

The Natural Farmer

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Conference Planning in Full Swing

by Steve Lorenz

This newspaper should be reaching you at just the right time. Nearing the end of what has been a rather brutal winter in the northeast, we are all in need of some good news. Although the good news of growing flora for the most part is a few weeks away, I bring you news of an event that's growing, and will continue to grow until it reaches its full beauty in early August: the NOFA Summer Conference. You will be receiving registration forms in no time at all, and with all that's set to happen, it would be best to mail those back in a timely fashion.

As was mentioned in the last **The Natural Farmer**, author, chef, nutritionist and home-maker Sally Fallon is set as the keynoter and keystone of the 2003 conference on August 8-10 at Hampshire College in Amherst, Massachusetts. Fallon will be giving an intensive 8 hour (2 day) pre-conference workshop, along with two regular workshops. A frequent contributor to holistic health publications, Fallon has made her name warning consumers about the dangers of low-fat diets and urging them to return to traditional food choices and preparation techniques.

Her book *Nourishing Traditions: The Cookbook that Challenges Politically Correct Nutrition and the Diet Dictocrats*, although hailed by many, was considered controversial because it challenged the current wisdom of the nutritional world, and claimed that much of what passes for new research is really just propaganda for the processed food industry which lives and dies on refined carbohydrates and vegetable oils. Fallon, along with her colleague Mary G.

Harvesting the Fruits...



...Discovering our Roots

Enig, Ph.D., draw on much scientific and anthropological research to refute the much-heralded notion that folks should reduce their intake of animal fats and cholesterol-rich foods, positing instead that these 'villains' are integral to growth, health and vitality. Similarly, other recent articles by her, including "Soy Products for Dairy Products?—Not so Fast" have generated much controversy in the health food industry.

Other themes in her work include the importance of traditional broths—made from chicken,

fish, beef and lamb bones—as a mineral source and aid to digestion. She also details the proper preparation of grain, nuts, and legumes in order to make them most beneficial. In all of her work, she is steady in her call for the return of organic farming, with pasture-fed livestock, and the consumption of traditional whole foods. She urges for the return of an economy based on small-scale organic production and food processing that returns added value to the independent farmer, rather than to large-scale food

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National Organic Program News:

Massachusetts Certification Program Files Legal Action Against USDA Congress Rewrites Organic Feed Rules as Favor for One Producer

by Jack Kittredge

The NOFA Massachusetts Organic Certification Program, administered by the Massachusetts Independent Certifiers, Inc. (MIC) has filed a complaint at the USDA concerning several procedural violations committed by the NOP. The local program had refused to certify an egg producer that had no access to the outside for its hens (see story in Winter 2002-03 TNF), but the NOP ordered the program to certify anyway..

The complaint will be heard by an administrative law judge within the USDA, most likely some time this Spring. Either side can appeal the judge's ruling, but the NOP must accept the decision of the appellate law judge whereas MIC has further recourse to federal court. MIC's case is being handled by the Farmers Legal Assistance Group and \$40,000 is being sought to help defray the costs. NOFA/Mass has put up \$3000 for the action, and the NOFA Interstate Council kicked in another \$1500. So far the NOP has not commented on the complaint.

In other organic news, on February 13 Congress passed a \$397 federal spending bill. Buried in it was a provision that would exempt livestock producers from the requirement to use 100%

organic feed. Only if the USDA reports that organic feed is not more than twice as expensive as conventional feed will producers be required to buy organic.

The provision is the result of recurring complaints from Fieldale Farms Corporation, a Baldwin, Georgia, poultry producer that has been marketing its birds as organic but says it can't afford organic feed prices. Congressman Nathan Deal (R, Ga) lived up to his name by getting an agreement from House Speaker Dennis Hastert to include the provision in the omnibus spending bill at the last minute. Before opponents could muster their forces, the bill was passed.

Organic advocates were outraged. Even corporations such as Tyson Foods and General Mills, which are trying out the organic marketplace themselves, opposed weakening the feed standard for fear of destroying the credibility of organic food.

Senator Patrick Leahy (D, Vt), original sponsor of the federal organic program, has vowed to get the provision overturned and plans to file a bill to do so. But some skeptics suggest, even if Leahy succeeds, nothing is to prevent similar measures from other vested interests. Stay tuned!

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Letters to the Editor

Dear Jack,

I was sorry to learn that my NOFA-NY membership no longer included TNF and am sending along some funds to keep it coming. I have greatly enjoyed reading it over the years and have appreciated your and many others' skills in assembling a great paper.

Dan Demaine, Ithaca, NY

Dear NOFA

The Natural Farmer is worth one heckuva lot more than \$25, but that's all we can scrape together at the moment. Hope it helps. Keep up the good work!

George DeVault, Emmaus, PA

Jack,

We are a county chapter of NOFA-NY and would like to subscribe to The Natural Farmer. We understand it will not be included with NOFA-NY membership in the future. Some of us are members and some of us are not. Is the price \$10 for everyone for a year? Is there a nonmember fee which is more?

Cheryl Allen, New York

Dear Jack & Julie,

We were distressed to learn from the most recent issue of The Natural Farmer of NOFA-NY's decision to eliminate The Natural Farmer as a benefit of membership and read your appeal. We gladly send our small contribution being very grateful for your good work. I would appreciate

The Natural Farmer Needs You!

The Natural Farmer is the newspaper of the Northeast Organic Farming Association (NOFA). Regular members receive a subscription as part of their dues, and others may subscribe for \$10 (in the US or \$18 outside the US). It is published four times a year at 411 Sheldon Rd., Barre, MA 01005. The editors are Jack Kittredge and Julie Rawson, but most of the material is either written by members or summarized by us from information people send us.

Upcoming Issue Topics - We plan a year in advance so that folks who want to write on a topic can have a lot of lead time. The next 3 issues will be:

Summer, 2003	On Farm Dairies
Fall, 2003	Irrigation
Winter, 2003	The NOP - A Year Later

Moving or missed an issue? The Natural Farmer will not be forwarded by the post office, so you need to make sure your address is up-to-date if you move. You get your subscription to this paper in one of two ways. Direct subscribers who send us \$10 are put on our data base here. These folks should send address changes to us. Most of you, however, get this paper as a NOFA member benefit for paying your chapter dues. Each quarter every NOFA chapter sends us address labels for their paid members, which we use to mail out the issue. If you moved or didn't get the paper, your beef is with your state chapter, not us. Every issue we print an updated list of "NOFA Contacts" on the last page, for a handy reference to all the chapter names and addresses.

As a membership paper, we count on you for articles, art and graphics, news and interviews, photos on rural or organic themes, ads, letters, etc. Almost everybody has a special talent or knows someone who does. If you can't write, find someone who can to interview you. We'd like to keep the paper lively and interesting to members, and we need your help to do it.

We appreciate a submission in any form, but are less likely to make mistakes with something typed than handwritten. To be a real gem, send it via electronic mail (Jack@mhof.net) or enclose a computer disk (MacIntosh or PC in Microsoft Word ideally.) Also, any graphics, photos, charts, etc. you can enclose will almost certainly make your submission more readable and informative. If you have any ideas or questions, one of us is usually near the phone - (978) 355-2853, fax: (978) 355-4046

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Northeast Organic Farming Association

insight on NOFA-NY's reasoning. Sorry this has happened. We wish you the best.

Don & Mary L. W. Faulkner, South Royalton, VT

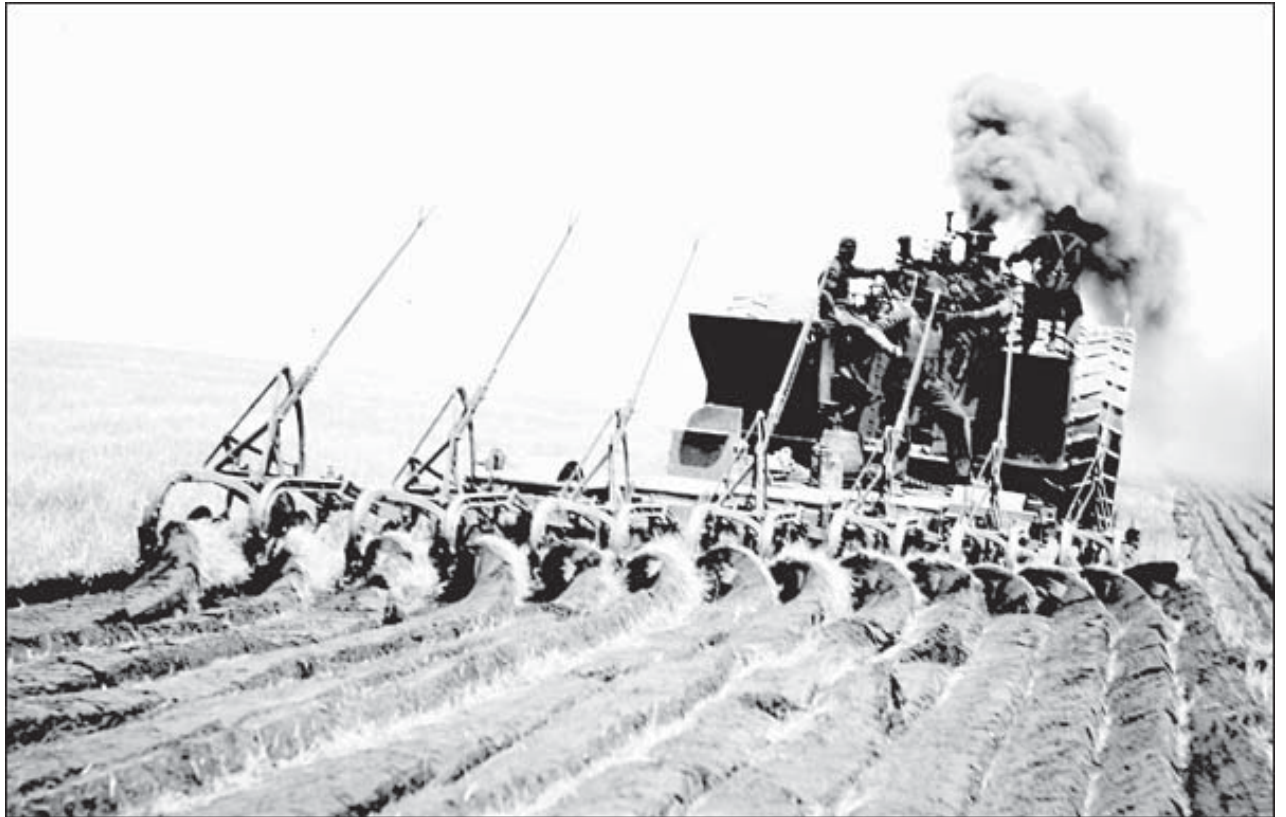
Dan, George, Cheryl, Don, Mary and the many others who wrote,

Thank you all for your generous words of praise and contributions of all sorts. We received outright donations of almost \$2000, plus gift

subscriptions, orders for back issues, an outpouring of support from advertisers, and new sponsors on page two. It has been very heartening for Julie and me to feel the appreciation of members and readers during this difficult period. Early figures indicate that over a third of renewing NOFA-NY members are opting for a direct subscription, which is particularly encouraging.

(letters continued on page 3)

Farm Equipment



One of the most difficult problems confronting farmers is the set of decisions to be made about labor saving equipment. What you decide on this topic will often set the tone for your operation for years to come. Will you have a system based on hand labor or will you opt for a larger, equipment-based farming system? If you go the latter route, will it be powered by tractor or by draft animals? In either case, what implements will you use for the various tasks to come? Will you buy new or used? Do you figure to maintain and repair it yourself, or will you need help? What skills have you? What aptitudes? How much land? How much money?

There are as many answers to these questions as there are farmers. In general, right or wrong answers

do not exist. But in a specific case one answer can result in disaster whereas another would have led to a functioning system. It is the purpose of this issue to present some of these options and the reasons why a farmer might choose one route over another.

In the pages which follow we hear from horse and tractor advocates, talk with grain, dairy and vegetable farmers, consider alternative power sources such as electricity, biodiesel and charcoal, and look at farmer-designed implements for tillage, sap evaporation, bed preparation, oil pressing, mulching and more. Most of these are experienced farmers with a story to tell and some lessons to be learned. We hope they are of help to you now, or in decisions you face in the years to come.

Advertise in or Sponsor The Natural Farmer

Advertisements not only bring in TNF revenue, which means less must come from membership dues, they also make a paper interesting and helpful to those looking for specific goods or services. We carry 2 kinds of ads:

The NOFA Exchange - this is a free bulletin board service for NOFA members and TNF subscribers. Send in up to 100 words (business or personal) and we'll print it free in the next issue. Include a price (if selling) and an address or phone number so readers can contact you directly. If you're not a NOFA member, you can still send in an ad - just send \$5 along too! Send NOFA Exchange ads directly to The Natural Farmer, 411 Sheldon Rd., Barre, MA 01005 or (preferably) E-mail to Jack@mhof.net.

Display Ads - this is for those offering products or services on a regular basis! You can get real attention with display ads. Send camera ready copy to Dan Rosenberg, PO Box 40, Montague, MA 01351 (413) 863-9063 and enclose a check for the appropriate size.

The sizes and rates are:

Full page (15" tall by 10" wide)	\$240
Half page (7 1/2" tall by 10" wide)	\$125
One-third page (7 1/2" tall by 6 1/2" wide)	\$85
One-quarter page (7 1/2" tall by 4 7/8" wide)	\$65
One-sixth page (7 1/2" tall by 3 1/8" wide), or (3 3/4" tall by 6 1/2" wide)	\$45
Business card size (1 1/2" tall by 3 1/8" wide)	\$12

Note: These prices are for camera ready copy. If you want any changes we will be glad to make them - or to type set a display ad for you - for \$10 extra. Just send us the text, any graphics, and a sketch of how you want it to look. Include a check for the space charge plus \$10.

Frequency discounts: if you buy space in several issues you can qualify for substantial discounts off these rates. Pay for two consecutive issues and get 10% off each, pay for 3 and get 20% off, or pay for 4 and get 25% off. An ad in the NOFA Summer Conference Program Book counts as a TNF ad for purposes of this discount.

Deadlines: We need your ad copy one month before the publication date of each issue. The deadlines are:

January 31 for the Spring issue
April 30 for the Summer issue
July 31 for the Fall issue
October 31 for the Winter issue

Disclaimer: Advertisers are helping support the paper so please support them. We cannot investigate the claims of advertisers, of course, so please exercise due caution when considering any product or service. If you learn of any misrepresentation in one of our ads please inform us and we will take appropriate action. We don't want ads that mislead.

Sponsorships: Individuals or organizations wishing to sponsor The Natural Farmer may do so with a payment of \$200 for one year (4 issues). In return, we will thank the sponsor in a special area of page 3 of each issue, and feature the sponsor's logo or other small insignia.

Contact for Display Ads or Sponsors: Send display ads or sponsorships with payment to our advertising manager Dan Rosenberg, PO Box 40, Montague, MA 01351. If you have questions, or want to reserve space, contact Dan at (413) 863-9063 or dan@realpickles.com.

Letters (continued from page 2)

In answer to the questions above, there are two rates for subscriptions. All individual subscriptions to the paper cost \$10 per year (or \$18 if foreign). When a state NOFA chapter buys the TNF for its members, it gets a quantity discount and pays only \$7 a year per member. The NOFA-NY decision to drop the paper was for financial reasons (that \$7 per year per member), not any issue about the paper's quality or usefulness.

If we continue to get the advertising, sponsorship, and individual subscription support we have gotten since the last issue, I think we will be able to manage without the NOFA-NY chapter subs. We all hope they will someday be in a position to resume full participation as a chapter!

Jack Kittredge, editor

Dear Editor,

Recently we have become involved in controversy concerning a local certifying agent whose decision was overturned by NOP. Our company, The Country Hen, based in Hubbardston, is a family company dedicated exclusively to the production of organic eggs. I basically pioneered the production of organic eggs in 1989. We were the first. And now there are many.

We voluntarily came to NOFA/Mass as our certification agent after several letters and phone calls. We wanted to support a local organization (who we admire) rather than a long distance agent where communication was very difficult and where correspondence was misplaced. NOFA/Mass subsequently denied us certification because our access to the outdoors was not generous enough. We explained that we were on the watershed for the water supply to Boston, that neighbors were, in some cases, very close – less than 360 feet from our barns, and we had very little land. We had submitted an outdoor solution which was based on wooden porches attached to each barn. Total cost would be about \$50,000. The NOP regs do not specify space or weather requirements.

Since a denial by NOFA/Mass would basically put us out of the organic business, I

forwarded my case to NOP Washington by e-mail and fax. As permitted by law, they denied the denial. At 71, I did not want to relocate the farm and start over again, and so naturally I welcomed the action by NOP.

I hope this might give our readers the story from our perspective.

George S. Bass, owner, The Country Hen

Dear George,

I'm glad to give you a chance to present your case to our readers. I know you are sincere in believing that your eggs are of high quality and that you are running your egg business in a fashion that respects the birds, the environment, and your customers. I am sorry to see you, personally, caught in this difficult situation.

On the other hand, as you well know, NOFA/Mass for years has maintained a strict policy requiring animal access to the out-of-doors. The NOSB standards adopted in Texas last year reaffirmed the access policy we had traditionally held and the NOFA/Mass Certification Program, administered now by the independent group MIC, just continued it. I'm not sure why you thought now your operation would qualify when it hadn't in years past.

This strong access position is based on a belief that both plants and animals — to be organic — need to be raised in the presence of the natural world – sun, fresh air and water, soil, other living organisms. This was the environment in which they evolved, and we remove them from it at our peril.

Science does not fully understand the influences of soil, with its almost infinite biotic network, on the life that lives in it. We are only beginning to recognize, for instance, the complex biochemistry that happens at the interface of root hairs and soil particles. Yet those interactions have sustained life on the planet for eons. Similarly, I do not believe we fully understand the need among animals for a flourishing and diverse intestinal flora and fauna in order to ensure health and a strong immune system.

You yourself recognize the beneficial effects of omega-3 fatty acids in human health. In

fact you tout the value of omega-3s on your egg boxes. But these acids all originate in the green leaves of plants. The simplest, most natural and freshest way for your chickens to incorporate these acids into their eggs is to have them raised on appropriate green pasture.

I recognize that commercial organic egg production will be far more challenging if the outside access standards are upheld. That happened to Horizon in dairying. When the pasture requirement for ruminants was upheld, they were forced to go to contracts with smaller outside producers rather than maintain huge herds in confinement.

