In September of this year John Warnow and Mathew Rubin took a four day tour of the La Grande hydroelectric project in Quebec, Canada. The following is a report of their trip and some observations based on what they learned.

Eight hundred miles north of Vermont, just east of Hudson Bay, one of the largest hydroelectric facilities in the world is being constructed. The region north of Quebec has huge hydroelectric potential to serve not only the Province, but populations the size of New York or New England and more.

The La Grande Complex, sometimes called the James Bay project, will eventually produce as much power as 20 Vermont Yankee nuclear power plants. La Grande is Canada's response to OPEC. The following is a description of the James Bay project, some of the known effects it will have on the region, and some of the questions it raises for Vermont.

The dams at James Bay – such as the one above on the Caniapiscau River – are earth-filled structures, carefully constructed banks of sand, gravel, rock, and clay laid across the bedrock of a river usually at its rapids. The dam on the Caniapiscau is two miles long and 180 feet high.

The Environment Considered

The natural environment of the James Bay region will be altered dramatically. But it appears that very little has been done to mitigate the possible ecological consequences or to even understand what those consequences might be.

The native populations will be the first to feel the environmental impact of damming the La Grande. The seven thousand Cree Indians who live in the James Bay territory depend largely on the wild animals and fish for their food supply. Beaver, moose, and other riverine life will be wiped out when the project inundates their habitat. The decaying vegetation in the flooded reservoirs will consume all the oxygen for at least two years, effectively eliminating any fish life in the man-made lakes. The damming of the river will also reduce stream flow and permit salt water from James Bay to come 20 miles upstream making the Cree villages at the mouth of the river uninhabitable. Water tables are expected to rise in many places and be lowered in others with the flooding of 4600 square miles to depths of hundreds of feet.

continued on page 2

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November/December 1979
Vermont Natural Resources Council

Hydro Quebec
A Power Play
John Warnow/Mathew Rubin

The Malls Come to Berlin
Betsy Brent

In 1977 the District 4 Environmental Commission was handed a monumental task when the Pyramid Company of New York applied for an Act 250 permit to build a 400,000 square foot shopping mall in the Town of Williston. During the Pyramid hearings, it was rumored that another shopping center developer was preparing to submit an application to the Commission. The thought of the lay-commissioners trying to cope with two applications for large-scale developments was a nightmare. Unfortunately, what was a bad dream for Williston is now a reality for the Town of Berlin.

Located in central Vermont, Berlin has experienced rapid commercial growth over the last 10 years. Along the road that runs between Barre and Montpelier, the town has two shopping centers, a large discount store, three fast-food franchises, a bowling alley, two car dealerships, and many smaller businesses. Now two major shopping center developers - Juster Associates of Yonkers, New York, and Developers Diversified of Cleveland, Ohio, - want to build regional malls in Berlin.

Juster Associates filed an Act 250 application with the District 5 Environmental Commission last winter requesting permission to build a 30 store mall on 20 acres of land located directly across the road from Central Vermont Hospital. The mall would cover 196,000 square feet and have parking for 1,200 cars. Juster, a major developer with shopping centers from Maine to Florida, has two malls in Vermont – the Rutland Mall and Burlington Plaza.

Pre-hearings for the Juster application were held this summer. Among the parties granted status in the Hearing were the neighboring towns of Barre and Montpelier, Central Vermont Regional Planning Commission, adjoining landowners, and a local, anti-mall group, Citizens for Vital Communities (CVC).

Developers Diversified, with 125 malls across the country, just recently filed an Act 250 application for a mall slightly larger than Juster's. The shopping center
Hydropower

The budget for all environmental work, including studies, monitoring, and reclamation, totals less than one-half of one per cent of the total funds spent on the project. Monthly monitoring of water quality, flora and fauna was started two and one-half years after construction began in 1973.

Similarly, river flow information is sketchy prior to 1973. The reservoir behind the largest power house, La Grande II, was due to fill by June of 1980. It filled seven months early because of the large spring rains. The spillways on the dams have been designed, according to the La Grande engineers, to handle the worst floods that could happen in 10,000 years. Because the dams have been designed in accordance with all the rules of the art - the designs reviewed, the construction closely supervised, and monitoring instruments installed - neither Hydro Quebec, the provincially owned utility building the project, nor the James Bay Energy Company, the wholly owned supervisory authority, has conducted any official study of the possibility of a dam rupture at the La Grande Complex. The engineers say that the life of the project is "extensive."

The technological development that made the project feasible was the perfecting of the 735,000 volt (kV) transmission lines built in the 1960's. These lines can carry large amounts of electricity long distances at low loss. The five lines running to James Bay from southern Quebec cost almost $4 billion. The lines are several times the size of the largest lines, $45 kV, now in Vermont. Each tower is 135 feet tall, and 90 feet wide. The towers support three cables which hang from insulators 14 feet long. A fleet of towers can carry the power of four Vermont Yankees, and needs a corridor 100 yards wide. "In damp weather," an engineer at Hydro Quebec commented, "the lines light up like Christmas trees from the corona charge." [The corona charge is a glow adjacent to the surface of electrical conductors at high voltage.] Each line will carry $400 million worth of electricity a year.

The Economic Equation

The construction at James Bay is out of scale, some believe, for Quebec, a province of only 6.3 million people. La Grande Complex, Phase I, will double the amount of electricity produced in the Province. Nineteen per cent of the region's electricity now comes from hydro sources. And although the provincial government is encouraging the use of electric heat, there are reasons to believe their growth projections are too high. It is likely that even in the winter months the amount of electricity produced will surpass the needs of Quebec's population.

