy's paper:—

"Spruce and Balsam are naturally good reproducing species under the climatic and edaphic conditions of the Province, and even under harsh treatment or no silviculture at all they will continue to be dominants in our northern coniferous forest."

I have no doubt that many of my observations and remarks are of a decidedly controversial nature. But it seems to me that controversy will always be the rule, until definite results are forthcoming, based upon local experience, and obtained throughout a whole rotation.

The figures on growth, regeneration, composition and distribution of types, etc., are based on data obtained from the files of Price Brothers & Company, Limited. For the interpretation of these figures, the writer alone is responsible.

Grateful acknowledgment is hereby made to Price Brothers & Company, Limited, for their kind permission to use these data.

ONTARIO—J. B. MILLAR

By JOHN RAEBURN,

North Star Lumber Co., Two Harbours, Mich.

In Mr. Millar's paper, he modestly refers to the theoretical nature of his suggestions for cutting methods to obtain better spruce regeneration. They at least represent the most advanced thought in the area to which they apply, and it seems that none of the rest of us will be able to give him much of an argument along these lines.

He suggests that experimental cuttings of this nature might form a basis for logging procedure ten to twenty years hence. I would support Mr. Henri Roy's view that the time to begin this sort of thing is now.

This necessity is particularly pressing in Minnesota, where remaining available spruce stumpage is rapidly disappearing. Further, if we as timber owners and operators do not act, we are faced with the prospect of extensive governmental regulation of cutting on private lands. The United States Forest Service has just made such proposals at Washington, in hearing before the joint committee of the Congress and Senate on Forestry.

Stringent cutting regulations, requiring various degrees and methods of partial cutting, have been in force for some years on sales of federal timber, usually small areas. Such may be all very well for experimental purposes, but when applied over a large area, are usually too inflexible, not sufficiently modified to suit local conditions.

Some mills in Minnesota are not much interested in spruce for the future. They are changing over more and more to the use of jack pine and poplar, planning to draw their future supply of these woods from small farmer producers and woodlot owners within a radius of 30 miles of the mill. Reference to a similar situation was made in Mr. Long's paper on the Maritimes.

But as Mr. Millar says, some mills do want spruce and apparently are willing to pay for it. Our cutting methods and procedure are limited by the factor of cost. Many mills in Wisconsin, to which we ship wood, also draw a considerable part of their supply from this side. We have to compete with Canadian wood, produced on areas where little or no regulation of cutting is in force.

What then can we do to get spruce regeneration? What are the possibilities before us in cutting practice and subsequent treatment? Whatever we do must be done on a hard "dirt" or dollars-and-cents basis. Far better to do it ourselves than do it under inflexible government regulations which might be very sound technically but have little or no consideration for practical logging problems and market conditions.

There seems to be room for a good deal more of experimental work in cutting procedure on a practical basis, by government agencies on both sides of the line. Referring to my own company, our outlook is based on regeneration and growth studies of cut-over areas in our locality. This work is recent, and not sufficiently extensive to give at this time final results and conclusions.

Preliminary results, however, are very much in agreement with Mr. Millar's conclusions. Our situation differs in that the highland mixed type is our most important and extensive forest type occupying approximately 70 per cent. of our area, with spruce slope, and spruce flat or swamp types in a minor position.

Briefly, our preliminary work has indicated that areas clear cut 15 years ago now are 65 per cent. stocked for the mixed type and 82 per cent. for the slope type. Stocking was determined by the quad system developed by Mr. Millar, except that, since area of our sample was small, we tallied each tree on every quad, instead of every tenth quad. Approximately 85 per cent. of the total regeneration in both types is balsam.

Mr. Phelps in the west has found that if spruce regeneration is desired, good fire protection is not enough. Evidently the same is true with us. Possibilities open to us without getting into over-elaborate and costly procedure are largely those suggested by Mr. Millar. We found about two cords of

merchantable wood per acre on 15-year old cuts studied, all resulting from advance growth, stuff just under merchantable size at time of cutting. Since 75 per cent. of this was spruce, we are impressed with the advisability of raising the diameter limit on spruce. In other words, leave the 4's and 5's standing. If marking timber is too expensive, we can try instructing the cutters, and increase supervision somewhat.

If we can simultaneously weed out balsam, say, to a 2½ or 3-inch top, so much the better. A good deal of our area is cut by shackers who live right on the ground. This is necessary because of the patchwork ownership pattern of lands on which our operations are based. We do not have large solid blocks of timber such as are found in Canada. Shackers can and do cut low cordage areas successfully, a favourable factor in possible partial cutting.

We have no more than thought of broadcast seeding and shall follow with interest the broadcast seeding experiments before and after cutting, to which reference was made to-day.

We could possibly do something with slash, but certainly nothing more elaborate than lopping. In time, some planting may be advisable on that portion of cut-over areas that does not naturally restock. We hope this will not be necessary.

It is probable that a thinning could be made on 15-year old young growth areas in our locality to further increase the percentage of spruce in the young stand at the expense of balsam.

THE PRAIRIE PROVINCES—V. H. PHELPS

By E. H. ROBERTS AND H. P. EISLER,

Department of Natural Resources, Saskatchewan

We wish to compliment Mr. Phelps for his very excellent paper and the many important points brought out by the study. It is only by such research method and the determination of actual conditions past and present that it will be possible to arrive at any adequate silvicultural management plans for the future. Due to the many factors that must be considered, as Mr. Phelps points out, we will not attempt to cover the whole field as there are no doubt many others better qualified to comment on the entomological, pathological, biological and soil factors involved.

We present herewith general comments on the outstanding features of the study that appear to us as most important concerning the undisturbed and disturbed stands followed by observations on type of seedbed, climate, logging methods and suggested additional studies.

Mr. Phelps' paper on spruce regeneration in the prairies brings out the following points:

1. In both the undisturbed and logged-over stands, the occurrence of spruce reproduction is best in the coniferous type, somewhat less in the mixed-wood type and poorest in the hardwood type. However, only 28 per cent. of the plots in the undisturbed stands of Manitoba and only 40 per cent. of the undisturbed stands of Saskatchewan showed any reproduction. In the logged over stands, up to 70 per cent. showed some regeneration but