It is clear that true organic eggs will have to command a higher price than they do now. Such a price will be the only way we can pay for the land and human care required to keep poultry on pasture. It may also mean that families can again actually make a living raising hens.

I know your operation seems small compared to the larger organic egg farms which have been certified elsewhere. I know than some other certification groups have not interpreted the new standards as rigorously as ours has. But it is possible that operations like yours, and certainly larger ones, just may not be able to raise organic eggs. In order to ensure care to the soil and water, your birds need access to enough land to keep green fodder growing. I don't think you can do that with so many birds on the few acres you have.

The next few months will sort a lot of this out. Will MIC win in its effort to stand up to the NOP? Will consumers and organic farmers stand firmly behind a strong animal access requirement? Will the role of the NOSB be reflected in program policy?

It may be that the desire of industrial food interests to cash in on the popularity of the word "organic" will succeed in lowering standards. But that is short-term thinking and will destroy the program in the long run. And it has not happened yet. I hope that the organic community will rally in defense of a high standard for animal access, even if it means operations like yours may have to change significantly in order to use the word.

Jack Kittredge

**Please help us thank to these
Friends of Organic Farming
for their generous support!**

**The
Natural Farmer**

NOFA Exchange

Chemical and pesticide free farm **seeks a self-motivated full-time worker** beginning in May to 30th of September. We are small, intensive cut-flower and salad farm, located on Martha's Vineyard. Workers will be responsible for all types of farm labor (From seeding to arranging flowers). On-site, rustic housing provided in converted barn. Stipend of \$175 per week (plus bonus for completed season). *Also need full-time child-care person.* Must enjoy children, peaceful lifestyle and be pet-free. Experience helpful but not necessary. Rebecca Miller 4 North Tabor Farm Rd. 508 645-3311, rmiller1@capecod.net

Greenhouse Planting Volunteers Needed - The Natick Community Organic Farm is seeking volunteers to seed and transplant. Learn about planting and get some sun in our solar greenhouses. - **Seeking Greenhouse Space?** We'll grow your seeds in our solar greenhouses for you or you may purchase the varieties we grow. **Teachers Needed** for summer programs *and/or* children and adult fall and spring programs. Summer Programs mid-June to late August. Positions are available to teach ages 3 to 13. Fall and spring program teachers needed to teach a wide variety of classes to adults and children. Call Lynda at 508-655-2204

July 19-Aug 8, 2003: Living Routes' **Summer Institute in Sustainable Living.** Participants will learn about Permaculture and explore the relationships between personal, social, economic, and ecological sustainability in the rich context of life at the Sirius Community in western Massachusetts. Course graduates receive 4 college credits through UMass - Amherst and a Permaculture Design Course certificate. Primary Instructor: David Jacke. Cost: \$1,100 plus room/board (varies) and optional credit (\$335). For more information contact Living Routes, 85 Baker Rd., Shutesbury, MA 01072; phone (413) 259-0025; info@LivingRoutes.org; www.LivingRoutes.org.

For sale, 13 acre organic farm (five acres in cropland) established 1980, in beautiful lakes-mountain region of New Hampshire. Roadside stand, at busy Sandwich, N.H., Rt. 25 location. With lots of summer traffic, you can sell all you grow right from the farm. And the honor system has worked well here. Simple two-story house with electricity and wood heat, but no septic or plumbing; sheds and farm pond. Additional five acres available. Beautiful swimming pond within one mile. Asking \$75,000. Contact Stephen Hanrahan, Realtor for Century 21, Lakes region Realty. 1-800-639-4045, extension 140. Or Chris Greene, 904-262-1532 or 904-710-0220

Interested in growing seed? **Seeking interns and volunteers** to help establish the "Organic and Indigenous Seed Garden" at Hampshire College Farm, Summer/Fall 2003. The gardens will demonstrate seed production and crop improvement techniques for a diverse array of crops important for NE organic farms. A living classroom for farmers and gardeners interested in growing organic seed, or using organic seed in their operations. All levels of experience encouraged, including students. Some commitment required, but terms negotiable. A great, hands-on experience in the dynamic world of seed saving! Affiliate of SARE funded "Restoring Seed Project" Contact Rowen at 978-790-8875 or rowenwhite@yahoo.com

Orchard Hill Farm is **looking for a couple or two singles to work** in our orchards, vegetable gardens, and brick oven bakery. Room and board provided on our diverse and busy farm. Communal living with private space away from activity. Rural but active local community with many artistic enrichment activities right here or close by. Work will include orchard, vegetable production and farmers market. Small stipend plus profit sharing from market. Season begins in April/May and continues through Oct/Nov. Contact Orchard Hill Farm 130 old settlers Rd. East Alstead NH. 03602. (603)-835-7845 breadworks@prexar.com

For Sale: 100 gal. Rears Pul-Tank **orchard sprayer.** Stainless steel, high pressure spray gun, well maintained. Rebuilt pump. Two years organic certification spray records, ready for certified organic use. \$1200. Call Don at 518-329-7578

Having a hard time finding clean **grassfed raw milk** in Massachusetts? (You're not the only one!) My adorable cows and I would like to produce some excellent raw milk here in Hardwick, MA, probably as a co-op/cow share, and help arrange drive shares as needed. **BUT, I need your input!** Please email Gina at mootopian@yahoo.com for more info, or call (413) 477-0011.

Road's End Farm **seeks intern:** There's still room for one intern at Road's End Farm for the 2003 season. We are a small - scale diversified vegetable and fruit operation, certified organic with NOFA-NY LLC. Marketing is primarily through farmers' markets and Finger Lakes Organic Growers' Cooperative. Interns will get hands-on experience with all aspects of running the farm. Family-style housing and board available; stipend if staying all or most of season. Experience is not necessary, enthusiasm is. Contact: Rivka Davis, Road's End Farm, 362 Smith Rd, Dundee NY 14837; 607-243-5234; <roadsendfarm@linkny.com>

Pumpkin Brook Organic **Gardening Crew members wanted** for organic land care business late March-November. All of our supervisors and returning crew members are NOFA Accredited Organic Land Care Professionals and are eager to share their knowledge. Established clientele in Concord-Lexington, Mass. area; car required. Skilled maintenance, planting, transplanting, pruning and fertilizing work using organic materials and methods. Full or part-time positions available. Previous horticultural experience desired. Pay range from \$10 to \$14 per hour. Contact Priscilla or Rich Williams, Pumpkin Brook Organic Gardening, 35 Turner Road, Townsend, MA 01469; phw@seedlingspecialist.com; 978-597-3005.

Organic Farmland Available for Lease or Sale. 650-acre farm between Rochester and Syracuse, NY has been organic for over 20 years. Currently it's home to a bison herd, Christmas trees, and a CSA vegetable farm. Beautiful soils and views. A small community and not-for-profit education center are growing on-site as well. Some sections (20 to 100 acres) and barns are available to farmers or homesteaders. For more information call (585) 455-4284 or visit crowfieldfarm.com

Unusual intern sought for unusual internship. Two acre organic vegetable farm and natural materials construction company looking for intern to split time. Farm duties include greenhouse and field work, farmer's markets, some delivery. Building is primarily straw bale construction and earth and lime plasters, with some carpentry. Some office work possible. 50 - 60 hours per week - Monday thru Saturday. May or June through October. Stipend: \$125 - \$200 per week, depending on experience, plus housing, lunches, and veggies from the farm. Call or email after March 1st. Sidehill Farm/GreenSpace Collaborative Amy Klippenstein or Paul Lacinski 413 625-0011 amy@greenspacecollaborative.com

Assistant Farm Manager (AFM) needed for The Morris Farm Trust, a non-profit educational farm in Wiscasset, Maine. Position begins the beginning of April to assist with all farm operations on this community farm. Duties include working with the organic dairy herd, pastured poultry operation, pigs, vegetable garden, and organic raspberry patch. In addition the AFM assists with education programs and must feel comfortable working on a public farm with daily visitors. To apply please send a cover letter and resume to Amanda Jamison, Farm Manager, P.O. Box 136, Wiscasset, ME 04578. Visit our website to learn more www.morrisfarm.org.

Established **CSA looking for more members.** Green Thumb certified organic farm with CSA deliveries to Cobble Hill, Brooklyn; Astoria, Queens, and Huntington, Long Island; is seeking to form another group on Long Island, possibly in Stony Brook area. We produce over 300 varieties of fruits, vegetables, herbs and greens to harvest May through December - delivering to our CSAs for 7 years. Anyone interested please call 631-726-1900 and leave message. We're also accepting new members in our other locations as well as our on-farm CSA in Water Mill. Also selling at farmstand open May through December.

Blow Your Own Horn!

Why pay rent, or make mortgage payments, when you can live rent-free? **The Caretaker Gazette** contains property caretaking/housesitting openings, advice and information for property caretakers/housesitters. Published since 1983, subscribers receive 800+ property caretaking opportunities each year, worldwide. Many landowners request caretakers for their organic farms. Subscriptions: \$29/yr. The Caretaker Gazette, PO Box 540-NF, River Falls, WI 54022. (715) 426-5500. www.caretaker.org.

Small organic farm located in Eastern Litchfield County, Connecticut, is **looking for a summer apprentice/intern** for the 2003 growing season. Experience not necessary, just a desire to get your hands dirty. Season would start in June and end in October, but is open to discussion. Responsibilities would include: all field operations, CSA setup and direct customer sales at a local farmers market. Intern would be offered room/board and a small stipend. Please contact us at Maple View Farm 276 Locust Rd Harwinton Ct 06791 860-485-0815 or E-Mail us at mgauger@snet.net

Come **work alongside farmer:** Are you interested in learning skills of organic vegetable production? Do you like to work outdoors? Do you like to swim off the sweat on really hot days? Come work with me from May to October (specific dates flexible) with planting, cultivation and harvesting. The farm is located in Sullivan, NH on a beautiful spot surrounded by woods, with fields that expose views of Mt. Monadnock. I have 2 acres in cultivation and market through a 60 member CSA, the Hancock Farmers Market, and wholesale accounts. For more information, call Tracie at 603-847-9066

Internship Opportunities at Holcomb Farm CSA: 18 Acre CT CSA serving greater Hartford households and community orgs. seeking interns for 2003. Interns are involved in the production and distribution of vegetables using organic methods and help facilitate programs for CSA members, volunteers, and youth program. Interns take responsibility for different areas of the operation depending on their educational goals and the needs of the farm. A strong interest in sustainable agriculture, willingness to work outdoors in all types of weather required. Contact Seth Hanauer, Holcomb Farm CSA, 509 Wethersfield Ave, Hartford, CT 06114. Phone: 860-296-9325 or e-mail: csamanager@hartfordfood.org, www.hartfordfood.org.

Electric tractor for sale: 12+ horsepower General Electric "Elec-Trak", model E12. Approx 30 years old, in good condition with little rust and everything runs. Accessories including weight box, rear lift, sleeve hitch adapter, mowing deck, snow thrower, and dozer blade available. \$350-900 depending on how many options. Located near Boston. Call or e-mail for details. Jim Coate, jbc@coate.org, 617-484-0295.

I am an environmentalist with two properties. First, my home in Foxboro with a 20 x 40 (20 yr.) organic garden with flowerbeds. Second is my wellness center in Walpole. I want to create a simple landscape with native plants, butterfly houses and bird-friendly places with compost bins at each place. I am **looking for anyone who would like to barter**; who could help splitting the Iris patches, ideas for creating ponds, rock walls and wildflower gardens. Services are massage, natural facials, natural manicures/pedicures, make-up and hair services with environmental products. Contact Kathleen Raftery, 30 Lakeview Rd., Foxboro, MA 02035.

Seeking Application Now to spring 2003 **One person sought** to join worker-owner farm collective on 7 acres of river bottom land in Burlington, VT. Delivery to wholesale accounts, farmers markets, 40-member CSA. Certified organic by VOF/NOFA-VT. Share responsibility, expense, decisions, fun, risk, and income. 1-2 years related experience necessary. Contact: Arethusa Farm, PO Box 8082, Burlington, VT 05402 [802]951.9552

Many Hands Organic Farm offers: **Shares in our CSA:** \$450/year; **Certified organic pork, turkey, chicken, goose at the farm**, contact for details; **Lavender Soap based on organic lard:** 1bar @ \$4.50, 2 bars @ \$8.50, 3 @ \$13, 4 @ \$16 incl. shipping of approx 5 oz. long-lasting bars; **Organic lard:** \$10/quart shipped; Contact farm@mhof.net or (978) 355-2853

The Berkshire Co-Op Market in Great Barrington, MA is **looking to hire a Produce Manager**. The successful candidate will possess proven management experience dealing with budgets and staff development as well as strong product knowledge. Interested candidates should mail a cover letter and resume to: Berkshire Co-Op Market, Attn: Art Ames 37 Rossetter Street, Great Barrington, MA 01230 or call Art for more information at 413-528-9697

We're **looking for an eager, energetic person, or couple**, to help us grow, harvest and sell our low-spray apples in Brentwood, NH (near Exeter). As we grow older, we're trying to plan how to keep the 5 acre farm/orchard/retail store, cider press and small bakery going. We could offer training (winter pruning, low spray techniques, orchard management, etc.) or other payment, but a second source of income would be necessary. Housing on the farm is not at this time available, but local rental is a possibility. Charles & Joan Pratt, Apple Annie, 66 Rowell Rd., Brentwood, NH 03833, (603) 778-8881

Wayne's Organic Garden, a small, diversified organic farm in Eastern Connecticut, **needs an apprentice/marketing assistant** for the 2003 season, mid May to October ideally, but will accommodate your schedule. Learn all aspects of farming and marketing: farmers' markets, CSA, wholesale, and special events, plus the work that leads to them. Help create and develop projects with us. Room and meals plus about \$125/week. Cash bonus for staying the agreed term. See if you really want to be an organic farmer. Not just a job, a way of life! PO Box 154, Oneco, CT 06373, 860-564-7987.

Brood herd for sale, organically raised, registered polled Herefords, seed stock from the Bob Genevaux herd. 14 cows and 1 bull. Please contact: Bob Holmes, 585-924-2210, Victor, NY.

Pure Vermont maple syrup, all sizes and grades. Hassle-free shipping, gift shipping too. We take pride in producing high quality syrup the old fashioned way! From our trees to your table! May your holidays be sweet. The Schlosser Family, Sandiwood Farm, Wolcott, Vt.05680, www.vtpuresyrup.com, toll-free-1-888-36-syrup(79787), local-802-888-2881, email:maplesyrup@mt-mansfield.com

Internship positions available on organic fruit farm. Learn from over 20 years experience farming strawberries, apples, raspberries, blueberries and vegetable crops. For more information contact Don or Marnie at Thompson-Finch Farm in Ancram, NY. Phone 518-329-7578, email thompfinch@taconic.net.

Weston Nurseries is sponsoring a Farmers' Market in Hopkinton, Massachusetts, to complement its involvement in the new People, Places and Plants television show. The Market is planned for Friday afternoons and Saturday mornings, starting in July. We have **space for 6 vegetable/fruit growers**, plus dairy, bakery, cheeses, jams and spreads, fish, etc, at \$25 per market day. Located 3 miles east of 495 exit 21A, the nursery will provide parking for vendors and customers, publicity, signage, and grocery bags. For questions, applications and rules, please contact Tim Kiely, Manager, Weston Nurseries, 93 East Main Street, Hopkinton, MA 01748, 508-293-8079, TimK@WestonNurseries.com

Experience farming as a lifestyle by **working on an organic vegetable/flower farm for a share of the earnings**. We need people to pool experience and resources with us to provide good food and environmental awareness to the larger community. Housing is on the farm and eating is communal. Priorities are: enjoying physical work, active intellectual interest in farming/the environment, flexible eating requirements and a willingness to share the risks as well as the joys of farming. (802) 295-7827, Tanyard Farm, West Hartford, VT.

Would you like to start a market garden/CSA on existing organic certified land? The land has a good site in central Vermont for a farmstand. There are also local farmers markets and an area with CSA potential. An existing 25 year organic farm operation has an **opportunity for an experienced person/couple to do direct marketing**. The farm would provide housing, food and fertile ground in exchange for help planting and harvesting our wholesale vegetables. (802) 295-7827 Tanyard Farm, West Hartford, Vermont.

Summer internship opportunity. Come work with us this summer on our nine acre organic farm-homestead and learn the pleasure of living directly from nature and in community with others. As an intern you will work with us (for a minimum of 20 hours per week), enjoy vegetables and eggs from our farm, and experience personal time of your own in a charming summer cabin in the woods. Contact Sharon Gensler, Wild Browse Farm, 87 Bullard Pasture Rd., Wendell, MA 01379 or wildbrowse@yahoo.com with a brief description of yourself, your qualifications, questions and the best way for us to reach you.

Farm Coordinator/Educator. The Meeting School, a small Quaker high school in NH, **seeks an individual/couple to manage 140 acre farm/forest**. Responsibilities range from houseparenting teens to integrating the farm into our daily life and classroom experience. Also seeking farm interns to begin Spring, 03. 603-899-3366 or www.meetingschool.org"

Production Garden Manager for an organically managed five-acre vegetable garden with some fruits. Manager supervises a crew of twenty-two students, using tractors and hand cultivation to supply the College during the school year and a tailgate market in the summer. Candidate must have managed a profitable organic vegetable operation using greenhouses and season extenders and have taught organic market gardening. An associate degree is required, agriculture degree preferred. Draft horse experience is a plus. Send resume, cover letter, and contact info of three references to: Gail Baylor, Warren Wilson College, PO Box 9000, Asheville, N.C. 28815-9000 by March 14, 2003.