What is not used will be available for export. The fact that 60% of the capital for the project was borrowed in the United States suggests that Quebec will need to export electricity to pay U.S. bondholders.

More than one-third of all construction in Quebec occurs at James Bay. In the rest of the province unemployment is high, and business is not investing because of the political situation vis-a-vis separatism. The work itself and its continuation are vital to the economy of Quebec. Moreover, the proposed expansion of the project will generate an even larger exportable surplus.

The electricity from La Grande is due to cost 2.9 cents per kwh, wholesale. This will be a bargain price for electricity in the early 1980's. Present sources for Vermont average 2.3 cents per kwh. Vermont Yankee costs 1.9 cents, Seabrook is estimated to cost more than 5 cents per kwh. Quebec recently agreed to sell Vermont 52 megawatts of power, but only on an interruptable basis, and only until 1985.

New York State is the principal customer for Hydro Quebec's surplus. New York needs electricity especially in the summer for its air conditioners. Quebec peaks in winter, and so has extra power to sell in the warmer months.

One 735 kV transmission line, placed in service in 1978, runs between Massena, New York, and Montreal. A second line was planned, but was dropped because of public opposition. Now, New York has suggested that Vermont run a 735 kV line from Quebec through the Champlain Valley into New York.

The energy picture emerging from the James Bay project is a dazzling one. But no one knows yet what the energy configurations will be, or what will be required by whom. The only thing that is certain is the array of questions the La Grande Complex raises for Vermont: Will Quebec really be forced to export its surplus energy? If so, for how much? What are the environmental and health effects of 735 kV lines? Will New York's energy needs and public opposition to 735 kV lines put pressure on Vermont to carry the high voltage lines through the Champlain Valley? If so, what will be Vermont's response?

Mathew Rubin, a Plainfield Vermont resident, is currently pursuing an engineering degree at Harvard University.

John Warshow is Town Energy Coordinator for Plainfield, Vermont.

Berlin Malls cont'd from Page 1

The site for the proposed malls would have 284,000 square feet of leasable space and parking for 1,340 cars. The total amount of land for the Diversified mall would be 28 acres.

As the hearings go forward several issues seem to be emerging both within the context of the Act 250 proceedings and in communities throughout central Vermont.

One issue is scattered growth. Although the proposed location of the malls is commercially zoned, the site is some distance from the towns' present business district. This situation, some fear, could create a pattern of scattered growth...something which Berlin's town plan decrees but which is made possible by its zoning.

Along with scattered growth, the sheer massiveness of the malls is a concern expressed by many. Anthony Pollina, a spokesperson for Citizens for Vital Communities, sees the size of the malls as out of scale for a region like central Vermont. He explained it in this way, "Look at the amount of retail space we have in the two largest cities in central Vermont. Barre has approximately 154,000 square feet, Montpelier about 87,000. Let's say that only the Jetter mall goes in -- the smallest of the two malls -- it would still be 27% larger than our largest city center."

Sewage disposal is also a critical issue. In mid-November the state put a freeze on Berlin sewer permits until the town straightens out its bookkeeping. At the time of this writing, the town is unable to accurately show how much sewage it has committed to its sewage treatment plant. A study conducted by CVC's attorney and VNRC's staff counsel, Darby Bradley, shows there to be an insufficient reserve capacity at the Berlin sewage treatment plant. But Bradley said, "There is really no way to arrive at exact figures because of Berlin's lack of accurate records."

If the District Commission agrees with CVC's findings, Berlin will either have to increase its sewage plant capacity or reduce existing flows in order to accommodate the malls.

Diversified questions the relevance of the Berlin plant capacity, since neighboring Montpelier has a new sewage plant under construction, and in order to receive federal funds must include Berlin. Montpelier's plant is scheduled to be completed in 1983. The two towns, however, have yet to reach an agreement on Berlin's use of the facility.

In the coming months the District 5 Commission will wade through mounds of documents, maps, and diagrams as they consider the complex issues of water quality, air pollution, regional economics, energy conservation, and other Act 250 criteria.

The lay-people who make up the District 5 Environmental Commission have a mammoth task before them. This situation has many people questioning the ability of the Act 250 process to handle large developments, and even has some beginning to rethink the concept of regional planning for Vermont.

Betsy Brent is a student at Johnson State College studying ecology.
Whole-Tree Harvesting Duxbury Project Ends

History
This summer marks the end of a whole-tree harvesting operation on a 70-acre site in South Duxbury, Vermont. This logging operation was an experiment to see what effects whole-tree chipharvesting might have on Vermont forests.

The experiment included a ten-acre clearcut and a five acre selective cut in 1977. Approximately five acres of shelterwood cutting was accomplished in 1978, and the remaining acreage, all shelterwood and selective cutting, was completed this past summer.

The project was a collaborative effort of the Vermont Department of Forests, Parks, and Recreation, the Ward Lumber Company, VNRC, the University of Vermont, Dartmouth College, the Northeast Forest Experiment Station, Burlington Electric Light Department, and many others.

