

such as ethanol from crops. In brief, approximately the same amount of energy is required to grow the crops and convert them to ethanol as is contained in the ethanol itself. But surely this is begging the question; if one has a great deal of difficulty in determining whether a process produces any net energy at all, it is obviously not an alternative which holds much promise for solving energy problems. There is, however, no question about the net energy balance involved in the "fuel" people use; food is essential for survival.

These arguments are countered by those who say the protein content of food crops is not consumed or damaged during fermentation and that developing new and marginal lands for energy crop production may actually increase the world's net amount of disposable protein. Furthermore, they state that this is more to the point since the world is starved of protein, not carbohydrate. The argument sounds convincing — at first — but further thought raises some serious doubts. This scenario would probably not, in fact, ever come about because the protein-containing dry distiller's grains produced during fermentation will almost certainly be used for animal feed in the developed countries producing ethanol. In fact, it is unlikely the protein would ever reach those peoples who desperately require it, at least not as long as the developed world continues to demand a large quantity of *animal* protein in its diet.

It appears that regardless of how attractive the biomass energy route appears to some, producing

energy products from food crops on a broad scale will almost certainly lead to increased prices for agricultural products and to world shortages of food. It will probably never do a great deal to mitigate the oil crisis the world is caught up in now, and it will almost certainly exacerbate the food crisis the world is sure to experience in a not-too-distant tomorrow. Energy can be derived from a variety of sources and can be distributed and consumed in the form of a variety of energy currencies. The question thus arises: Why use the food resource, which is essential for one purpose — namely providing sustenance for the human race — for a purpose such as providing energy, when there are alternatives for the latter? One aim of proper resource management should always be to fit the resource to the end-use required. This basic principle may be violated in turning food crops into energy crops.

On the other hand, energy from *cellulosic* biomass, particularly wood, is an attractive alternative energy opportunity in Canada and seems well-suited to making a significant contribution to energy supplies. This is why in *Alternative Energy Sources, Currencies and Technologies* the Committee recommends that Canada develop methanol from cellulosic biomass rather than ethanol from food crops, for use as a fuel in the transportation sector. (The promise of producing ethanol from cellulose is also attractive but this process requires further R&D at the present time.)