News Notes

compiled by Jack Kittredge

University of Washington study analyzed pesticide breakdown products (metabolites) in pre-school aged children and found that children eating organic fruits and vegetables had concentrations of pesticide metabolites six times lower than children eating conventional produce. The study compared metabolite concentrations of organophosphorus (OP) pesticides (a class of insecticides that disrupt the nervous system) in the urine of 39 urban and suburban children aged 2 to 4 years. The researchers' findings point to a relatively simple way for parents to reduce their children's chemical loads—serve organic produce. The authors focused on children's dietary pesticide exposure because children are at greater risk for two reasons: they eat more food relative to body mass, and they eat foods higher in pesticide residues—such as juices, fresh fruits and vegetables. An earlier study cited by the authors looked at pesticide metabolites in the urine of 96 urban and suburban children and found OP pesticides in the urine of all children but one. The parents of the child with no pesticide metabolites reported buying exclusively organic produce. *Source: Pesticide Action Network Updates Service, January 31, 2003*

Farm Chemicals Linked to Lower Sperm Counts. A study published in the November issue of Environmental Health Perspectives has found significantly lower sperm counts and sperm motility among men from farming areas. Already researchers are testing the urine of the men involved for byproducts of pesticides used on nearby farms. *Source: In Good Tilth, February 15, 2003*

Mushrooms from Oil? An interesting idea is being tried out in New Mexico. Chain saws used to cut firebreaks are supplied with saw oil which contains mushroom spores. The spores are released along the firebreaks as they are cut and then create an environment rich in mushrooms which are grazed by sheep. A local cooperative produces and sells clothing made from the wool of these sheep. *Source: Organic Farming, Winter 2002/03*

New Populism in Pennsylvania? In December the municipal officials of Porter Township (Clarion County) passed an ordinance stating that corporations should not be considered to be 'persons' within the township. The action stems from a lawsuit filed by a sludge hauling company against local towns trying to protect their land from contamination. The company, like many corporations since 1886 when the US Supreme Court granted corporations the legal rights of persons, claimed constitutional protections against local regulation. Should the townships move stand up legally, a new day would dawn for citizens struggling with today's immensely powerful multi-national corporations. *Source: Wild Matters, February, 2003*

Most conventional chicken contaminated. A study by ABC Research found that over half of 200 chickens purchased at supermarkets in Iowa and Minnesota were infested with campylobacter and salmonella bacteria resistant to one or more antibiotics. Seventy percent of all antibiotics in the US are fed to healthy pigs, poultry and cattle to increase their rate of gain. The result, however, is that bacteria are rapidly evolving resistance to the antibiotics and becoming a threat to human health. *Source: In Good Tilth, February 15, 2003*

Organic Valley Passes Success on to Farmers. Organic Valley, the national coop marketing organic dairy products had a good year. In 2002 it achieved over \$125 million in sales. This has enabled the group to pay it's Wisconsin farmers \$20.02 per hundredweight at a time when convention milk is getting about \$11.00. The coop has 515 farmer members milking 17,800 cows and farming about 75,000 acres. *Source: Acres, USA, February, 2003*

Organic Market Still Growing. Sales of organic grain doubled between 1998 and 2000. According to Newsweek magazine the market for organic wheat, rice, corn, barley and oats now exceeds \$400 million a year and soybeans are expanding apace. During the same two-year period demand for organic meats grew 71%, dairy products 96%, and convenience foods 86%. The overall organic market has grown 20% per year for the last decade (5 times faster than food sales in general) with 40% of consumers purchasing some organic products. Sales topped \$11 billion in 2002 and should be close to \$20 billion by 2005. Whereas in 1991 almost 70% of organic sales happened at natural products retailers and under 10% at conventional supermarkets, in 2000 the two types of retailers had about equal sales, each at about 48%. Organic consumers are extremely loyal, with 85% of recent organic buyers planning to continue. *Source: The Germinator, October 2002; Greenmoney Journal, December/January 2003; In Good Tilth, December 15, 2002; Acres, USA, December, 2002*

Genetic Engineering (GE) Section

Soil Association Studies US GE Experience. The British Soil Association recently issued a report on the experience of the US with GE crops. Besides the well documented problems with contamination, they found for farmers that 1) GE crops are less profitable than conventional, due to high costs and limited markets, 2) reputed yield increases are not real, with RoundUp Ready soy yields down by 6 to 11 percent and only a small yield increase in Bt corn, 3) Herbicide use has increased as herbicide tolerant crop plantings increase, and 4) farmers have fewer choices now, often finding themselves locked into a GE crop. Economically, GE crops have been a disaster. 1) US corn exports to Europe have almost vanished, along with Canadian canola exports there, 2) US farm subsidies have grown as our exports have shrunk, and 3) overall, GE crops have cost the US economy at least \$12 billion from 1999 to 2001. *Source: Seeds of Doubt, North American Farmers' Experiences of GM Crops*

North Dakota Foundation Soy Seed Contaminated. Despite their best efforts, officials who maintain the North Dakota State University foundation seedstock have discovered GE contamination in two lots of their soybeans. Foundation seedstock is supposed to be the purest available, and the foundation for a region's entire seed production and distribution system. The contamination apparently happened when seed was sent to Chile to grow out for new seed and was harvested with an improperly cleaned combine. "Contamination of foundation seedstocks strikes at the very heart of the segregation argument," said Duane Boehm, a Richardton, ND farmer. "Not only does it call into question how realistic it is to think we can keep transgenic varieties out, but it raises the issue of at what cost and who bears the liability for the costs associated with such an event." *Source: The Non-GMO Source, January, 2003*

Canada Rejects Mouse Patent. The Canadian Supreme Court has upheld a rejection of Harvard University's effort to patent a line of mice engineered to develop cancer. "If you start treating a living organism as a mere composition of matter," said a Commissioner of Patents spokesperson, "there's nothing to stop us from treating all life forms in that way. The danger is that we treat everything and everyone like a product." *Source: Gene Watch, January-February 2003*

Washington State Bans GE Fish. Washington's Fish & Wildlife Commission has adopted new regulations banning GE salmon from fish farms in its marine waterways. The move is designed to protect native salmon in the wake of repeated escapes from fish farms. Some salmon have been engineered to grow four to six times faster than natural salmon. *Source: Wild Matters, February, 2003*

Organic Corn Seed From Argentina? Great Harvest Organics, an Indiana seed company, is moving its corn seed production to a 10,000 acre organic farm near Buenos Aires, Argentina. "To get two-mile isolation from any crop in the US is difficult," says company vice president David Booher. "We needed the ability to isolate from any other corn crop, GM or not, to ensure the organic integrity of the product." This may be the trend of the future. Tom Ehrhardt, of Albert Lea SeedHouse, says "In search of isolation, it may be necessary to go to other areas of the world." *Source: The Non-GMO Source, January, 2003*

ProdiGene Fined \$3 Million for Contamination. On December 7 the USDA announced an agreement with the company responsible for mixing 500,000 bushels of soybeans with GE corn containing an animal vaccine (see last issue of The Natural Farmer). ProdiGene, Inc. will pay a \$3,000,000 fine as well as compensate the USDA for the beans and the cost of destroying them. Secretary Ann Veneman said "...we're going to go ahead with industrial and pharmaceutical plants, but only if we can assure ourselves as a nation that the way we grow these does not result in contamination of our food supply." *Source: Acres, USA, February, 2003*

Food Industry Challenging BioTech on Pharma Crops. The national food industry is alarmed at the threat posed to consumer confidence by the new wave of pharmaceutical crops and is calling for strong regulation. In February the National Food Processors Association (NFPA) strongly urged that there be no use of food or feed crops to produce plant-made pharmaceuticals (PMPs) or industrial chemicals "without a 100% guarantee against any contamination of the food or feed supply." "In the absence of demonstrated effective controls and procedures to ensure against any contamination of the food or feed supply, NFPA vigorously opposes the use of food or feed crops to produce PMPs," noted Dr. Rhona Applebaum, NFPA's Executive Vice President and Chief Science Officer. The Grocery Manufacturers of America have not been silent on the issue, either. GMA Senior Vice President of Government Affairs Mary Sophos said: "...a clear system of regulatory enforcement and liability needs to be in place for the development, testing and eventual commercialization of PMPs... Until then, no permits for new field trials or for commercialization should be issued by USDA because there is no room for trial and error." *Source: NFPA and GMA press releases, February 6, 2003*

These Little (GE) Pigs Went to Market. The Food and Drug Administration (FDA) is investigating the possibility that genetically engineered pigs might have been illegally sold for use as food. The pigs were created at the University of Illinois as part of an experiment to see if they could be made to grow faster. Some pigs were given a cow lactation gene to promote increased milk production for their young, university officials said. Others were given a synthesized gene for insulin-like growth factor 1, which was designed to improve their digestion. Some pigs contained both genes, they said. The FDA said that from April 2001 until January of 2003, 386 of the offspring of the genetically engineered pigs were sold to a livestock dealer who might have sold them for use as food. Dr. Lester Crawford, FDA deputy commissioner, said that the university could face fines or be required to stop certain research. *Source: New York Times, February 6, 2003*

China GE-free Corn Exports Rise. In the first 10 months of 2002 China's exports of non genetically engineered corn increased 73% to 10 million tons. The country is now the second largest producer of corn, after the US at 120 million tons. China so far does not allow GE corn to be grown, and is still researching its impact on people and animals. *Source: The Non-GMO Source, January, 2003*

Soy Market Share: US Down, Brazil Up. The total market share of US soybeans fell from 57% in 1999/2000 to 40% in 2002/2003. Meanwhile, Brazil's export share has increased from 24% to 34%. Just this last year Brazil's soy exports jumped 15%. Brazil's soybeans are not genetically engineered, while most US ones are. *Source: The Non-GMO Source, January, 2003*

Monsanto Fires CEO. On December 18, 2002, Monsanto announced the resignation of its president and chief executive Hendrik Verfaillie, ending a 26 year career with the company. In a press release the company stated that the resignation was a mutual decision. Both Verfaillie and the board of directors agreed "that the company's performance during the past two years has been disappointing." However, according to the St. Louis Dispatch, "industry analysts and those who have closely worked with Verfaillie over the years said they believe the board called for his resignation." Monsanto stocks fell almost 6% at the news; Monsanto's stock fell nearly 50% in 2002. Monsanto attributes the drops to unusually dry conditions in the U.S. throughout the summer and early autumn, plus a sharp decline in maize seed sales in Brazil and Argentina. Sales of Monsanto's herbicides, including its flagship herbicide Roundup (glyphosate), were down almost 43% in the third quarter. There was a 26% decline in herbicide sales (to US\$1.5 billion) in the first nine months. *Source: Pesticide Action Network Updates Service, December 20, 2002*

Syngenta Closes Research Plant. A pacesetter in plant genomics, the Torrey Mesa Research Institute (TMRI), will close its doors by the end of January, an apparent victim of tightening research budgets. TMRI's owner, the Swiss-based agribusiness giant Syngenta, announced on 4 December that it intends to shutter the 4-year-old San Diego, California, institute, which led the company's efforts to sequence the rice genome. "It is a big retraction in Syngenta's apparent willingness to invest in basic research," says Chris Sommerville of the Carnegie Institute of Washington's department of plant biology in Stanford, California. Biologist Alan Jones of the University of North Carolina, Chapel Hill, says he sees similar belt tightening throughout the agbiotech industry: "They are hunkering down." Steven Briggs, TMRI's chief executive blames the "very somber experience" of TMRI's closing on the agricultural economy. "We've been in a state of contraction for the past 5 years," he says. "There's no indication of a turnaround ... and so there's a danger of significant reductions in research budgets—the focus has to be on generating revenues. You sacrifice your research." *Source: SCIENCE, Vol. 298, 13 December 2002*

Truth is an Unfair Trade Practice? In Maine, if you buy dairy products bearing the state's Quality Trademark Seal, you know the producer has stated that none of the milk came from cows injected with Bovine Growth Hormone (rBGH). But in December Monsanto, joined by the Biotechnology Association of Maine and three dairies, asked the Attorney General and the Agriculture Commissioner of Maine to suspend the use of the Seal on milk products. They also asked the Attorney General to initiate law enforcement proceedings against the two major processors using these labels, for "unfair trade practices." The rationale, of course, is that milk from cows injected with rBGH is "equivalent in all respects" to any other milk—except for the higher levels of pus, antibiotics, and Insulin-like Growth Factor-1. *Source: Organic Consumer Association, http://www.organicconsumers.org/rbgh/012203_rbgh.cfm*

British Medical Association Calls for GE Moratorium. The association which represents more than 80% of British doctors in November called for a moratorium on field trials (currently in Scotland) and on any commercial plantings of GE crops. They said public health concerns are "serious enough" to justify an immediate end of these trials. The most worrying issue is antibiotic resistance resulting from the transfer of markers from GE foods to pathogenic organisms. The group also cited allergenicity among humans from GE foods, and the lack of any monitoring system near the Scottish trials to pick up unexpected human health impacts. *Source: The Germinator, January, 2003*

U.K. Minister Terms US Policy 'Wicked'. Michael Meacher, England's environment minister, called the US policy of forcing starving countries to accept GE food as aid "wicked". He says plenty of non-GE food is available but the US is "using the famine to push" GE food for reasons of "politics". *Source: Acres, USA, February, 2003*

Europe Tightens GE Regulations. European Union farm ministers have agreed that any food or feed containing GE material at a level of 0.9% or higher will have to be labeled, and unauthorized GE "traces" have a threshold of 0.5%. These proposals will go to the European Parliament next, which has supported even stricter levels. *Source: Elm Farm Research Center Bulletin, December, 2002*

Japan Ditches GE Rice. Japan has decided to end a six-year research collaboration with Monsanto to develop a RoundUp Ready rice. The project was dropped because of strong consumer opposition. Rice is a staple food in the Japanese diet. *Source: The Non-GMO Source, January, 2003*

India Rejects GE Food Aid. Last year India turned back a shipment of US food aid containing bio-engineered corn and soy. US officials are appealing to New Delhi, saying they cannot guarantee grain will be free of GE content since separation procedures are not followed at the source. But A. M. Gokhale, chair of the Indian committee which rejected the consignment, said "...if there is reason to believe that there may be damage to human health, we have the right to reject any import." *Source: Acres, USA, February, 2003*

MOFGA Completes its \$3.1 million Capital Campaign!

by Susie O'Keeffe

January 29, 2003 (Unity, Maine) The Maine Organic Farmers and Gardeners Association (MOFGA) has successfully completed its \$3.1 million capital campaign! MOFGA launched this effort in 1997 to create a permanent location for the Common Ground Country Fair, and a year-round education center dedicated to sharing MOFGA's 30 years of experience and expertise in local, organic farming and gardening.

The generosity of thousands of individuals, businesses and institutions helped pay for the land and buildings that now comprise MOFGA's beautiful Common Ground. To date the organization has hosted four Common Ground Country Fairs at the new site and hundreds of workshops. Several gardens and plantings, including a wonderful orchard demonstrating cash crops that growers can cultivate while their trees mature, are now all permanent features at the site. The capital campaign also allowed MOFGA to construct a central building, which houses the exhibition hall and includes office space, a large-scale kitchen and library space. Livestock barns and outbuildings were also funded by this campaign. A demonstration Farmhouse, which provides housing and gardening space for people participating in the organization's Journey person Program, was also made possible through this campaign. Countless volunteers helped build these structures and hundreds of in-kinds gifts allowed the organization to establish itself at its new home.

MOFGA wishes to thank everyone who has helped create its Common Ground. Having its own home has opened up an entirely new world for the organization. MOFGA can now share what its members and growers have been learning and doing since 1971, all year long. The organization invites everyone to visit its Common Ground at 294 Crosby Brook Road in Unity at any time. For more information call (207) 568 4142 or visit their website at www.mofga.org

Notice to all NOFA Certified Farmers!

by Ellen Kittredge

Many thanks to those who provided food for the 2002 NOFA Summer Conference All-Local meal. Over 500 conference participants enjoyed a delicious Saturday evening meal. Due to the success of last year's venture, the Conference Committee will again contract with certified farmers from the seven NOFA chapter states to provide one meal made entirely from local produce, meats, eggs, etc. Farmers who wish to participate will receive market price for their products. By paying you directly from our account, we will be cutting out the middle-person and feel the satisfaction of knowing exactly where and how our food was grown. We hope the opportunity to sell to us will not only provide an additional market for you, but also allow us to further our mission by connecting with and directly supporting NOFA farmers.

We will put together a menu based on what you can provide, and at this point are looking for sources of fruit, vegetables, herbs, meats, eggs, dairy, and grains. Your product will need to be delivered on Thursday the 7th of August. Unfortunately we cannot pick up from all the farms that will be participating, so we need to ask you to be responsible for delivery on this date. If you are not planning on coming to the conference, please consider participating anyway, for we can most likely find someone from your area who would be willing to transport your product for you. Please think over what might be ready for harvest on your farm in early August and consider planting a few extra rows for us. To advertise for you and thank you, each participating farm will be mentioned on a leaflet provided for those eating the meal. We hope to involve as many farms as possible and make this a very successful event!

If you are interested in participating this year, please contact Ellen Kittredge at (978) 355-2853, or by email: ellenkit@wildmail.com. Respond by the end of March at the latest. I look forward to hearing from you. Thanks in advance for helping us provide the most local meal possible at the summer conference.

Equipping the New Small Farm

by Judy Gillan

We all know it. In days gone by, new farmers acquired skills and knowledge through life experience, most often working side-by-side with family members and neighbors, over the course of time. Occasional but important help came from “professional agriculture”—service providers such as salesmen and county extension agents. Farm buildings and equipment also passed from generation to generation, with replacement and upgrades also taking place over time. Rarely was a new farmer faced with assembling farming knowledge, skills and infrastructure all at once. That was then. Things are different now. Especially in the Northeast.

Today, many of our new farmers come from non-farm backgrounds and others, who do come from farm families, choose to farm very differently from their predecessors. At the same time, retiring farmers often take all that they know, and all that they own, out of agriculture when they exit. Our pool of farming expertise is rapidly dwindling, threatening the transfer of core skills essential to production agriculture.

This poses a real challenge for our new, next generation farmers—particularly as they grapple with farm equipment acquisition, operation and maintenance. Mechanization strategies must reflect technical skills and available resources as well as personal preference. And once acquired, farm equipment requires competent operation, maintenance and repair, if it is to play its important role of enhancing labor input on the farm.

In the spring of 2002, the Northeast SARE Program provided support to the New England Small Farm Institute to address these challenges. Through its “Educating Northeast New Farmers about Farm Equipment and Mechanization” Project, NESFI has embarked on a three-part effort to create and deliver a new farm mechanization decision-making “tool” and a set of competency-based technical skills learning guides for farmer-learner partnerships. Nearly one-third of the way through our project, we have learned at least as much as we have taught. We know that barriers faced by the next generation of Northeast farming mentors and educators are nearly as daunting as those faced by our new farmer constituencies.

First, we are reminded daily that the continued erosion of our Northeast farming skills pool is truly tragic. While our new farmers express a strong preference for learning “from those who are doing it,” our population of experienced farmers is growing smaller by the day. Traditional skills transfer models must be replaced with new partnerships between learners and willing, experienced farmers. Fostering this is both an urgent and a challenging Project task.