The fact that no studies had been made of summertime chip-harvesting operations in Vermont was among the primary reasons for the Duxbury experiment. It is during the summer that the greatest potential for soil compaction and erosion exists. The advent of new, bigger, more efficient wood harvesting equipment—the feller-buncher, grapple-skidder, and whole-tree chipper—was also a reason. The heart of whole-tree harvesting is the chipper, a large machine which is capable of converting an entire tree to wood chips within 15 to 45 seconds, and blowing them into a waiting truck. There was a need to test how well this new equipment would work on Vermont’s hilly terrain, to learn what practical problems there might be, and to see if it was economically feasible to harvest trees on a selective basis using this type of machinery. The development of woodchip-fired heating and power plants was another reason. Underlying the need for the project was the recognition that the demand for wood as fuel in private homes, institutions, and industries is increasing dramatically—possibly too swiftly for the good of the forest resource.

VNRC coordinated the environmental team for Duxbury, which consisted of forest research people from the University of Vermont, Dartmouth College, and the Northeast Forest Experiment Station. This team designed an experiment which would study the regeneration of both the type and the quantity of trees on the site, the damage and growth in the residual stand, the effects of deer browse, the feasibility of replanting hardwoods, and the biomass yield per acre. Unfortunately, because of time and financial limitations, the experiment was unable to examine the impact on water quality or on depletion of nutrients, if any. Although it will be several more growing seasons before a final evaluation can be made, the operation at Duxbury is yielding some important information. Darby Bradley, the VNRC staff member most active in the Duxbury project over the last three years, presented his personal observations to the U.S. Senate Appropriations Subcommittee on the Interior at a hearing held on wood energy in Randolph, Vermont, on October 8, 1979. In the following excerpt from his testimony, Bradley outlines the short-term impacts of the Duxbury project and draws his conclusions on its outcome.

Testimony

Regeneration
In the areas cut in 1977, the regeneration has been excellent in terms of quantity, especially in the clearcut area. There was a good ground cover one year after the harvest, and today some of the trees exceed six feet in height. This type of regeneration may not please every woodlot owner since it is mostly aspen and pin cherry, but the value of these trees can be debated.

(Aspen is critical as grouset habitat, and both types of trees serve as "trainers" for hardwoods growing in the understory.)

Erosion
There was very little observable erosion. And, remarkably, the least erosion occurred in the clearcut area. This was because the skidders travelled everywhere in the clearcut, instead of always following the same path as in the selection cut area. Although waterbars were put in the skid-roads, they were not always effective. No siltation of nearby streams, however, was detected. This was in part because of the large buffer zone that was left between the skidders and the stream. In the selection cut area harvested in 1977, the skid-roads have naturally and completely reseeded themselves in grass. The landing area is not yet reseeded because of the continual disturbance each summer.

Damage
In the selection cut area done in 1977, when mostly chain saws and cable skidders were used, virtually every residual tree was damaged to some extent either by the skidders or by trees being dragged through the woods. Less damage was done this year, because the operators were more skilled and a feller-buncher and grapple-skidder were used. (The feller-buncher has a pincher which grabs a tree at chest height and then with another scissor-like mechanism shears the tree at its base. The machine then lays the tree down in a pile on the skid road, for picking up by a skidder or forwarder. Since some feller-bunchers are able to operate in a path only 6 feet wide, they are able to take selected trees.)

Aesthetics
South Duxbury proved that selection cutting can be done contrary to the popular belief held by many loggers and the general public. Whether it is economically feasible depends on the skill and organization of the logger, and the price he receives for his product. South Duxbury proved that both factors are critical. The damage that was caused by the selection cutting will be upsetting to many landowners, particularly in the first year, but most landowners will probably be pleased with the way the selection cut area looks two years later.

What we have learned from the South Duxbury experiment shows that the environmental impact of whole-tree chipharvesting can, under conditions as they are within acceptable limits. Some damage did, of course, occur, and while it might alarm an individual woodlot owner, it was not alarming from a public policy point of view. I say this with great caution, however, for I have seen logging jobs which have caused severe environmental damage. Many factors will govern whether the impacts will be slight or severe: slope, soils, time of year, method of harvest; all are important contributors. But I believe that the most important factors are the skill and pride of the operator and his ability to plan ahead. Good operators are the key to good harvesting operations, and to the success of wood energy.

Further Reading

Wood for Energy by Darby Bradley and David Stevens. An interim report on the whole-tree harvesting experiment in South Duxbury, Vermont. VNRC and the Department of Forests and Parks, March 1978. Limited copies available free from VNRC.

A complete copy of Darby Bradley’s testimony before the U.S. Senate Appropriations Subcommittee on the Interior is also available from the Council. If you wish a copy, please send a self-addressed, stamped envelope to: Testimony, VNRC, 7 Main Street, Montpelier, Vermont. 05602.
**In Brief**

**Confronting Energy Projects in the Courtroom**

Peter Kirby

Judicial review of energy projects is an American tradition. This tradition, however, is coming under fire from some critics who are asking, “In an energy crisis, is the precaution of judicial review worth the possibility of delaying a potential source of energy?” Judicial review usually comes into play when citizens take an energy project to court, usually for environmental reasons. If the citizens are victorious, this forces the defendant to comply with environmental protection laws, which in turn often causes the project to be delayed. Perhaps the most famous court action which resulted in a delay was the lawsuit over the Alaska oil pipeline from the North Slope to Valdez. The case held up construction for years. The final resolution came about only by Congressional action. In the meantime, however, major design improvements were made. The most notable of these was the construction of an elevated, rather than buried, pipeline. The elevated pipeline lessened the danger of the permafrost melting and made the monitoring for leaks more effective.

The following is a brief tour through some recent court cases; two resulted in delays, one did not.

**The Elk and the Oil Wells**

At issue in *West Michigan Council v. Natural Resources Commission* (1979) was whether the drilling of ten exploratory oil and gas wells should be allowed in the Pigeon River State Forest in Michigan, the habitat of the only sizable wild herd of elk east of the Mississippi. The State of Michigan granted a permit to drill for oil on the assumption that even if the area were opened to roads, seismic work, and drilling, the depleted elk population might still recover and return to the assumption levels in about 50 years.

Michigan law, however, forbids the State to impair or destroy natural resources, including wildlife. In light of the expected damage to the elk (as well as to bobcats and bears), the Michigan Supreme Court found it had no choice under state law but to halt the exploratory drilling. Now, if oil and gas work is to invade the last eastern refuge of wild elk, the legislature, with the governor’s approval, will have to expressly provide for it.

**The Corps, Bald Eagles, and Congress**

The Army Corps of Engineers was planning to add four more electrical power generating units at the Libby Dam in Montana. The increase of water to be released from the Libby, however, would cause major water-quality problems, so the Corps decided to build another dam ten miles away to “re-regulate” the flow. Local sportsmen objected to the additional inundation of the Kootenai River. In *Libby Rod and Gun Club v. Potratz* (1978), the court found fault with the new facilities. The first defect was that Congress had never authorized the new dam, as required by law, and the second was that the cost-benefit analysis in the environmental impact statement failed to account for recreational losses in the form of quantified fishermen and hunter days lost. The court noted in closing that the delay gained from the injunction will allow research on the effect the dam might have on the habitat of the endangered bald eagle thought to be found along the portion of the river to be flooded.

**Strip Mining for Coal — Guaranteed Profit**

Surface coal mining on steep slopes in the east has often left a trail of devastation — rapid and massive erosion, landslides, and ugly, exposed highwalls. As a remedy, the Surface Mining Act of 1977 requires slopes to be restored to their “approximate original contour.” Studies by the Tennessee Valley Authority and the Appalachian Regional Commission have shown that without new practices strip mining on steep slopes can comply with the Act and still be economical.

Nonetheless, a federal trial judge in *Virginia Surface Mining Association v. Andrus* (1979) has halted the enforcement of the Act in Virginia, where almost all of the coal that can be surface mined is on steep slopes. Relying on evidence from the coal companies, the court found that it would be “impractical” to produce coal in conformance to the Act. In concert with Virginia at competitive disadvantage to coal surface mined in flatter terrain elsewhere; hence, the judge concluded that the Act’s environmental protection was unconstitutional since it deprives the companies of assured profits.

The judge did not address at least two pertinent questions involved in this case: (1) Would the increased demand for coal along with higher prices for western coal (which is also subject to environmental protection laws) help make Virginia coal more competitive; and (2) Does the Constitution guarantee coal companies a profit, even if the hills of Virginia are left looking like the surface of the moon?

As the energy crisis bears down on us, we grow more and more anxious about finding and developing new sources of energy. This nervousness has already manifested itself in the form of the President’s Energy Mobilization Board. In our haste, the process of judicial review may seem an unnecessary encumbrance. But in view of the potential consequences for the environment, it may be one check in our system of checks and balances that we can ill-afford to put aside.

Peter Kirby is a staff attorney at the National Wildlife Federation in Washington, D.C.

He has written extensively on environmental law issues for the Federation.

**Book Review**

*Malignant Neglect* by the Environmental Defense Fund and Robert H. Boyle
New York, Alfred Knopf 1979, $10.00, 275 pages

It is difficult these days not to join with those who cry out, “I give up. Everything causes cancer.” Over the last 60 years as cancer research and environmental, food and drug laws have been carried out, we have become painfully aware of cancer and what causes it. Many Americans appear to feel helpless when cancer is discussed, fearing, perhaps, that preventive efforts are futile. Malignant Neglect attempts — and succeeds to a great extent — to have become an informed and less fatalistic that have grown-up around cancer.

The staff of the Environmental Defense Fund’s Toxic chemical program has compiled factual, scientifically accurate, yet comprehensible information to help lay reader understand cancer as a biological, social, and political phenomenon. It discusses how safer products and policies can and must become the alternative to “cancerphobia.”

Malignant Neglect begins with a chapter on the nature and scope of the cancer problem. It explains what scientists have learned about the chemical causes of cancer, and the responsibilities of government and industry to use this knowledge in preventing compliance. A chapter on the biology of cancer follows. It describes the various types of cancer in language that laymen and medical colleagues within the grasp of most readers.

Subsequent chapters examine specific environmental factors known or believed to be responsible for this country’s high cancer rates, beginning with a case study of PCBs, the widely used carcinogenic industrial chemical.

Chapters on air, water, and pesticides trace national environmental policy efforts to reduce human exposure to carcinogens. Chapters on food and consumer products detail the failure and success of regulatory actions involving familiar products such as: cigarettes, saccharin, hair dyes, estrogen drugs, and the flame-retardant Tri.

A chapter on children and cancer suggests ways we can prevent the spread of cancer in future generations. A chapter on the biology of cancer follows. It describes the various types of cancer in language that laypeople and medical colleagues within the grasp of most readers.

In this case, “Not,” he points out, “because the suggestions are wrong, but because some are tedious.” He said, “If a few of the recommendations for how to lessen one’s own risk of cancer seem annoying and of uncertain utility, all have logic.” This chapter concludes with the Act as a part of the American dream, the belief that actions people can take. They range from boiling water to monitoring your town’s adherence to environmental laws.