Phase I of the Equipment Project has focused on “discovery”—finding, acquiring and evaluating existing teaching tools and information that can support such farmer-learner partnerships. It makes no sense to reinvent the wheel, and our goal is to use existing material whenever possible. It is disappointing to discover that current material mainly targets the needs of an agricultural sector (commodity based), in a region (the Midwest), at a scale (from medium to large), and for a constituency (secondary and early post-secondary school students) quite unlike our own. Moreover, this material rarely envisions a teaching/mentoring role for the practicing farmer. Developing regionally relevant teaching tools and delivery systems that both involve the expertise of farmers and respect the learning styles and personal schedules of career changers and post-college young adult learners is also an urgent and challenging Project task. Training material developed for the Project’s first round of workshops and mechanization consultations is being piloted and refined to meet these criteria.

Phase II of the Equipment Project has focused on confirming and learning to meet new farmers’ needs in two key areas: technical skills development and

The Natural Farmer

Special Supplement on Farm Equipment



photo courtesy NESFI

Rachel Seemar, Appleton Farms intern, practicing welds at White Oak Farm Shop, Belchertown, Massachusetts.

farm mechanization decision-making. Learners have affirmed their strong preference for technical skills training by skilled farmers in on-farm settings. At a summer 2002 gathering of CRAFT apprentices and their mentors, a half-day, on-farm “workshop” on the topic of farm equipment repair and maintenance was offered, at their request. Our Project goal for the event included evaluating the usefulness of this type of learning opportunity, and soliciting ideas for more effective approaches and high-priority topics for future training events. It became clear that, if competency is our goal, single-session workshops—especially those that focus on very broad topics—are likely to have limited impact. Participants encouraged multiple-session workshops or short courses, targeting specific technical skills and providing opportunity for ongoing supervised practice. There was limited interest in competency testing and certification. Six apprentices interested in welding skills training agreed to work with the Project to “co-pilot” this model—but not until harvest season pressures diminished in the fall!

To date, and guided by learners’ needs and suggestions, two farm-shop-based, multi-session welding workshops have been piloted. Each session has been limited to four participants, insuring close farmer-teacher supervision for each individual. Convening with a half-day informational session, held in a traditional classroom setting, the workshops have begun with a focus on “knowing.” A basic informational package or learning guide, targeting learners’ stated needs, is reviewed. Tools and supplies (in this case, clamps, brushes, electrodes, nozzles, safety gear, weld samples, etc.) are closely examined. Safety considerations and “rules of the shop” are discussed. Questions, and more questions, are encouraged. Concerns about hands-on practice are raised and addressed. Then, moving to a farm shop setting, a shop tour, including an

introduction to shop safety devices and practices, is followed by “doing”—demonstration and supervised practice. Importantly, a training (in this case, welding) station, safety gear and supplies are provided for each participant—valuable time is spent in hands-on, supervised practice, not in waiting in line or watching a fellow student’s activities.

Originally scheduled for one and a half days, practice sessions have been both extended and expanded; extended by an additional two days of supervised practice, and expanded to include a “project”—repair and/or fabrication of farm equipment of the participants’ choice. Evaluations have been overwhelmingly positive, and ongoing feedback has provided guidance in making mid-course improvements needed to meet trainee needs. We have been encouraged to consider the value of “learning teams”—colleagues who, applying as a group, can feel comfortable “goofing up or asking dumb questions” in each others’ presence, and who can provide each other with support when supervised practice is no longer required. By request, a supervised practice “tune-up” session for new farmers with prior welding experience has also been designed. And, looking toward Phase III of the Project—recruiting and supporting experienced farmers who are able and willing to offer similar on-farm training—workshop “co-pilots” have been invited to help design an On-Farm Skills Training Manual for farmer-teachers, including a checklist of necessary teaching skills, training equipment and settings, as well as informational material on teaching what you know.

The complex process of developing and implementing a mechanization strategy is among the most daunting challenges faced by new farmers, and

(continued on next page)

creating an effective decision guide is an equally daunting Project task. "Discovery" in this Project component has included acquiring and evaluating existing mechanization decision "tools," and assessing their relevance for our Northeast new farmer constituency. As expected, the best current material is designed for experienced farmers faced with trade-in decisions — Midwest grain farmers, for example, considering the economics of trading an older combine for a newer model, or exiting dairy farmers shifting their equipment inventory to meet the needs of a new replacement heifer enterprise. While they provide a useful model, these tools require extensive modification to serve Project needs.

Mistakes in equipment acquisition can be costly, and most new farmers have little margin for error in such investment. They often start with little or nothing—perhaps a set of inherited equipment abandoned in the barns and hedgerows of the "new" farm. Financial resources, technical skills and personal preferences must be matched with the requirements of the new farm enterprise (including scale as well as type), and with the capability of the "new" farm's land. Tolerance for debt or for gradual "boot-strapping" must be assessed and faced squarely. Other considerations include cost (often a new or used equipment decision); ease of operation, maintenance and repair; access to dealers, parts suppliers and/or repair shops; access to custom-hire services; and, perhaps most importantly, the new farmer's equipment-related interests, aptitudes and skills. An effective mechanization decision-making tool and plan must accommodate all of these. Drawing on the best features of existing models and new farmer input, a first draft design is still under development. It will be piloted in one-on-one mechanization consultations during the late spring and summer of 2003, and offered in the form of a multi-session short course in the fall. A self-study workbook and service providers' guide will follow, accompanied with on-line resources and technical support.

As expected, the Farm Equipment and Mechanization Project has offered — and keeps on offering — a wealth of insights. First, we are reminded that replacing our regional pool of farming skills will be

a farmer-by-farmer proposition. Effective training, resulting in true competency, cannot succeed if offered en masse. In addition, we are reminded that it is presumptuous to assume we know, without asking, what learners want and need. While peer-guided program development is time consuming, it effectively links learners' stated needs with program content and delivery—a central program development goal. Last but not least, we have discovered that creating program development partnerships with farming learners, on the one hand, and experienced farming teachers, on the other, is not only challenging and productive, but, as it turns out, really a whole lot of fun for everyone. Perhaps more than anything else, this bodes well for Project success.

The Farm Equipment and Mechanization Project welcomes questions from new farmer learners, and is actively seeking experienced farmers willing to share, through on-farm technical training, what they know and can do. The widest possible participation in this Project is important. Contact Eric Toensmeier, NESFI NESARE Equipment Project, 413-323-4531 or erict@smallfarm.org.

Biodiesel: A Cleaner Fuel

by Sherry Russell

Dr. Rudolph Diesel first exhibited his newly patented "compression ignition motor" at the World Exhibition in Paris in 1900. Onlookers were surprised to learn that it was running on unadulterated peanut oil. His design was revolutionary in that no spark was needed to ignite the fuel mixture and that it was designed to run on almost any hydrocarbon from gasoline to vegetable oil.

In 1912, Dr. Diesel stated, "The use of vegetable oils for engine fuels may seem insignificant today, but such oils may become in the course of time as important as petroleum and the coal tar products of the present time."

That time may be coming sooner than anyone thought. Tom Leue is one of a few pioneers in New England who want to replace imported petroleum-based diesel oil with a renewable, local fuel source. Biodiesel is a clean burning vegetable-based fuel that can be used to fuel diesel cars, trucks, boats, tractors, generators, and anything else with a diesel engine. It can also be used as home heating oil.

Biodiesel generates comparable miles per gallon and similar horsepower as petroleum diesel. It can be used 100% by itself or in any ratio with normal diesel fuel. Biodiesel can be stored anywhere petroleum diesel is stored. The fuel is made in a simple process that converts vegetable oil and methanol into a powerful source of energy. Yet it is non-toxic and biodegradable, so is less harmful in a spill than petroleum diesel. Biodiesel meets all standards of the Energy Policy Act of 1992 and has completed all Health Effects Testing under the Clean Air Act. It is the only EPA approved alternative fuel for diesel engines.

In Europe, where nearly a third of all new cars are powered by diesel engines, the demand for biodiesel is high. All of the diesel fuel sold in France is blended with 5% biodiesel and there are over a thousand biodiesel filling stations in Germany.

The chemistry of biodiesel is not complex. A molecule of vegetable oil consists of three hydrocarbon chains (esters) bonded to a central molecule of glycerin. Through the process of transesterification, the central glycerin molecule can be replaced with an alcohol, either ethanol or methanol. Ordinary household lye, sodium hydroxide, will catalyze this simple reaction. The removal of glycerin results in a thinner fluid, and the addition of alcohol makes the oil more flammable.

Leue said he has always been interested in alternative fuels, and was led to biodiesel after buying his first diesel tractor. He converted his maple sugaring operation into a biodiesel processing system, a relatively easy conversion. "The investment is similar to that of maple sugaring," he said.

Leue has been making biodiesel for five years, and admits he still has a ways to go in construction of his system. What he figured out on his own was that he can collect used vegetable oil, put it in a storage tank, and let gravity separate the water and particles from the oil. He warms the oil to 140 degrees, tests acidity, then adds a mixture of lye and alcohol to neutralize the acid and break the molecules into component parts.

"It's a simple reaction," he said, of breaking the oil and glycerin molecules. "The clean oil rises to the top. I draw off the glycerin from the bottom, and filter the oil. I keep a log book for each batch, because it is such a variable commodity, and it changes quite a bit from day to day."

He uses a vat from a commercial kitchen for the separation, a hot water heater to warm the oil, and filters that came from a chemical plating industry. His truck is equipped with a pump and storage tank, and he uses this to collect the used oil from area restaurants.



photo by Sherry Russell

Tom Leue of Ashfield, Massachusetts, uses this truck to pick up used vegetable oil from local restaurants.

The fuel, he said, "runs quieter, and produces a pleasant smelling exhaust. It reduces tailpipe toxins by up to ninety percent, and reduces sulfur emissions by 100 percent. It does not add to carbon dioxide in the air. So it has health benefits, mechanical benefits, and environmental benefits."

Leue said, "My demand is far greater than I can produce right now. I would encourage other farmers to start biodiesel production. There is a big market for it."

One drawback of the fuel in current engines, Leue explains, is that: "Biodiesel can clog fuel filters, and slowly degrades rubber and rubber based compounds (both natural and synthetic). So if you don't replace rubber seals on connectors, one day you'll discover a growing pool of your valuable (yet non-toxic) biodiesel under your car. You will know what lines to replace, however, because they will be soft and soaked in biodiesel."

The only by-product of transesterification is vegetable glycerin. Depending on the purity of the source vegetable oil, the glycerin can be made into soap for various uses or it can be composted. Leue said he is still trying to come up with the best use for glycerin. He built an outdoor furnace that he plans to use to burn it, which will produce heat for his processing system.

The major obstacle Leue has faced is meeting EPA requirements. He said, "The government does not encourage alternative energy," and in fact has made it difficult for small producers.

He has been working with EPA to meet the strict federal requirements for an on the road fuel. In the meantime, he sells the product as a "de-greaser" to customers. He sells it in recycled five gallon containers for \$12 per five gallons. Leue said, "It's profitable on a small scale, and not too time consuming. It can be made year-round, so has a much better profit margin than maple syrup."

Leue would like to see others duplicate the system, so that the collection and distribution stays local. He said, "It's not realistic or environmentally sound to buy biodiesel from the West Coast when you live on the East Coast. The amount of fuel used to transport it nullifies any advantages. What is needed is a greater interest in biodiesel in the east, and the production will follow."

Tom Leue's company, Yellow Brand PREMIUM Biodiesel in Ashfield, Massachusetts operates as Homestead Inc. To contact Homestead, call #1-800-285-4533 or email tilapia@aol.com. To learn more about biodiesel, go to the website, <http://www.biodiesel.org/>.

Low Cost, Low Tech Implements for Horse-Powered Vegetable Production

by David Fisher

As we've developed the market garden to be a horse powered operation over the past three years, equipment has been the weak, but crucial, link in the system. At this point we are fairly well-equipped to manage our six acres of fields effectively and efficiently. In chronological order, we use the following implements in raising our produce throughout the season:

The first implement used on our early vegetable fields — which lie through the winter in a winter-killed cover of oats and peas — would be the disk harrow. We have managed with a quite small (six foot) harrow for years but have recently graduated to a larger tractor-drawn, eight foot harrow hitched to a forecart. A couple of passes with the disk is all an early field needs before step two, which is a light pass with a spike tooth harrow.

The spike tooth harrow consists basically of two sections of a four foot square metal frame, across which span about five bars, each with a dozen railroad-like spikes; the two sections are attached to an eight foot wooden draw bar. This

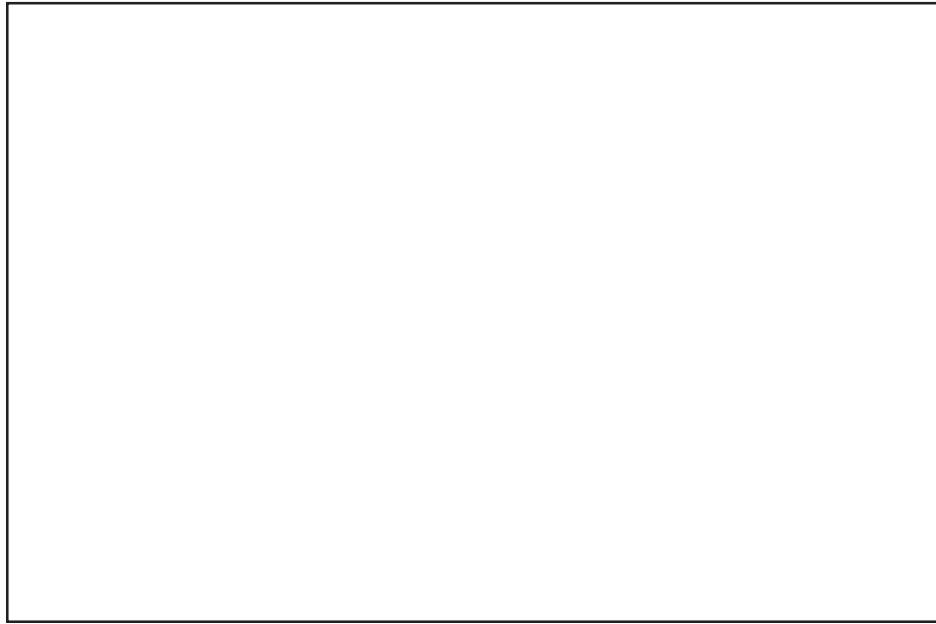


photo courtesy of David Fisher

Spreading compost with a ground-driven manure spreader.



photo courtesy of David Fisher

Rolling beds with a cultipacker

harrow can be set a full 4 inches deep to break up any larger clumps in the soil or not set at all to simply level the field before bed forming.

To form planting beds we take our two-horse, straddle the row-type riding cultivator and add a center sweep to make a total of five V-shaped, 12 inch sweeps in flying geese formation. We set the two outside sweeps, which track in the wheel paths, a good 5 inches deeper than the others, which results in the soil being thrown from the pathways up onto the beds. Now the bed is formed to the exact width of our cultivator and the horses have already determined the path spacing between beds before the crop even comes into the field.

After beds are formed we roll them with an eight-foot, single-axle cultipacker. The iron press wheels of the cultipacker are heavy enough to firm up the soil to promote food capillary action (wicking) from the moisture reserves lower in the earth should the crop face dry times, and to ensure good seed to soil contact once our direct seeded crops go in. The cultipacker is not so heavy that it causes detrimental compaction to the earth.

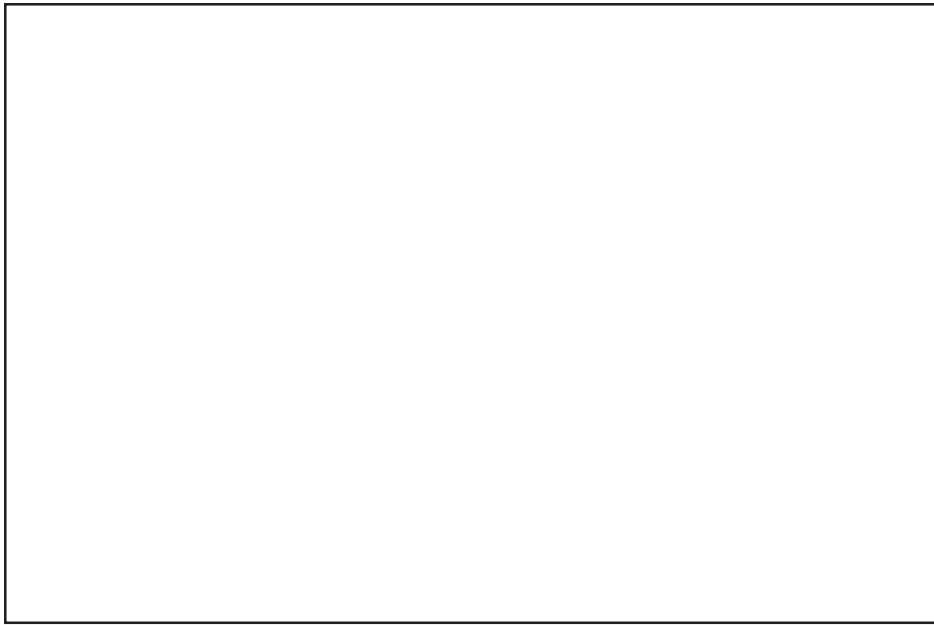


photo courtesy of David Fisher

Opening narrow furrows with a cultivating shank mounted on the riding cultivator.

Next step is to put in the crop. For direct seeded crops (about 60% of all our crops) we seed a single row per 32 inch bed by hand with a push seeder. For transplanted crops we take our same row cultivator with which we made the beds, pull off the sweeps and put a single, narrow straight-tooth cultivator in the center location. Another pass over the bed leaves a straight, narrow slit in the bed into which the transplants are tucked by hand. For potato planting, a wider shovel takes the place of the tooth to open a wider, deeper furrow for depositing seed potatoes into. And another change-up of the same implement sees us through the end of planting. We take off the center-mounted shovel and add two disk hillers, angled in, to throw soil back over the seed potatoes, and later on, to hill the growing spuds. A little later on, the same cultivator will do the V sweeps again — this time minus the center sweep — for row cultivation of the growing crops one to three times, depending on the crop.

At this point in the season we are ready to get into our later fields which have come through the winter in rye and vetch and need to be turned in with the mouldboard plow. A team or a three horse hitch does a nice job with our Oliver two-way sulky plow. After plowing we pick up where we began the season with the disk harrow, spike tooth, and so on.

These are the basic implements that we rely upon for raising our mixed vegetable market garden. Other implements that we use throughout the season include the indispensable farm wagon, ground-driven manure spreader,

ground-driven potato digger, ground-driven lime spreader, ground-driven mowing machine, stone boat, and water sled (for livestock).