Schafer sums up the book in this way, “Fatalism is an uninformed response to a specter. There is more, a huge number of carcinogenic substances which can be substituted for or put aside. There are personal and public steps that are technically achievable. The burden of prevention at least of lessening, is not too much.”
Commentary

An Energy Strategy for Vermont
Mark Lapping

The energy program President Carter put forth this summer seems to me a highly centralized one. Carter’s approach does not consider in any effective way regional differences and needs. I am skeptical, in other words, that solutions for solving Cincinnati’s legitimate energy problems will have much relevance for Island Pond, Vermont.

By 1989 President Carter proposes we replace or save one equivalent of 8.5 million barrels of foreign oil per day. To do this he has called for a limitation on imports of oil, the streamlining of energy facility siting procedures, and a massive effort to develop synthetic fuels. All of this is to be financed by a “windfall profits tax” on the oil companies.

“I am skeptical that solutions for solving Cincinnati’s legitimate energy problems will have much relevance for Island Pond, Vermont.”

If we break out Vermont’s portion of the 8.5 million barrels of oil per day, it works out to approximately 3.1 million barrels of oil per year or 355,000 gallons per day. The anticipated national price tag for Carter’s plan is estimated to be $140 billion over a ten-year period. Vermont’s share works out to be about $311 million for the same period.

If allowed to develop our own strategy — and assuming we don’t have to buy into the federal plan totally — Vermont could achieve its share of the national energy picture almost solely through conservation.

State Energy Office figures indicate that the weatherization of 20,000 low-income homes, the implementation of thermal and lighting standards in public buildings, mandatory boiler efficiency standards, the changeover to wood heat, and the Congressional-imposed fuel efficiency standards for cars have the potential of conserving over 600,000 gallons of oil per day. In these ways Vermont could realize its portion of oil savings by 1989.

The cost, however, of such conservation efforts will not be cheap. The weatherization of low-income homes is likely to cost upwards of $10 million and thermal and lighting standards implementation amounts to another $75 million. State Energy Office estimates put such measures at $82 million over the next ten years. As expensive as this course of action is, it is still less than the $311 million we would pay under a federal plan. When we look at Carter’s program next to our situation, it becomes evident that Vermont could develop a strategy which speaks to our needs in a more cost-effective, less environmentally damaging way through conservation and the use of renewable resources.

The coming years must be seen as a transition period heading us toward a future very largely dependent upon solar energy in its many manifestations. And as the recently published Harvard Business School report, Future Energy, notes, we must come to see conservation as “the key energy source.”

Wishing, however, will not make it so. We need to make investments which will carry us through this era of change. We also need to develop a constituency here in Vermont which supports a sensible and sensitive energy policy. Some potentially effective measures have already been presented by the State Energy Office, and others are contained in the recently adopted State Economic Development Plan.

We cannot escape the fact that we operate within a federal system, and that Washington still calls most of the shots. But this must not be a barrier to achieving the necessary results in ways which are appropriate and meaningful to Vermonters.

Mark Lapping is Chairman of the VNRC’s Board of Directors and Assistant Director of the UVM Environmental Program.

Harvesting Timber by Hand
Richard Brett

“Two roads diverged in a wood. And I... I took the less travelled by, And that has made all the difference.”

From The Road Not Taken by Robert Frost

Sea coast population pressure caused Vermont’s forests to disappear with only pearl ash and potash for the cash crop. Sheep kept the forest at bay for a time. When the woods did creep back, the best trees were cut, and the worst were left.

This treatment left understocked woodlots, full of inferior species. Erosion was extreme. Forests are the product of soil and climate. Our Vermont terrain is steep, and precipitation is heavy. Ideally the steep land never should have been cleared.

In our heavily populated Northeast, we need forests. They are more than mere sites for growing wood for fuel, fiber, and lumber. They contribute to the welfare of society in ways essential to survival. Forests are one of the cheapest and most efficient ways to produce potable water. They moderate floods. They prevent erosion and siltation. They provide a habitat for a wide range of life... including man. They are a prime recreational asset.

The use of wood as a renewable fuel is more and more important. We do have quantities of junk wood — inferior species, diseased and damaged trees, and overaged-rolls.

We should use this junk wood and increase our forest capital in the process. However, the job must be done in light of the forest contribution to the welfare of society, not in response to short-term economic gain.

Some of the factors involved in Vermont’s present forest management picture are: a diffuse supply of low quality wood suitable for fuel, a vulnerable natural habitat, a capital scarcity combined with a surplus of human power, and the increasing cost of machine operation.

What should this mean in terms of how we harvest our forests?

The answer is obvious. We should use the surplus manpower to cut the junk wood on a selective basis. This would conserve capital, save petroleum, cut unemployment, create a reliable wood supply, and protect the environment. But how does our machine-conscious society solve the problem?

We opt for expensive equipment which is costly to operate, capital intensive, and adds to unemployment. Big machines are incapable of harvesting trees on a selective basis. Large machines cannot be operated on steep terrain in such a way as to prevent erosion and siltation. Siltation ruins trout streams and clear-cutting ruins the scenery. (You may remember that this is a tourist-oriented state.) Furthermore, the machines must be used continuously to justify costs. This means clear-cutting. Large machines are no respecters of young trees or ground cover.