All in all, we have been lucky with regards to implements in that many of the aforementioned were on the farm already, some in the barn in excellent condition, some rotting away in the hedgerow. Others have come from chance encounters or through friends traveling the countryside with keen eyes. Still others have been bought at auction in Massachusetts or Pennsylvania. We have had some good parts and technical help from B. W. Macknair & Son in Lewiston, PA at (717) 543-5136. The Small Farmer's Journal is also an excellent resource for implement and equipment sources, parts, and technical advice.

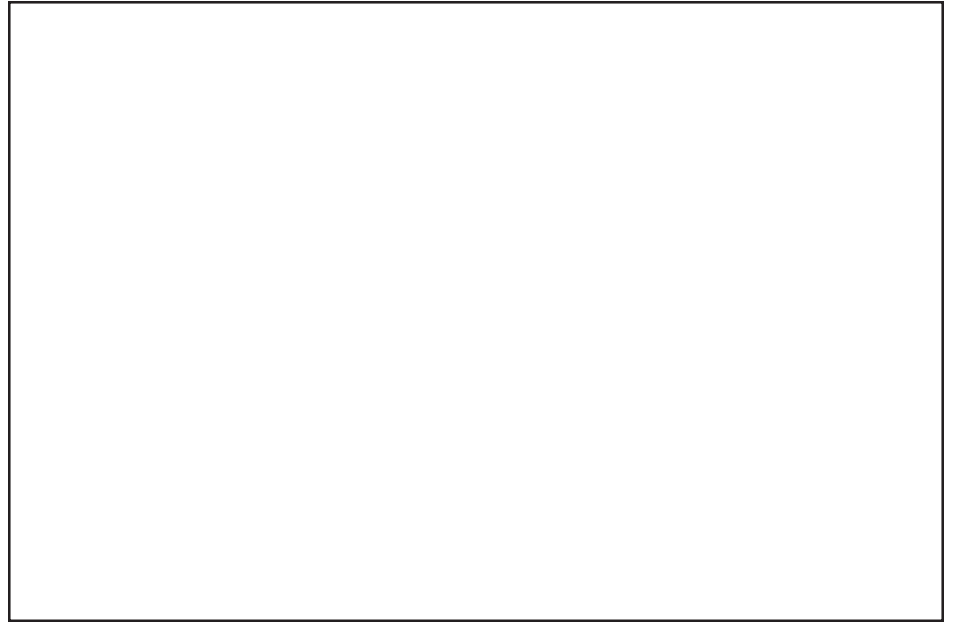


photo courtesy of David Fisher

Covering potato beds with discs on the riding cultivator.

Plans for a Wood-Fired Evaporator

by Brian O'Hara

Here are the plans to the wood fired evaporator used in maple syrup production at Tobacco Road Farm in Lebanon, CT. This evaporator was built in 1996 at a cost about \$300, and has boiled enough sap to produce 200 gallons of syrup in a maple season.

Though not as efficient as modern manufactured evaporators, its rate of production is efficient enough to be profitable. The base of the evaporator is made of field stone, angle iron and masonry cement. The masonry walls and angle iron suspend four 3' X 3' stainless steel pans in a row above the flames. The masonry walls enclose a firebox that is 30 in. wide by 3 feet high by 6 feet long which is under the first two pans. Under the third and fourth pans the masonry is built up inside the walls to create a flue 7" X 30" X 6'. Smoke escapes through a 14" diameter chimney built into the flue past the fourth pan. In the front of the evaporator is a door made of steel covering the mouth of the firebox. The evaporator sits upon the ground under an open sided pole shed with a tin roof. This maple shed is close to power and water sources and there is a decent road right up to the shed.

Initial excavation was done to about one foot below ground level to allow for the dimensions of the masonry. This excavated earth was later piled along the outside walls of the evaporator to provide for better viewing, working and drainage. Some sand was added to provide a base for the first run of stones for the masonry walls. Larger stones were laid first with a thorough layer of masonry cement between each additional layer of stones. When a height of 20" was reached, the 2 angle irons (34" long X 3" sides) were built into the masonry to create the top of the fire box mouth. Masonry was then layered on top of these angle irons and layering continued to a height of about 29" at which time the bottom of the flue was laid. As the masonry walls were built up, loose

stones were piled inside in the area below the flue. On top of these stones, to reach the height of 29", flat stones were laid in masonry cement to create the bottom of the flue. The walls were then brought to a final height of 36". The angle iron bars which suspend the pans are emplaced in the last run of stone level with the top of the masonry. The first bar is emplaced so as to support the middle of the first pan. The second and the third angle irons are emplaced on either side of the line where the first and second pans meet. The fourth angle iron is placed 18" from this point and so on every 18".

The chimney is built atop the flue beyond the fourth pan. The flue is tapered down using the masonry, to a diameter of 14". The chimney pipe comes down through the masonry to be held at its' bottom edge by masonry and the last angle iron. Masonry is built

up around the chimney pipe for about 1 foot. The chimney pipe is made of regular stovepipe steel, 2' long and either 14" in diameter or two 7" pieces which can be locked together. The pipes total length is 12' and it is supported by the hole cut in the tin roof through which it passes.

The pans are made from two 4' X 8' sheets of stainless steel, purchased at about \$100 each. These were cut in half creating four 4' X 4' pieces. These pieces were bent 6" in from each side so as to create 3' X 3' pans with 6" sides, and wing-like spouts off the four corners. The pans were bent using tools such as the hand sledge and brute force. The thinner the gauge of stainless, the more easily it is bent, but the heavier gauge is stronger. In any case, ear plugs are recommended. The spout corners are left open enough to allow for cleaning and are formed so the pans can sit close to each other. A fiberglass insulation material is purchased in 6" wide rolls. This material is placed between the pans and masonry and between the pans themselves. Metal spacers made of 3" lengths of 3" channel steel are placed atop the

angle irons that cross the middle of the pans at a rate of 2 per pan. These compensate for the height of the insulation around the edges of the pan and keep more flames on the bottom of the pans.

The fire box door is made of two layers of sheet metal separated by a tubular steel frame. The inner piece of sheet metal needs to be replaced yearly as does an occasional warped angle iron. The door flops back onto the ground when the fire is to be fed. It can also be removed to the side or partially opened for appropriate draft. Sap gravity feeds down to the pans from an elevated tank. Generally sap is fed into the first pan and is scooped towards the back as it concentrates. Thin pieces of sheet metal are bent over the meeting edges of the pans to keep from spilling sap between them. The last pan is brought to syrup density two or three times per day. The syrup is then scooped out, filtered and canned.

The original ideas and dimensions for this evaporator were derived from observations and measurements of other evaporators. The materials used here were appropriate for our situation. Many other designs and materials are available for other situations, but the idea is simple – wood fire, pan, boil off lots of water. Maples are available to many of us, and it's fair to say that syrup and sugar made from this sap is superior to that of sugar cane or sugar beet. Hopefully this plan will give you ideas on how to get sugarin', producing high quality sugar for family, friends and market.

Don MacLean: Doing It All with a Tool Bar

by Jack Kittredge

Farming has long been the economic base of communities along the Hudson River Valley between New York City and Albany. The fertile, slightly rolling fields produced abundant crops and the relatively easy access to urban markets guaranteed a steady demand. Gradually, however, as in much of the northeast, local farming is losing the battle to generate enough value to keep land in agriculture. There has been a slow, steady transfer of land from local families to absentee owners – in this case New Yorkers looking for second homes.

One of the farms which has been able to remain in agriculture and adapt to the times is the Thompson Finch Farm in Ancram, New York. A couple of brothers stopped farming it to go off to World War II, and never came back. The family rented the land to local farmers for years until, in 1981, the family offered daughter Marnie the chance to farm it. She and husband Don MacLean took it over.

Don was raised in Southern Vermont, next to a small orchard and maple syrup operation where he played as a youngster and later worked. He always liked farming but didn't have land himself and when he graduated from high school figured he'd be a carpenter. After he met Marnie, however, they began thinking about starting a little farm in Vermont. When the opportunity to take over the family farm opened up, they jumped for it.

"It was hard culturally," Don recalls. "It's a bit of a change. This area is much more conservative than where I grew up – the Brattleboro area. But it's been interesting. There are a lot of good people here. Wonderful, helpful neighbors. People in Vermont would be talking about community this and that. Here, no one talks about it but when we were starting out our hay baler broke. Our neighbor just showed up, just appeared, baled the hay and left. No talk. Just did it."

They moved onto the farm in 1981, with a two year-old daughter when they arrived and another born that year. They planted a small orchard and started growing 80 varieties of vegetables for sale to restaurants and the Omega Institute, a large health and retreat center. They later planted strawberries, raspberries and blueberries to supplement the orchard fruit. The idea was to have a pick-your-own operation that would have fruit available all summer, without stop. The farm sits on an underlying ledge of limestone, however, and the soil wasn't acid enough for blueberries. The MacLeans also discovered that they didn't want to have customers coming out all summer, without stop.

So the couple has concentrated on producing a few crops they do well. Their one acre orchard produces as many as 700 bushels of apples in a good year, so they have maintained that. But their primary crop is now strawberries. Each year they put in about 5 acres of them, while marketing the fruit off of last year's 5 acre planting. The berries are primarily sold through a pick your own operation, but the farm also is part of a fruit share with the nearby Hawthorne Valley CSA — which has about 200 families. The share includes strawberries, apples and cider from the MacLeans, as well as blueberries from Grindstone Farm and stone fruit from Hepworth Farm. Don and Marnie also wholesale to 3 or 4 local stores. But they feel that finding pickers for strawberries is a real bottleneck, so they're trying to find more pick your own customers.

"It's working well," says Don, "because we're competitive locally in terms of quality. Our price is a little higher than others, but not extremely so. We got \$1.25 this year (2002) but that was low."

The pair also have an arrangement with the Camp Hill Village – a nearby com-

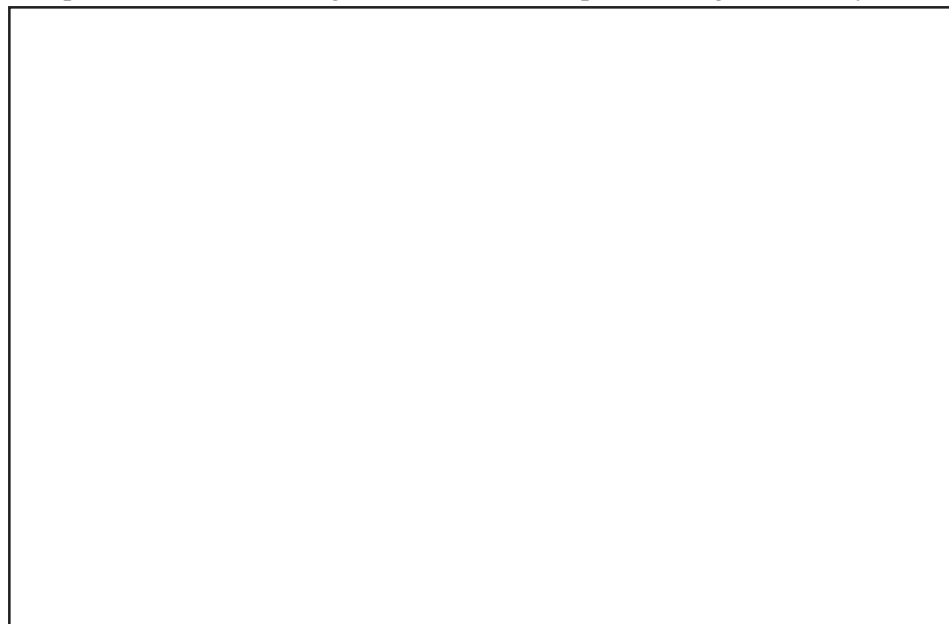


photo by Jack Kittredge

All Don's devices mount on the same tool bar. The wheels on the bar are the same as were used to form the bed, so they guide all the implements uniformly. This shows the tool stands MacLean uses to support an implement when it is not in use. The square steel bar facing the tractor (and another like it on the far side of the cultivator) are what slide into the tool bar guides to mount the implement.

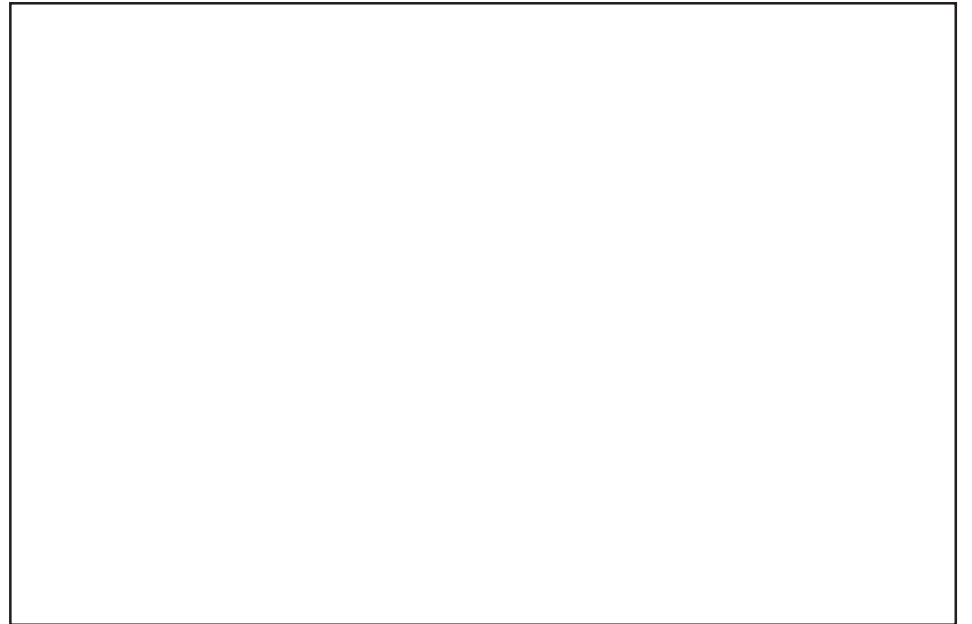


photo by Jack Kittredge

Don MacLean poses with the power cultivator he designed for tractor-mounted strawberry weeding. He plans to patent the device.

munity of about 200 mentally handicapped adults in households. They have their own farm and garden, but have space limitations so have asked Thompson Finch Farm to grow carrots and beets and potatoes for them. The arrangement is unique in that the Village is biodynamic and provides Don with special seed produced on biodynamic farms and then actually comes out and applies biodynamic preparations and sprays while the crop is growing. At harvest time the Camp Hill people come out and help.

The vegetables fit well within the strawberry system Don has developed. "When we plant a field of strawberries," he explains, "there's one row of plants down the center of a raised bed. By fall they've formed an entire matted row on top of the bed, but most of the summer and into the fall there's room on the edge of the bed. After the first three or four cultivations we have a stale seed bed, so we plant carrots or beets into the edges of the strawberries. Then we harvest a crop from them in October for fall root storage. We have 20 Hill people here for a big harvest day. We can do 6000 or 7000 pounds in a day — dug, topped, bagged and ready to be taken to the Camp Hill root cellar. It has no effect on the strawberries at all. But it gives us a crop off the land that otherwise would not be giving us any return at all this year.

The MacLean's farm has been certified organic for 10 years. That has been important to the success of the pick your own, Don feels: "We have local customers who come because we have nice berries and we're close. But we have others who drive three hours to come. They want organic strawberries. We get folks up from New York City a lot. then a lot just coming for the day from Westchester County or even Long Island. The same happens when we have a good apple year. Both of those crops draw people a long way."

The whole farm is a little over 200 acres, with most of the land – 120 acres -- tillable. Over half of the land is still leased out, but Don and Marnie have about 25 acres in the strawberry rotation, about 6 acres where the orchard is and the raspberries were, and then there are hayfields and a new orchard area, as well as a river to irrigate out of.

The MacLeans rotate their strawberry acreage over 4 years. Strawberries are planted in year one, then harvested the next year (two) with the field being plowed and harrowed in July, once the crop is out. Then the field is cover cropped with rye that fall, then planted to vegetables the next spring (year three). After harvest the field is again cover cropped with rye, and also underseeded

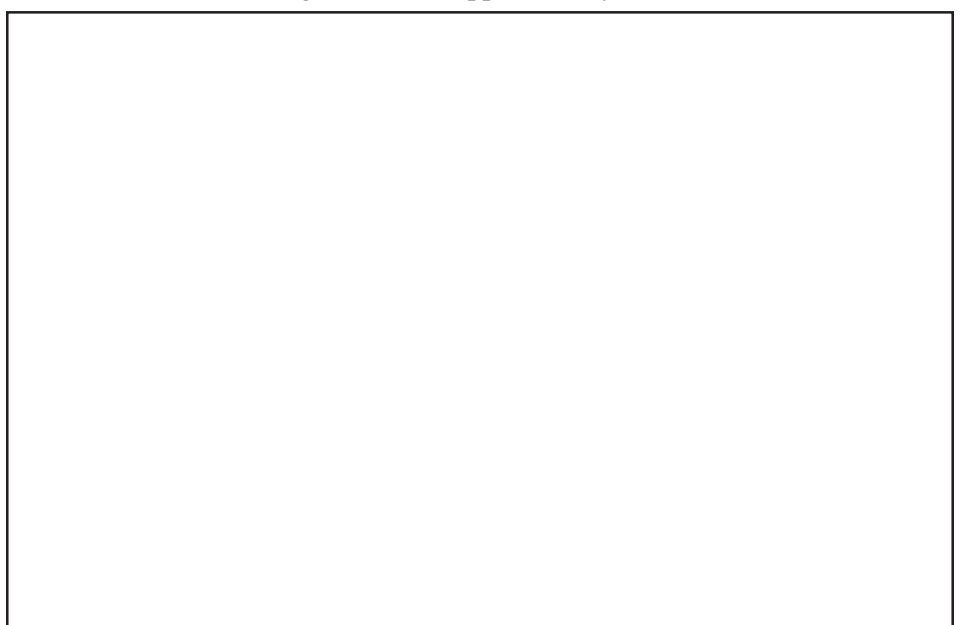


photo by Jack Kittredge

The power cultivator fingers lift up and fall into the raised bed several times a second, disturbing the rooted strawberries very little but effectively kicking germinating weeds out of the soil.

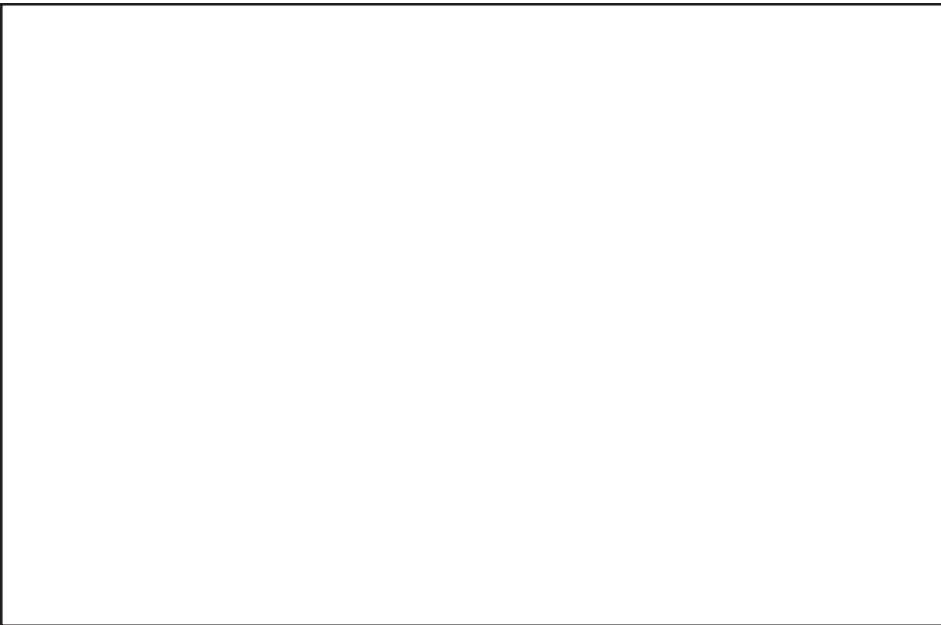


photo by Jack Kittredge

Don rigged a commercial seeder to fit onto his tractor's tool bar. The front wheel regulates depth and the back one drives the cups inside the housing to pick up seed and dump it down through the furrow which has just been opened ahead of it. Then a press wheel follows and presses the seeds in.

with clover. That rye is harvested for straw the next spring (to winter-mulch the newly planted berries in a different section of the rotation) while the clover grows all summer (year four). The clover is tilled in come the fall, the field is harrowed, a rye cover is planted for the winter and then beds made and strawberries planted again come spring (year one again). Don feels strongly that the year of clover, then harrowing and planting to rye, does a nice job of getting the weeds down.

Fertility comes from farm-made compost created from horse manure and shavings from nearby farms mixed with dairy manure. Don turns it in windrows regularly, and works it into the strawberry beds prior to planting. "Other crops can give you problems with burning," he volunteers, "but strawberries thrive on compost even if it isn't completely done."

Pest control is another area where Don doesn't have much trouble. In the orchard he is a big advocate of "Surround," a formulation of kaolin clay. It acts as a repellent for Plum curculio, which would normally bring 80% or 90% crop loss. He also uses sulfur for scab, and trapping to control insect damage.

Applying "Surround" is not easy, however. The trees have to be covered with kaolin from petal fall until curculio is finished, a period of about a month. The clay doesn't stay on well, he says, so you have to reapply after every rainfall. The whole orchard looks like it has been whitewashed, but it's important to maintain that level of coverage. Surround is expensive, but the numbers work out for small scale orchards which can do niche marketing and get a good price. Don says he can't imagine trying to do sulfur and kaolin on a large orchard, though. Since they wash off and have critical times when they have to be applied, you can't do half today and half tomorrow.

With regard to other insects, MacLean says he doesn't have much of a problem: "Tarnished Plant Bug doesn't do much damage in the berries, especially if you don't mow around your fields. That just kicks them out of the grass and weeds into the strawberries. One of the last things we do before opening the pick-your-own is mow the parking area. The bugs are fine there and we don't like to disturb them."

He feels the most effective tactics against fungus in strawberries are 1) a raised bed, for good air drainage, 2) resistant varieties – not the soft-fleshed ones that are easier to lose to rot, and 3) keeping your fields clean. If it rains a lot he goes out and cleans up all the rotting berries. That way, when the rains stop, rot doesn't continue. But without such preventive efforts, he says, you can lose your whole crop.

Late frosts are a constant threat to fruit growers. Last year most nearby growers were hit hard by frosts in early 2002. But Don laid irrigation pipe out to the threatened strawberry field and turned the water on full blast. "It's a lot of

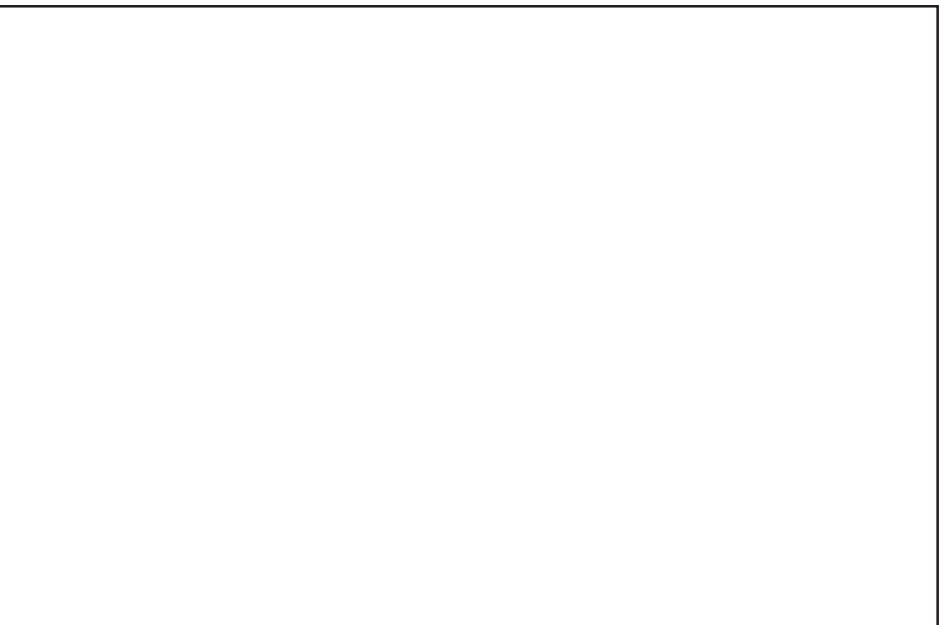


photo by Jack Kittredge

Don welded this tool bar-mounted bed former together from scrap steel.

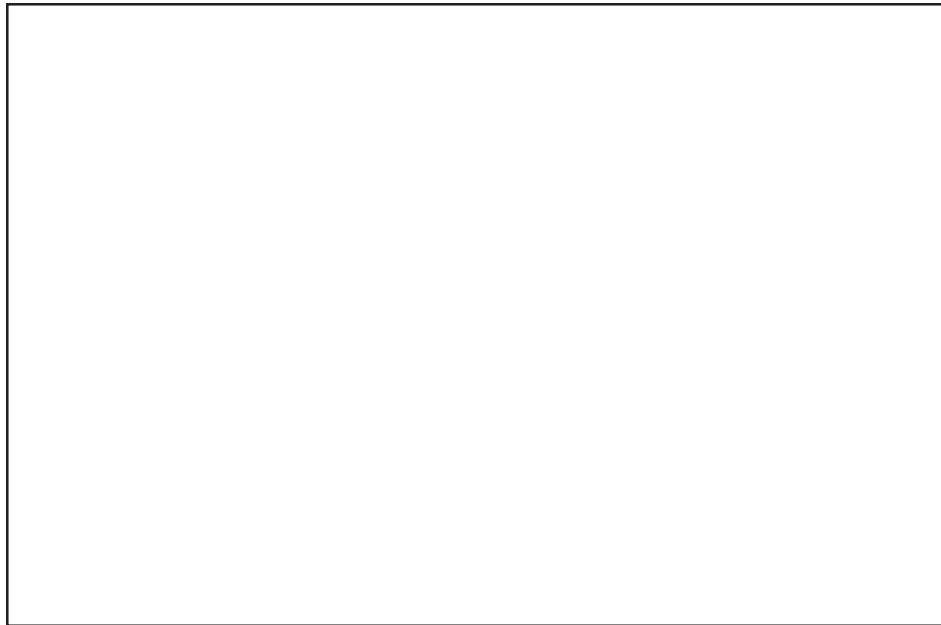


photo by Jack Kittredge

MacLean cultivates the carrots he planted on the sides of his strawberry beds during their first year of growth

work," he admits, "but it's worth it. On any given night you could lose \$40,000 to \$50,000. You stay awake worrying about that!"

The biggest problem the MacLeans have in their operation is the requirement for labor. They have a couple of employees during the summer and have had interns.

"There's a lot of interest in farming," he admits, "especially organic farming, among college kids. But there's a big, big difference between what they perceive and what is the reality. We find that when we have interns. No matter how much they know or how prepared they think they are, they're just not aware of how much work it is. The romance comes off it pretty fast!"

With their kids gone and the difficulty of finding local people willing and able to do what is needed, Don has been working on mechanized equipment to replace hand labor when possible. What he is most excited about right now is a system he has developed for his tractor.

"We have an entire system now on a toolbar," he glows. "We use it for everything. The main thing is this toolbar. An implement is plugged in here and bolted to the tool bar. Since I use this same toolbar for making the bed, seeding, planting, weeding, everything, the wheel tracks we make when we form the beds become permanent for that year."

Don has made several mounting bars that slide into the tool bar, and then mounted implements permanently on their bars. He also made a number of stands to support the implements. When taking an implement off the toolbar he just put two stands into the implement mounting bars when taking it off to carry the weight and balance it. That way, the next time he wants to change an implement he just backs up, puts what he has been using on a stand, pulls away, backs up to the next implement, slides it on, and he is off to do that job.

"The key to the whole thing is these Bezzerrides wheels mounted to the tool bar," Don confides. "When I put the bed former on, after the second pass there's a little furrow on each side of the bed which these wheels follow. If, after that, steering the tractor I veer slightly to the right or the left, the implement just follows the tracks. It's like being on railroad rails. If you put the transplanter on the toolbar, when you go through the toolbar wheels follow the tracks and the transplants follow the bed exactly — even little places where there might be a jog. That little crooked place has been there since the start and will be there for the cultivator later. All the cultivating can be done really close to the plants and you can get the weeds in between the rows. You can also go fairly fast. When I cultivate strawberries I'm going about 4 miles an hour. I can do the whole field in about 3 hours."

Don's beds are about 68 inches center to center. When he plants potatoes he does two hilled rows on that dimension so that every bed has either two hilled rows or one raised bed.

Another virtue of Don's tool bar system is that it works on various tractors. He realized the importance of this in the summer of 2002 when their tractor died on them. They borrowed one for a time, then ordered a new one from a dealer and got a loaner until it came. So they cultivated with four different tractors last year. But they all used the one toolbar and its various implements without trouble.

The earliest implement Don uses on the tool bar each year is the bed former. He welded it out of some steel bars and plates. It's heavy enough to ride on the soil and mound up beds without downward pressure. Don plows and harrows before forming up a bed, of course.

"Sometimes I just use the tine harrow," he says, "depending on what the cover crop was. But I never got into tilling. There's all kinds of arguments about plows versus tillers. In the long run what's good for the soil — whether it's a spade or a tiller — is to stay out of there for a year and let it go to clover, and to keep out of it in the spring, when it's too wet.

"To use this bed former, he continues, "you have to have your soil pretty level and friable. It compresses the soil a little, but most of our compaction problem is in the aisles, where we drive. When you plow this field up after picking strawberries, you'll see clods from where the aisles were. But the bed is really

nice. The soil there stays in great condition. Once those beds are formed, there's no more driving over them. After plowing, a couple years of cover crops and the whole field is nice again."

Once the beds are formed up, the next task is planting. Don uses a regular one-row, two-seater transplanter hitched to his toolbar for the strawberries (he likes Jewel and Earliglo varieties). For vegetables like beets and carrots he uses raw seed given to him by the Camp Hill Village, and plants it with a Nybex planter. Nybex is a Swedish brand of precision planter, and they make various models. MacLean bought the least expensive one, designed for hand pushing with a handlebar. But the body of the planter is the same one used for tractor mounting, so it has holes already cast in the aluminum. Don just figured out how to mount it to a bar using those holes.

"It's ground-driven," he explains. "It will do any small seeded vegetable like chard, beets, radishes, lettuce, or carrots. To plant carrots I typically drive up the bed in one direction to plant one side of the row, then drive back in the other direction to plant the other side. If I had enough money to own two planters, I'd rather buy a second one and mount it on the other side. It's better to do cultivating in one direction, and to have planted in that same direction. So one day I'll buy a second one and build another bar hitch."

For cultivation in the beds where first year strawberries keep company with beets and carrots, Don has made up a cultivator bar. It has Bezzerides spiders (little spokes which turn and disturb the soil by pushing it away from or into a row), and various sweeps, knives, tines and other parts which travel under or through the soil creating shock waves to force out germinating weed seeds.

Don would like to buy enough parts to make a cultivator for each crop. But right now he slides the parts into position and clamps them down depending on the crop. "Steel is money," he asserts. "But time is money, too!"

But MacLean's crowning achievement, he says, is the development of what he calls a "power cultivator" for strawberries. It came about because of his frustration with the weeding demands of strawberries.

"If we were growing vegetables," he explains, "at some point we could just say: 'This is good enough. Let's stop.' Because the vegetables will outcompete the weeds. But with strawberries, you have to wait for the fruit until the second year. If you have let your weeds get ahead of you, they'll get to be a huge problem next year. Also, there are a lot of seeds that wait until the fall to germinate. Winter annuals like chickweed, wild mustard, and sorrel have seeds that lay in the ground all summer and germinate when it gets cold. So we can have the field immaculate in August and then lose it in October.

"As a result," he continues, "we have to cultivate a lot. I can cultivate with our standard tractor cultivator when the strawberries are starting out as a nar-

row row. But during the summer that row gets wider and wider. By August you have a row of berries 18 or 20 inches wide, forming an intricate mass of runners, and there's no way I can get in there anymore with a cultivator. So then it turns into hand work - hoeing. Then one time we were hoeing and took our stirrup hoes and put two-tine and three-tine hooks on the flip side with hose clamps. We were just going through the field chopping around and killing the weeds as they germinated. That's where this idea came from. I realized that we were doing the whacking blindly, so why couldn't we do it with a machine? You can't drag anything through the strawberries, but you can hit and lift, hit and lift."

MacLean's 'power cultivator' is made from a gearbox from a rotary mower. The PTO turns the gear, which turns an eccentric, which turns an arm and drives the tines up and down. It's adjustable for the angle of the tines, and the whole carriage can be raised or lowered to be closer to the ground.

"I cultivate with it about every two weeks," Don says. "This arm oscillates and drives these tines down into the dirt right over the strawberries. It goes 'whack, whack, whack' right on top of them. It disturbs the soil all throughout the bed - underneath, below the plants. The soil is penetrated about 2 inches and thoroughly disturbed. But it disturbs the plants very little. Some of the runners which aren't well rooted get kicked up, but they re-root very quickly. While weeds that have just germinated are killed, it's no help on anything which is well established. So timing is a really big deal!"

MacLean uses pins and clips to hold his other implements to the tool bar, but the power cultivator has to be bolted because of all the vibrations. He made it out of scrap steel, the gearbox off a bush hog, and some bearing units he had around. For tools he has a set of cutting torches and a 220 volt buzz box welder. Without power cutting saws, he cuts everything with a torch and then grinds it down so it will fit.

Don thought about the machine design for two years, always coming up with improvements. Even while hand weeding the strawberries a year ago, he says, he came up with a major change in the design. Now it's close to working very well and he's finding and fixing the last weak links. He plans to apply for a patent on it because he thinks it's innovative and hasn't seen anything like it. On the other hand, he can't think of anything except strawberries that it would work for.

The problem of labor has been a serious one for the MacLeans, and Don is hopeful that his innovations can take a lot of that load off of them.

"We want to keep doing this," he sighs, "but we don't want to be out there doing it by hand. We want to grow five acres of strawberries without having to ever go out there with a hoe. Or hire teenagers and have them not like it either and give us a hard time because it's boring. My wife and I both had the knife out and were ready to cut something! 'Something has to go! This is crazy!' But we're thinking now maybe we'll stick with it a while longer. We have a few things that are going really well."

MacLean's Straw Bale Spreader

Another device that Don created is a manure spreader retrofitted to spread straw mulch each winter on his berries. Square bales are placed in the bed of the spreader, the bale strings are cut, and the bales are drawn into a chute where they are torn apart and flung out a hood in the back by beaters. A rack mounted on the spreader carries extra bales so the spreader doesn't have to be refilled as often. All the parts are removable so the machine can be used again for manure.



photo courtesy Don MacLean

Here the tractor drawn spreader is depositing a straw mulch. In the foreground is mulch laid down by a previous pass.

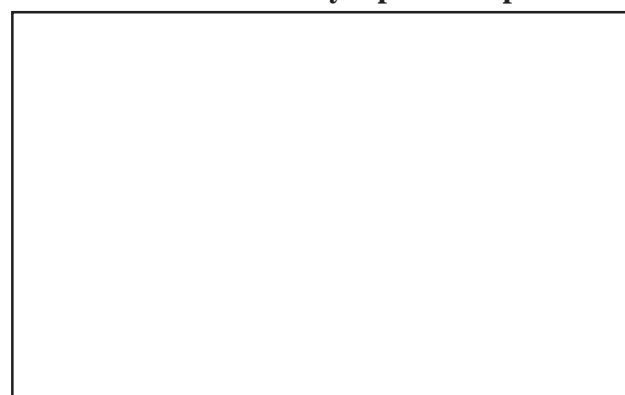


photo courtesy Don MacLean

An operator's view shows the bales going through the beaters via a steel guide shute.

Mechanization at Riverbank Farm

by David Blyn

Agriculture has always been at the forefront of mechanization. Even before Jethro Tull invented the grain drill in the Middle Ages, farmers have been looking for ways to make their labor easier, faster and more precise. Producing vegetables, especially harvesting them, will always be labor intensive and can not be completely mechanized. Tillage, planting, irrigation and cultivation can be done faster and more precisely, however, with the aid of farm machines or implements. This leaves the labor force to concentrate on harvest and other labor-intensive tasks. Some farmers feel the pressure to mechanize more than others, depending on the crop and their markets.

Organic farming is in some ways more machine-intensive than conventional farming. Conventional farming uses no-till and herbicides to reduce tillage and cultivation. Organic farms usually rely on timely tillage and mechanical cultivation for weed control. Making and spreading compost and growing and incorporating green manure require even more equipment.

As machines and implements are added to a farm they, along with the infrastructure, act as a system. When adding or upgrading components of this system consideration must be given to whether it will compliment or overwhelm the existing system. Adding a new implement may not increase productivity too much if it leads to bottle necks later on in the system. The ability to harvest, transport and sell the crop has to keep up with the increased production brought on by mechanization. For example if adding a potato planter you would probably want to think about purchasing a potato digger to harvest all the potatoes, and adding storage infrastructure. Remember: planting is usually easier than harvesting and marketing.