Finally, the machines are so heavy and big that they must be escorted by the police from place to place. Roads and bridges must be beefed-up to support them.

This modern approach ignores related costs.

So, which way, Vermont? Which road are we to take?

Dick Brett is a founding member of VNRC and a forester in Woodstock, Vermont.

![Map of Vermont with注解](image-url)

WELL, WELL... WHAT HAVE WE HERE? A VERY ENDANGERED SPECIES!
Naturalist's Journal

Field Guide for Woody Plants

“A Book I Can Learn From”

Bob Jervis

I asked my daughter, Becky, a budding Vermont botanist, what she would look for in selecting a woody plant field guide. Her reply, “a book I can learn from,” was minimalistic, but good.

Few of us would be satisfied with a field guide or manual whose sole purpose was simply to provide information without explanation. We want to know how to know a beech from an oak, a striped maple from a mountain maple, and in as many ways as possible. Leaf, twig, bark, flower and fruit characteristics are all useful, and when these identifying features are used in combination in a guide, the user is bound to learn more than the name of the plant.

In fact, to me, a truly successful field guide is one which teaches so well that, with sufficient use, it becomes unnecessary. One will simply become familiar enough with the choices used to distinguish plants from one another that those choices can be made without the guide. The extent to which other information is available — geographical range, habitat preference, phylogenetic (evolutionary) relationships, historical and current usage, and other interesting plant lore — provides further criteria for measuring the success of a field guide.

Four recent additions to the naturalist’s bookshelf in the area of woody plant identification are: Frederick Steele and Albion Hodgdon’s Trees and Shrubs of Northern New England published in 1968 by the Society for the Protection of New Hampshire Forests; a follow-up revision and condensation by Steele of the earlier edition, titled A Beginner’s Guide: Trees and Shrubs of Northern New England published by the Society in 1971 and re-printed in 1979; and two 1979 reprints from the Charles Tuttle Company — The Handbook of Vermont Trees by G.P. Burns and C.H. Oles, and The Handbook of Vermont Shrubs and Woody Vines by L.R. Jones and P.V. Rand, originally published in 1899 and 1908, respectively, as agricultural station bulletins from the University of Vermont.

The following is an evaluation of how well these two sets of books fit the criteria Becky and I feel are necessary for a guide to be useful for the average person buying and using this kind of publication.

Intended to serve as companion pieces, the two Vermont handbooks are consistent in their organization and, although the quality of illustrations is far superior in the trees handbook, I think it is possible to view these two as a type of guide that stands in marked contrast to the two Northern New England guides published by the Society.

The Vermont handbooks provide particularly thorough introductions with drawings to supplement and clarify the terminology used in both the tree guide and shrub handbook. By providing a key which has a series of choices among paired alternatives, the user of the guide can identify, with minimum confusion, any of Vermont’s, and most of New England’s, woody plants. The shrub and woody vine handbook’s key has an early numerical flaw that leads to confusion at first, but is otherwise sound and easy to use. Summer and winter keys are provided for trees, using leaf, twig, flower, fruit, bark, and wood characteristics for identification.

A wide spectrum of characteristics is also brought into play in the identification of shrubs and vines. Once a plant is identified the information available on each species in these handbooks is quite impressive, both in quantity and quality. Plant lore and valuable factual information abound and serve to extend the reader's appreciation of the natural world far beyond the simple acquisition of the plant’s name.

Although these books are scarcely revised (one wonders why a nomenclature update was not included for these new editions) since the turn of the century, they are as useful and informative as any regional guide currently available. Floricentric manuals for Vermont and New England currently in print do not serve the same function as these handbooks. No existing publica-

is a publication that attempts to serve the same function as the two Vermont handbooks combined. It is the most directly comparable publication available. Except for its modern nomenclature, smaller size (fits easily into a back pocket), and its italicized key points of distinction, found in the body of the text on each species, I find that the handbook and its condensed edition suffer in comparison to the other two volumes. They fall short of the needs of most people who require a field guide.

The lack of a key for basic identification is the most serious fault in both publications. One must thumb through the entire book looking for pictures and/or descriptions since not all of the species are illustrated. Even without a key this task could have been aided by some arrangement of plant illustrations by vegetative characteristics (i.e. those with opposite leaves separated from those with alternate leaves, etc.). Instead the authors chose to organize the plants according to the system of classification found in Gray’s Manual of Botany, the fine points of which are out of reach of the average beginning naturalist.

My main qualm with this arrangement is that it makes little sense to classify plants which the reader is not even able to identify. The descriptive material on each species included in the guide is largely related to appearance, with occasional references to features such as wood quality, but contains little of the interesting regional historical lore found in the Vermont handbooks.

A Beginner’s Guide offers a simplified version but with no improvement in utility. Follow is a highly introductory section in which one stumbles over unfortunate statements such as, “an herb is a plant without a woody stem, in other words, a flower,” the first half of the book is a series of plant drawings — arranged again according to Gray numbered to correspond to pages in the following section. In this section the same plants are described as to range, field marks, and sometimes, uses. The range and habitat information is solid. The field marks section is extensive, but frequently not sufficiently clear to distinguish between confusing species. The section on uses is interesting and valuable, but too often no information is included for a particular species.

So for a book one can “learn from” and which will truly aid a reader’s efforts to identify and know regional woody vegetation, I would enthusiastically recommend the two-volnummer Vermont handbooks on trees, shrubs, and woody vines.

Bob Jervis is a Professor of Biology at Goddard College.

Update:

Rochester

On October 15 the State Water Resources Board turned down a request from the Town of Rochester, Vermont, to reclassify a segment of the White River from Class B to Class C - a stream which is allowed to receive treated sewage. The Town needed the reclassification, in order to build a Rotating Biological Contactor — a municipal sewage treatment plant which would require discharging treated wastes into the White River. The decision of the Water Resources Board forces the Town to build their second sewerage choice — a septic-type system which does not require waste to be discharged.

The refusal of the Board to downclassify the segment of the White River was applauded by environmentalists and sportmen. Testimony from such groups as VNRC, the Atlantic Salmon Foundation, the Barron County State and federal agencies outlined clearly the magnitude of the potential threat of the RBC plant and the resulting downgrading of the White River. The possible ruin of the multi-million dollar Anseigau Fish Hatchery project was among the chief concerns of those who opposed the reclassification of the River.

The Board concluded that while an RBC facility would not be discharging harmful substances (primarily chlorine) under normal operating conditions, the possibility of human error, mechanical failure, or future industrial pollution — all of which could result in the destruction of the salmon project — was too great a risk. In commenting on the Board’s decision Andy Stout of the Atlantic Salmon Foundation said, “In an era when we are trying to upgrade our streams, it seems foolish to downgrade the cleanest river we have.”

Wilderness

In recent weeks the hope of resolving the wilderness issue in Vermont through a mediator has become dimmer. The impasse apparently centers on whether or not the land in question should be designated by Congress as wilderness. Bonnie Barnes, a UVM graduate researcher who is closely involved in the mediation, explains the situation this way, “To one side, it is absolutely unacceptable to have any congressional designation of wilderness in the state whatsoever. To the other side, nothing less than congressional designation will do.” If the wilderness bill cannot be decided by the citizens of Vermont, the issue will return to the political arena and the legislative process will be the final arbiter.
The Council

VNRC Moves
We’re here! Finally after months of looking for larger quarters, the Council has moved to new offices on the second floor of the railroad depot building at 7 Main Street in Montpelier. The building, which was rehabilitated two years ago with the help of federal historic sites funds, is located near the principal entrance to downtown Montpelier, the Main Street bridge across the Winooski River.

The new space, which is considerably larger than our old offices, provides a private office for each staff member with program responsibilities, a conference room, a large work room and space to accommodate intern and volunteer services.

There is off-street parking behind the building reserved for members and others coming to see us. So the next time you’re in Montpelier, please come in and pay us a visit. We’d love to show you around.

Special Thanks
In the last issue of the VER we somehow managed to report the events which took place at the Annual Meeting without publicly acknowledging those who made the day possible. To the many who gave a fine fall day to help make the occasion a success, we give our belated thanks.

Special appreciation goes to Sally Lesolin for volunteering her day and turning-over the Vermont Institute of Natural Science auditorium for our afternoon meeting. We also want to thank those responsible for the field trips: Preston Bristow, Joy and Bud Doten, Monty Fischer, Anne and Milt Pullerton and family, Robert Green, Charles Hiltz, Don McFeeters, Andy Stout, and Ed Wildman. Afternoon speakers and panelists deserved another round of applause as well, thanks: Rick Carbin, Bill Darrow, Bob Kinsey, Mark Lapping, and Deacy Leonard.

Tree Farm Award
Bill Fund of Canaan, Vermont, has been described as a purist—a man who believes that there are no short-cuts to managing a healthy, productive woodlot. This attitude of Mr. Fund’s has brought him Vermont’s Outstanding Tree Farmer award for 1979.

Fund manages a 100 acre woodlot which produces a variety of forest products including pulp, sawlogs, veneer, and Christmas trees. He has also averaged over 5 acres of tree planting and timber stand improvement work per year for the past 13 years under the U.S.D.A.’s Agricultural Stabilization and Conservation Service programs.

This summer Robert Farrington, the Vermont State Chairman for the American Tree Farm System, awarded Mr. Fund a plaque and a new chain saw. As a state winner, Mr. Fund will compete with the winners from other New England states for the regional award.

The American Tree Farm System was started by wood using industries in 1941 to stimulate interest among woodland owners in doing a better job of managing forests for repeated tree crops. To receive Tree Farm Certification the woodland must be (1) privately owned, (2) managed for the growth and harvest of repeated forest crops, and (3) adequately protected from fire, insects, disease, and destructive grazing.

For more information about the Vermont Tree Farm program, please history or call: Robert Farrington, Vermont Natural Resources Council, 7 Main St., Montpelier, Vermont 05602. (802) 223-2328.

Volunteer Needed
The Council needs a volunteer to manage our library and help with related tasks one day per week. The work would include: helping to organize the filing system for library materials, cataloging new acquisitions, ordering library materials and review copies for books and other publications, and writing reviews periodically for the Vermont Environmental Report. Some previous library experience would be useful but is not required. Typing skills would be helpful. If you are interested, please call Don Hooper at the VNRC office (802) 223-2328.

Calendar
Man, Energy, the Future, and the Environment
December 18 – Tuesday

Man, Energy, the Future, and the Environment is a slide show and lecture by Alan Betts. Mr. Betts, a meteorologist, has built his own solar home in West Pawlet and has been active in energy issues in Vermont for several years. The program, sponsored by the Vermont Institute of Natural Science, will examine the energy situation today and some of the scenarios for the future. The show is open to the public. Admission will be a $1.00 for members and students, $2.00 for non-members. The program will begin at 7:30 pm in the VINS auditorium. For directions to the Institute or more information about the slide show and lecture, please call or write: Wendy Vogt, Vermont Institute of Natural Science, Woodstock, Vermont 05091 – (802) 457-2779.