When choosing a tractor, consider the transmission and hydraulics. Often on used tractors the internal hydraulic system which powers the 3 point hitch is either obsolete or due for an overhaul. "Live hydraulics" is not found on many antique tractors. This means the hydraulic pump stops when the transmission clutch is disengaged. This can lead to problems when using the 3 point hitch. Look for a tractor with a slow ground speed. A special creeper gear or a hydrostatic transmission is a necessity for high density transplantings of lettuce or onions. Creeper gears can be purchased and installed on your existing tractor. Ask the dealer. Auxiliary hydraulics can also be added to a tractor. This allows the operation of remote hydraulic pistons (rams). Many farm implements have multiple remote hydraulic pistons.

On our farm tire size is important. All nine tractors have tires 13.6" in width or less. Some farms have a standard tire even narrower in order to reduce the amount of area devoted to tire track even further. To reduce tire size to the desired width the rim may need to be exchanged for a smaller one. If a used tire rim can not be found, look for a new one. Some narrow rims are easier to find used. On an original stock rim the tire size can go up or down one size. This means each rim size can be used for 3 different tire sizes. Figure out what rim width you have - maybe you can go down one or two tire sizes.

Most farms choose a bed width and then adjust the tractor to the proper wheel space setting. Most farm tractor wheel spacings can be adjusted from 48 inches all the way to 80 inches. This measurement is taken from the center of one tire to the center of the other tire. The most popular bed sizes are 60" to 72". On the West coast they use two 40" beds for an 80" tractor wheel spacing. Unless your fields are very level, working two beds at a time can be very challenging. We choose 60" wheel spacing for most crops except potatoes, tomatoes, zucchini, cucumbers and melons, which are planted on 72 inch wheel spacing. We can plant 1 or 2 or 3 rows per 60 inch bed. On the beds with 2 rows, the rows are 30 inches apart. The three row beds are 15 inches apart. On our farm we do not build raised beds nor do I think it is necessary or desirable. In our case we have well drained soil and raised beds are much harder to mechanically cultivate.

Most farmers try to standardize as much as possible right down to the harvest vehicles. Compact pickup

trucks usually measure 60 inch wheel base and a full size truck measures 68 inches. I like 60 inch beds because I believe with narrow tires and denser planting there is less area that is not in production. Also 60 inches is easier for workers to straddle when walking perpendicular to the beds. In addition our Allis-Chalmers Model G does not go wider than 60". Since our two row potato digger is not adjustable we must have available one tractor at 72 inch wheel spacing for planting and cultivating. The individual rows of potatoes are 36 inches apart. Single row crops like tomatoes and melons can be planted farther apart than 60 inches by driving next to the previous wheel track rather than the usual overlapping.

Weed control on most organic farms relies on timely mechanical cultivation using a variety of tractor mounted cultivating implements. This is an old practice that predates the development of herbicides and has many new innovations and adaptations. Every organic farmer has a favorite tractor used to cultivate and control weeds. Some tractors were built especially for cultivating and have midmounted (belly mounted) cultivators. This usually allows closer cultivation than a rear mounted cultivator. Any tractor can be rigged with custom mid-mount hydraulic cultivators. Specific cultivating tools we use are sweeps, rolling spidders, basket weeders and a rotary hoe. The basket weeder is effective on just germinating weeds and is also gentle on sensitive emerging crops.

Studies have shown that mechanical cultivation improves yields. The good news is there are more benefits of cultivation than just weed control. Through capillary action moisture wicks its way to the soil surface where it is lost to evaporation. Cultivation breaks the soil crust and stops the capillary action limiting evaporation. When it does rain it soaks in instead of running off the land. Stirring the soil releases carbon dioxide to feed the plant and aerates the soil for increased biological activity.

Since the farm has over 30 tillable acres we have also to cut hay. I do not recommend making hay while raising mixed vegetables. First cutting must wait until after the majority of the spring planting is done. On a large farm with surplus land, hay is often a necessary crop. Another alternative is mowing and not harvesting the crop. Since the barn has a large hay loft, hay becomes a feasible crop. We also cut and bale small fields on neighboring farms. We have cut back significantly in this area. On the plus side we enjoy using unlimited amounts of hay and rye straw on mulched crops such as tomatoes and garlic and cucumbers. If there is enough hay land available and the tractors are already on the farm, making hay with used equipment can be very feasible. To make quality hay fast more modern equipment is necessary.

There are many aspects of mechanizing your farm. Tillage tools and cultivating equipment all have to be designed to meet the size and soil types of your operation. In the beginning I made many mistakes, but now feel that I have the equipment needed to run my farm efficiently and save my body. For this article, I wanted to focus on some key aspects of mechanization. Here is my story.

Riverbank Farm started almost by chance in 1989 when my dream and desire to be a carpenter brought me to some worn down farm buildings in Roxbury, CT. The large dairy barn would be transformed into a woodshop. Two other barns had collapsed and the silo looked like it would fall any day. The house, a converted small barn, was also in sad shape. The 45 acres of land was mostly in a flood plain, making it unsuitable for development. By 1991 the construction industry was in a severe recession and I was ready for a new career. The year before I had plowed and cultivated a small garden with a two wheel tractor. This was slow and hard on the human body. I decided that walking behind a two wheel tractor was not the way to go. I did not think that it would lead to a long career in farming.

In 1991 I began full-time farming with a 2 bottom mould board plow, 8 ft. drag disk harrow and a mower. This is a good, inexpensive way to do tillage since plows and discs are found used at many farm auctions. We now use a spader for primary tillage. A

rototiller helps with secondary tillage. We now use only the plow when tilling hay sod. When plowing sod, make sure you have coulters to cut the sod. Also the tractor wheel spacing must be adjusted depending on the size and number of bottoms on the plow.

In 1991, I relied on a 50 year old Ford 2N tractor for power while growing 2 acres of vegetables. I found I could rapidly cultivate single rows of winter squash using a 3 point hitch spring shank rear mount cultivator. Good weed control required covering a lot of ground in a short period of time to be effective. I also realized that learning to tractor cultivate multiple rows at the same time was the key to real productivity gains. The next year I would plant multiple parallel rows with this in mind.

In 1992 I bought two more used tractors - a Ferguson 40 and an Allis-Chalmers G for cultivating. Now I had 3 old gasoline tractors. After a few days dealing with a defective 3 point hitch I traded in the Ferguson on a new diesel Massey Ferguson 240. It became apparent that a new reliable tractor was an important part of the equipment mix. The growing season is short. Unless you are already an excellent mechanic, stay away from really old tractors. Many old tractors do not even have a 3 point hitch or power steering or 12 volts. After repairs and lost productivity because of down time the newer tractor is a better business decision than the fixer upper. Also, a new tractor can be ordered with options and tire size you need.

In 1992 I acquired three different 2 row planters for direct seeding a variety of crops. A Planet Jr., a Stanhay, and a plate type corn planter. The Stanhay is used for round seed and pelletized seed and can plant at precise spacing. Three years ago we converted the Stanhay to a 3 row unit. We waited until I felt that our weed control capability could handle a third row. The Planet Jr. is a drill and does not singulate the seed and space it out. If we were to upgrade our direct seeding we could move to a single vacuum type planter that plants any shape or size seed precisely. When moving from a one row push seeder to multiple tractor mounted seeders there will be times when the crop stand might have some major gaps. To avoid this the tractor operator must maintain an extra awareness towards the planter operation. Otherwise, uneven crop stands will result. Becoming familiar with a particular planter will result in progressively fewer errors.

Also in 1992 I expanded to 3 farmers markets per week including all day, 15+ hours, on Tuesday in New York City. Saturday an employee would sell in New Milford, Ct market and I would go to either Bethel Ct or NYC. Mondays and Fridays became predominately harvest days in July through September. It became even more apparent that my days on the farm had to be extra efficient. Until 1997 I continued to farm five acres with minimal part time help. Mechanization enabled me to keep up with fieldwork and market my crops. After 1997 the farm slowly expanded to twelve acres of vegetables. Since the farm was mechanized the transition to a larger operation went smoothly. My labor force did increase, but I had the infrastructure in place to run an efficient operation.

By 1993 it had become apparent that transplanting by hand tomatoes and cucurbits was a major bottleneck. I started using a one row 3 pt hitch Holland transplanter. Since 1999 we have been using the more versatile water wheel transplanter. This transplanter can easily be adjusted from 1 to 2 to 3 rows. We have become so efficient at transplanting that we have found even more crops to transplant including sugar snaps, onions, spinach, kale, chard, winter squash, lettuce and broccoli. All these crops we used to direct seed. The winter squash is less vulnerable to cucumber beetles and needs fewer passes with the cultivator. Transplanting usually results in a more dependable crop. This shift to transplanting could only happen with the availability of plants propagated in the greenhouse. Related infrastructure is important to maximize the benefits of mechanization.

Farming is never easy. Mechanization is not a panacea for all the problems facing farming. These machines, however, have enabled me to keep farming enjoyable and easier on my aging body.

Vermont's Better World Workshop

by Jack Kittredge

North of Montpelier, on a back country road in East Calais, sits a most amazing workshop. Inside are some inventions which will enable Vermont towns to become energy self-sufficient, African farmers to double or triple the value of their crops, and indigenous people to ply the Amazon in boats powered by locally produced fuels. The resident inventor, Carl Bielenberg, is an unassuming engineer who has been slowly pursuing these and other design goals for the past 20 years.

"I studied Mechanical Engineering at MIT and graduated in 1975," he says. "After I graduated I traveled in Africa and ended up in Cameroon. I worked there voluntarily with some Peace Corps volunteers helping them dig fishponds. Once I used up all my money I got a job with a project promoting agricultural mechanization. It was funded by the German aid program and pushed modern Ag equipment, but I was the token appropriate technology guy. So I tried to develop prototypes of what the farmers could actually use. That was a tremendous opportunity. I realized one could make a living designing useful equipment in Cameroon. So I ended up opening a workshop and doing just that for three years. I helped to create a couple of metal-working cooperatives with people who had good skills as founders, blacksmiths, sheet metal workers, etc. We devised equipment for local uses. It got off to a good start."

In 1981 Carl moved back to the US, to Vermont. Always interested in energy, in 1982 he went to a wood energy fair in Randolph and saw a lot of technologies on display. One was a gasifier that was supposed to produce gas that could be used to generate electricity. Another was a system for storing and transporting wood chips to an automated boiler. Carl was very impressed with the design. In 1985 Calais got funding for a wood chip heating plant in the local elementary school. Carl contacted the guy he had met with such a system in 1982 and has worked with his business ever since, helping do local design, and servicing the boilers. For awhile Bielenberg still went back and forth to Africa helping design appropriate equipment, but after 1996 the wood chip business got to be too much and he stopped going to Africa altogether.

Among the tools Carl has designed are some simple vegetable oil extractors. Oil seed is a huge industry here but in Africa it hasn't really started, he says, except for cottonseed. For the better quality oil seeds there are traditional techniques for extracting oils, but nothing large scale. Oil seed gives you edible oil, animal feed, fertilizer, soap, and fuel. It can be a tremendous product for rural economic development - given a simple machine that can extract the oil.

Castor oil, for instance, is a great lubricant, as well as being valuable for use in the pharmaceutical and cosmetic industries. And Castor grows wild - as a perennial, thus requiring no tilling of the soil - in Africa. *Jatropha* is a perennial bush that grows in virtually every tropical area - Latin America, Africa, Southeast Asia. The seed and its oil are inedible, but it's a drought resistant bush and produces huge quantities of seed. If the tree is irrigated it will produce two or three harvests per year. Carl has a generator in his shop that has run for 2000 hours on *jatropha* oil. And that's raw vegetable oil - not biodiesel. He has two VWs that run on vegetable oil. In West Africa they commonly use nuts from Shea nut trees. There's a very intensive practice used to extract the oil. Palm oil is also very popular. It's made from oil palms, a type of palm tree. They're the most prolific producers of edible oil of any complex species, by area of land. They can produce as much as 5 tons of oil per hectare per year.

One of Bielenberg's designs is for a long handled hand press. It's for small oil seeds like canola, sunflower or sesame. Oilseed from Ethiopia, which is about the size of rice, can be used. Mustard seed, about the size of a sand particle, works well. The biggest seeds it is designed to press are like peanuts.

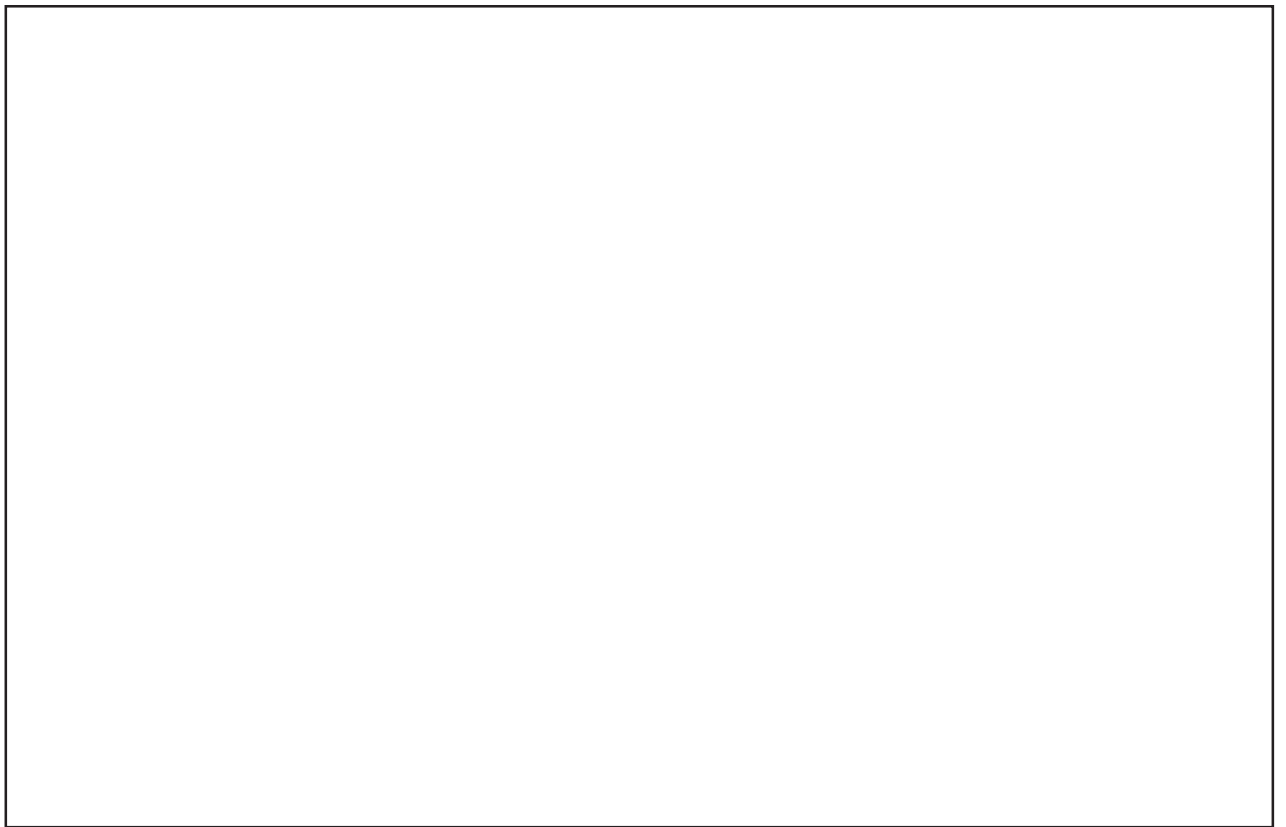


photo by Jack Kittredge

Here Carl shows his oil press with the handle in the upright position, enabling oil seeds from the hopper to fall into the compression chamber.

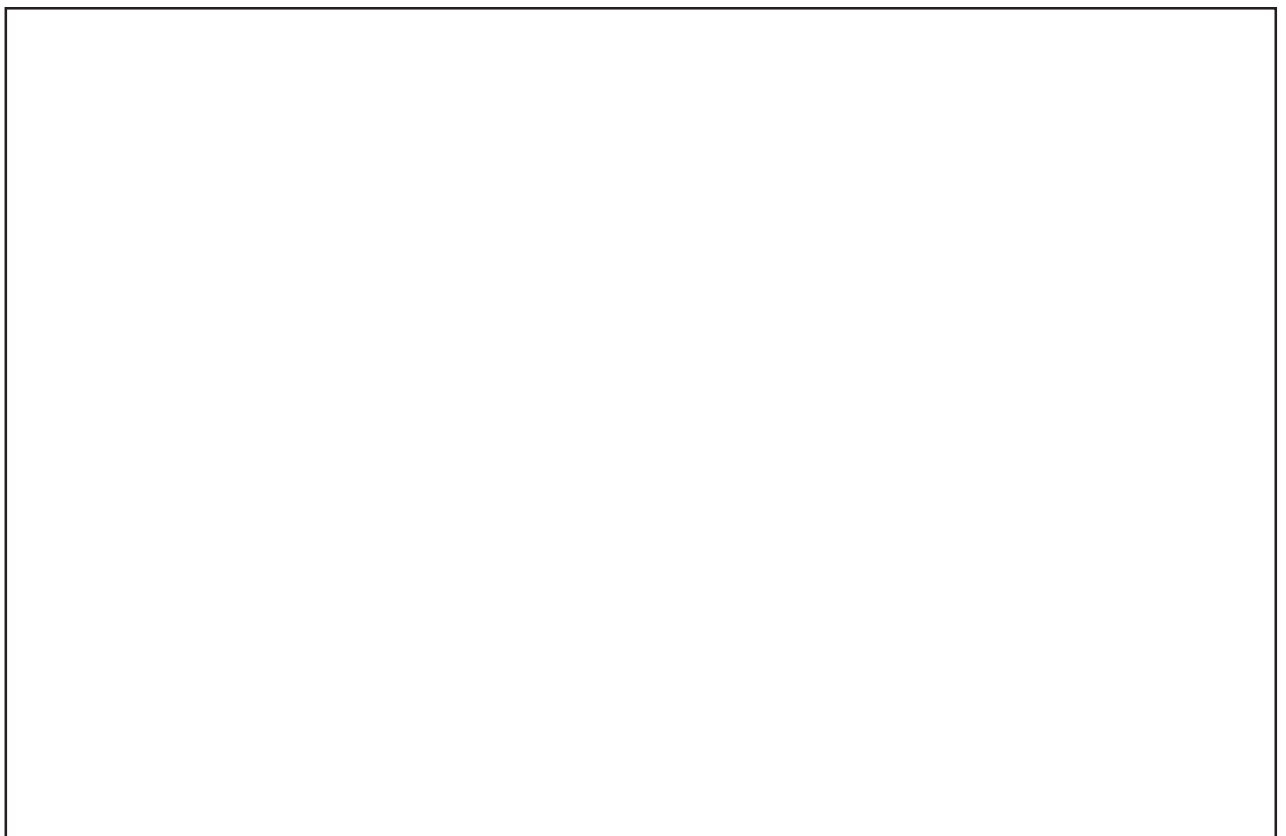


photo by Jack Kittredge

Bielenberg shows the press with the handle extended. In this position the seeds are being crushed. (The base of the press would be bolted to a log or floor in normal use.)