Groundwater Protection and Water Conservation

The League of Women Voters looks at the issues surrounding groundwater protection and water conservation in a series of public meetings and television programs. The following is the second half of the League’s project.

December 18 – Tuesday

Water conservation will be the topic discussed at a public meeting held by the League of Women Voters as part of a grant from Environmental Protection Agency’s public participation training project. The public forum is an attempt to bring together citizens and government in order to better define groundwater protection and water conservation policy and develop programs appropriate to Vermont. The meeting on water conservation will be held at Bellows Falls Union High at 7:30 pm on Tuesday, December 18. (This is the second public meeting. The first, held in November, dealt with groundwater protection issues.)

December 12 – Friday

“Down the Drain” will be presented by Vermont Educational Television in cooperation with the League of Women Voters’ citizen participation project. The program will cover water conservation issues and will be aired at 9:00 on ETV, Friday, December 21.

“Closing the Loop - The Agency's Response to Public Questions” is the League’s final ETV program on groundwater protection and water conservation. This program will discuss with viewers groundwater protection and water conservation policies and programs for Vermont. “Closing the Loop” will be aired on ETV at 9:00 pm, Friday, January 18.

For more information about either the public meeting in Bellows Falls or the upcoming TV shows, please call or write: Sonja Schuyler, the League of Women Voters of Vermont, 2 Railroad Avenue, Essex Junction, Vermont 05452 (802) 879-4814.

Help Us Get Out the Word
. . . tell a friend about VNRC. Recommend the name of a friend who believes -- as you do -- in a clean, healthy, productive Vermont, and we will invite him or her to join our efforts and receive the Vermont Environmental Report and special Bulletins throughout the year.

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Report From:

The Bennington Garden Club
Planting the Seeds of Environmental Conservation

The term “garden club” does not usually evoke a mental image of an issue-oriented, public education organization. Yet according to Catherine Cumpton, President of the Bennington Garden Club, “The days of women with white gloves pruning roses is gone. Our aim is to preserve our environment as much as it is to plant our gardens!”

In keeping with this philosophy, the Bennington Garden Club recently sponsored a public forum on one of the most controversial issues in Vermont – uranium mining. “We wanted the meeting to be an educational experience for those attending, not an emotional free-for-all,” explained Liz Titus, one of the organizers of the forum. “Educated decision-making on issues such as uranium mining is necessary, and we tried to select well-informed, responsible people to present the pros and cons.”

A four member panel set forth the arguments for and against uranium mining. Dr. Howard Shrobe, Director of the Energy Policy Institute in Boston; Charles Ratte, Vermont state geologist; and David Scott, former radiologist with the Vermont Department of Health, presented the facts on the problems and dangers associated with uranium mining. Edmund F. Gaines, Jr., a representative from Vermont Yankee Nuclear Power Plant, offered the pro-uranium arguments. The discussion was moderated by Lieutenant Governor Madeline Kunin and the keynote address was made by the Secretary of the Agency of Environmental Conservation, Brendan Whittaker.

Public forums, such as the one on uranium, are sponsored regularly by the Garden Club. “The public has many decisions to make now,” stated Mrs. Titus, “and we want to help equip people with the facts to make those decisions.” The Bennington Garden Club, founded in 1925, has a commitment to conservation written into its bylaws. It has become more active on conservation issues over the years and is now a balance between horticultural and conservation activities.

The group conducts serious horticultural studies such as the current one on the pea family which includes experiments in propagating new species. The Conservation Committee also regularly holds educational seminars for members. The most recent was on wetlands.

The Club has received awards for both its horticultural and conservation endeavors. The Club’s restoration of the Victorian Garden at the Park-McCullough House in Bennington won it national acclaim from the Garden Clubs of America, an umbrella organization for Garden Clubs across the country. Club member, Liz Titus, was presented the prestigious Douglass Medal by the G.C.A. for her founding of and continued work with the Student Conservation Association. This Association is a nationwide group that places students in temporary conservation employment positions such as those in national parks.

Wood Providing More Energy

Wood now provides Americans with half as much energy as nuclear power, according to the Department of Energy. Since the 1973-74 oil embargo, the use of wood as fuel has increased nearly 15% a year. Between 1972 and 1977, the number of woodburning stoves in use increased from 250,000 to 2,000,000. One-fifth of the homes in New England rely on wood as a primary source of heat, and 30% more use it as a supplemental source. The Vermont State Energy Office estimates Vermonters will use nearly 400,000 cords of wood this winter.

VERMONT ENVIRONMENTAL REPORT
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Chairman of the Board
Mark Lapping

The Vermont Environmental Report is published six times a year by the Vermont Natural Resources Council. The intent of the VER is to provide citizens with information and discussion of current environmental issues affecting Vermont. The opinions expressed by VER contributors and editors are their own and not necessarily those of VNRC.

Please address all correspondence to VER-Editor, VNRC, 7 Main Street, Montpelier, Vermont 05602.

Whimbrel
One of seven Plum Island Sketches by Ralph Scott, Director of the Ipswich River Wildlife Sanctuary in Massachusetts. Reprinted with permission from Massachusetts Audubon Society Newsletter.

Vermont Environmental Report

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