You put the seeds in the hopper and when you raise the handle the piston comes back, allowing the seeds to fall into the crushing chamber. But when you pull it forward the hopper opening is closed and the seed is compressed. The more you pull the handle down, the greater the mechanical advantage. You get extremely high pressures - about 3000 pounds per square inch. Then the oil comes out between the cage bars - which are separated by a gap of about a half a millimeter. A screw adjusts the pressure by increasing or decreasing the clearance. Finally the piston drives the oil cake out and you are ready to repeat the process.

Carl invented the press in 1985 in Tanzania. At the time they had a crisis because their currency was overvalued. They couldn't get fuel or vegetable oil. The farmers could grow the oil seed, but it couldn't be transported to the oil mills because the trucks had no fuel. So Bielenberg designed his press. It was very popular and ended up being produced in 6 or 8 countries. But some of the local producers were not qualified, so there was some disappointment with the local product. They sell for about \$200 to \$250, which would be about the annual net income of a farmer. A press could pay for itself in a season. Most of them are currently being used for edible oil. But in some countries they are used for fuel oil.

"This machine," Carl recalls, "went through an enormous amount of design evolution. It's fairly

elaborate, but we made some major simplifications. For instance, we use hardwood bearings for the block. This has proven to be more durable than any of the bearings we used in the past. We have a couple of oil holes where you can add a little lubrication occasionally to the 35-millimeter steel pin going through it. Hardwood is an excellent bearing against steel."

Another oil press is a more recent experiment. It's the same mechanism but it's designed to be operated by steam or compressed air. (Bielenberg is in the process of building a couple of small steam boilers.) The most common type of mechanized oil press is an expeller press. It has a screw and Carl developed a simple expeller design for Africa, but he was never satisfied with it. It produced a dirty oil because the screw grinds up the seed. The quantity of sludge with an expeller is high - about 40% of the final oil. That excessive grinding also requires a lot of power, so it needs a diesel engine or electric motor. And the screw is subject to wearing out very fast - the shell of the seed is abrasive and under pressure that gives the screw a limited service life.

"People were asking for a mechanized press," he explains, "so I ended up developing a motorized version of my hand press. Either air or steam moves a large 12-inch diameter piston. The gas comes into a valve, and when enough pressure builds up and presses it to one side, then the piston switches and

presses the other direction. I can get about 5 gallons of oil an hour with this. That's about 35 pounds of oil from about 100 pounds of seed. That is roughly 4 to 5 times the productivity of the hand press. I think this could be used in a cooperative. It doesn't require any skill to operate it. All you have to do is adjust these two handles to keep the pressure correct, keep the hoppers full, and it will produce a clean oil.

"Part of the reason I developed this," Bielenberg continues, "is because I thought there might be a market in the US for it. The reason this press is inexpensive is partly that it doesn't require labor to operate it, and partly that it can be powered by biomass. It doesn't require any of the oil it produces; it doesn't require diesel, or electricity. The steam which moves the piston comes from burning biomass, and the excess heat from the steam goes into copper tubing to heat the seed prior to pressing. That has to be done anyway, but here you're not using any more biomass than you would to heat the seed, but you're also operating the press.

"You could use this," he concludes, "here in New England on canola seed — or sunflower seed, that has an oil content of 40%. Canola is grown heavily in Canada and Europe; it's all over France and England. Pressing vegetable oil locally using a press like this is very rewarding. The quality of the oil is unbelievable. The flavor is like nothing you can buy, because of the freshness. But some of the oils conserve very well without processing or refrigeration.

A growing market for certain kinds of vegetable oil is as a fuel source to replace diesel oil. Edible oils can be sold for more than diesel commands and in most cases would never get converted to fuel use. But inedible oils, if they can be produced cheaply enough, can take the place of diesel fuel in many uses. As the price of petroleum products rises, the opportunity for vegetable fuel oils becomes larger.

Most of what you hear about when this topic is discussed is biodiesel. That's what you need to produce if you are going to market the oil as a direct substitute for diesel oil, without making any changes to the engine. You can make biodiesel from raw vegetable oil, but to do it you need to react the oil with alcohol using potassium hydroxide (lye) as a catalyst. The alcohol breaks the triglyceride molecule into three monoglyceride molecules. That means that the molecular weight of the oil is reduced to one third what it was in the vegetable oil state so it is more fluid, having a viscosity similar to diesel. Chemically it is identical to vegetable oil and the alcohol can be distilled out and reused.

But Bielenberg is interested in developing a way to run engines directly on vegetable oil without having to convert it to biodiesel. He is currently working on an engine that runs primarily on vegetable oil, but needs a small reservoir of biodiesel to start it (it will start on vegetable oil, but will run very smoky until it warms up.) The other modification he has made is that the vegetable oil needs to be heated to a temperature about 80 degrees Celsius (170½ F) before it goes through the filter. If it isn't, the waxes in it will coat the filter and in about 10 operating hours the filter will be impermeable.

In the engine Carl designed, the fuel line wraps around the exhaust pipe with a coil to get the temperature up to 200½ F. It will flow through the filter for about 300 hours before a change is needed. The engine also has an automatic valve for switching between vegetable oil and (bio)diesel. It starts the engine on (bio)diesel, runs it for 5 minutes then switches it to vegetable oil and runs it for 300 minutes. Then it switches back to (bio)diesel and runs for 5 minutes, then shuts down. The final run is to get (bio)diesel in the cylinders for when you start it again after letting it cool off.

In order to run his mechanized oil extractor, Bielenberg requires a gas under pressure. The simplest way to provide that in a rural setting is with a boiler, preferably fueled by local material like crop residues, wood chips, charcoal, etc. He is currently working on a boiler design to sit on top of furnaces made from oil drums.

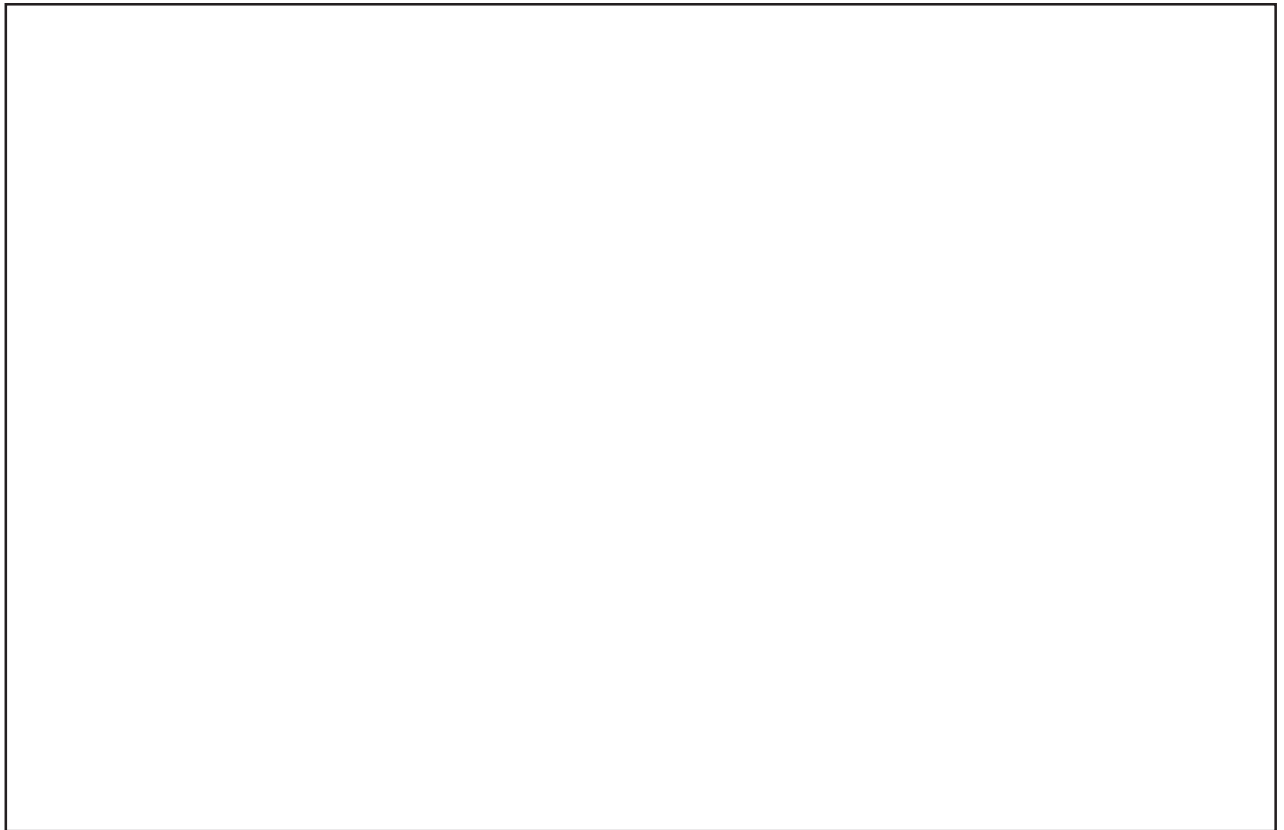


photo by Jack Kittredge

This is the steam-driven oil press with 2 hoppers and 2 compression chambers. The piston is driven back and forth by the pressure.

"The complete boiler," he explains, "will be a little smaller than a full drum. This is a complete, self-contained high-pressure steam boiler fueled with biomass. You can burn wood or corn stalks or millet stalks or corn cobs. These finned cylinders are filled with water and sit over the fire, picking up the heat. They are safe to a pressure of about 600 pounds per square inch. (The mechanized press works at a pressure of about 150 pounds per square inch.) They're made out of standard 12-inch pipe. A bolt runs down the middle of it and enables you to take off a cover and clean it out. The steam will come out of it through a port in the top, and enter tubing that wraps around the fins, enabling the steam to be superheated. That way it won't condense immediately when it enters the engine. There is also a small hand pump used to replenish the water.

"In principle," he continues, "it would be possible for one person to keep the boiler stoked, to run the pump every 15 minutes to keep the boiler filled with water, and to manage the oil press. But in practice it will probably involve two or three. There are plenty of people in Africa to do that. It would be a small industry. For the press and boiler it would cost about \$2000. It's a substantial investment. But it should produce enough oil to pay for itself in a year."

Carl realizes that biomass is a valuable resource in Africa. It is used for cooking, for animal fodder, for padding, and in many other ways. Wood and charcoal are the primary sources of energy in much of the continent. But he feels that there are two ways to reduce the pressure on wood. One is to look to different fuels, which is what the governments and World Bank have been doing — subsidizing kerosene, propane, butane. The other thing you can do is introduce more efficient stoves which burn less wood. In fact, you might be able to enable towns and villages to electrify themselves from their own wood. To the extent that you make local fuels more useful you make them valuable and encourage conservation and reforestation efforts.

Charcoal is a form of biomass that fascinates Bielenberg. "When you make charcoal from wood," he explains, "you burn it with very little oxygen. The little oxygen present preferentially combines with the volatile organic compounds in the wood and they are consumed by the partial combustion, while the carbon in the wood is left uncombusted. Then you have a pure carbon material that burns without smoke or steam. Charcoal, at 13,500 Btu's per pound, as opposed to wood at 7000, is easier to transport and thus especially burned in cities.

"Charcoal is extremely convenient to use in Africa," he continues. "When a family cooks with it, after they are done they take the remaining charcoal in the stove and dump it into a bucket full of wood ash. The ash surrounds the charcoal. In the morning, when they want to restart the stove, they pour the old charcoal through a sieve. The charcoal is retained, and it is still lit. You don't have to re-light it.

The ash prevented it from burning because it precluded the oxygen, and since ash is also a great insulator, it kept the charcoal at a high temperature."

Producing electricity in a sustainable fashion is almost an obsession with Carl. As an engineer he has used so much electricity welding metal together that he wants to compensate for it. He won't feel that his skills and knowledge are fully utilized until he can stop drawing down on the battery and can charge it back up. Vermont, he feels, is a sufficiently small state that it is feasible to produce much of its energy from wind, solar, hydro and biomass.

He's not too optimistic about wind right now, however. When the wind isn't blowing hard enough you're not getting any electricity, but you are still paying for the towers, turbines, etc. Utilities also don't like it because it's not dispatchable — you can't have it when you want it. With subsidies wind has become competitive in some areas, but Vermont is not likely to be a good candidate for success. One reason is that the state doesn't have many excellent wind sites. An excellent site is one at which winds are sufficient to drive the turbine to produce at 30% to 35% of its rated capacity year round. A poor site produces a capacity factor of less than 5%. A current 100 kWh wind turbine installed in Barre, at one of the best sites in Central Vermont, produces at less than 5%.

Carl is also not much of an advocate of photovoltaics. He feels there is too much energy imbedded in the equipment. Efforts to do thin film and amorphous film and things, which use less energy to manufacture, are less efficient and less durable. A realistic price for competitive wind, solar and hydro is about 10¢ a kilowatt hour, which he doesn't think solar will ever reach.

He thinks, however, that methane is an excellent natural fuel. The methane production process is the best for sustainable systems because it's a completely clean fuel. All you get when you burn it is water vapor and carbon dioxide. Unburned and released to the atmosphere, however, it is a serious greenhouse gas. When you use photovoltaics you could say you are neutral with respect to the atmosphere. But when you extract methane by biological methods and then burn it, you are actually improving the atmosphere. You are also fixing nitrogen in a form that is more harvestable by plants. If you decompose organic matter aerobically, the nitrogen is released as ammonia, but if you do it anaerobically, the nitrogen is fixed as protein in the soil.

Natural fuel, or biomass, appeals to Bielenberg, because it is created by photosynthesis, which enables the production of fuels which can be burned very cleanly, produce no net carbon dioxide, and which are completely dispatchable. Among these natural fuels he is most interested in wood chips.

"What I do for a living," he declares, "is put in

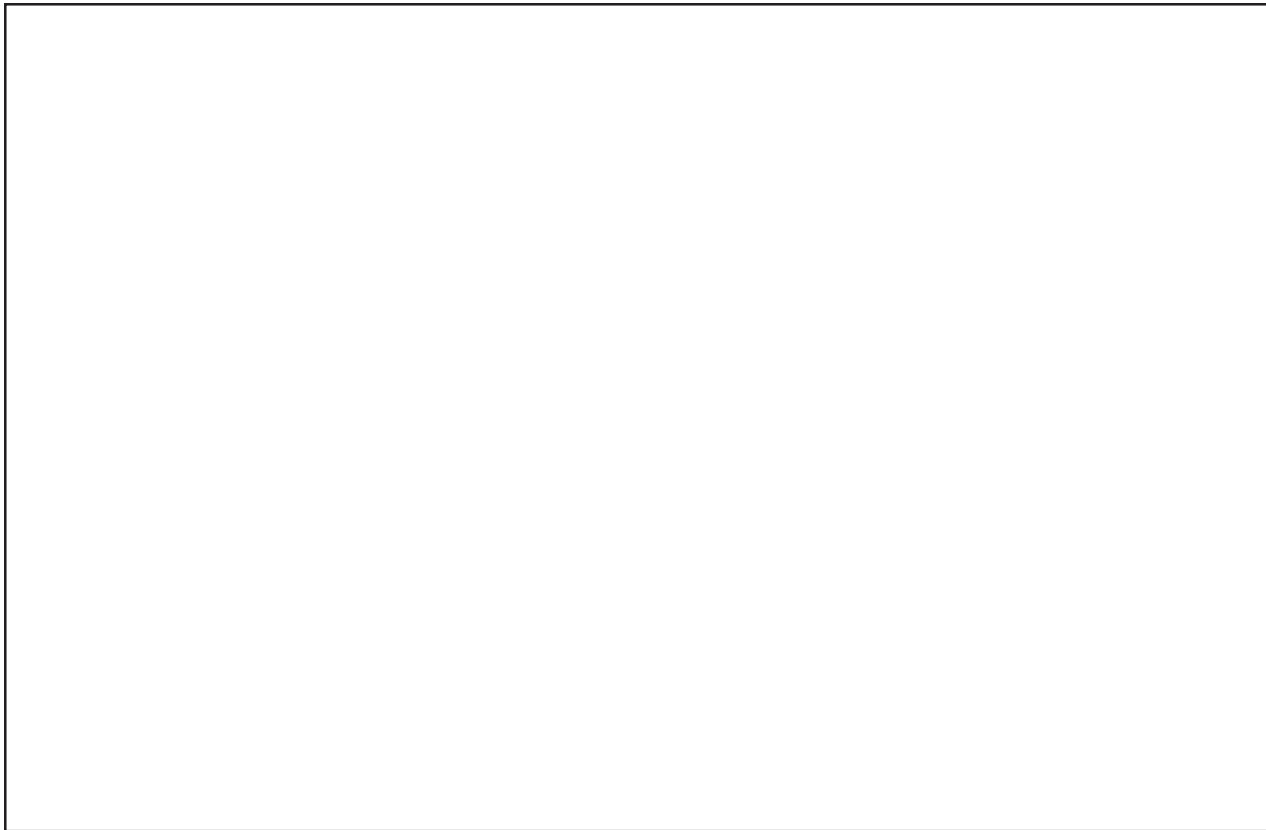


photo by Jack Kittredge

This furnace (made from oil drum) and steam boiler (finned structure on work bench) is designed to burn crop residue and could be used to power the mechanized oil press.

wood chip heating plants – boiler plants. Most of the wood chips we use are sawmill residue chip. They are the premium chips in the industry because they don't have any bark - that can lead to ash problems – and they are screened for size. The chips are commercially available for about \$30 a ton, which is like buying oil at 45¢ to 50¢ a gallon.

"If you use vegetable oil to produce electricity," he continues, "you are going to pay twice as much per kilowatt hour as you are paying now. Not because the process is inefficient, but because the fuel is expensive. There are other, higher value uses for it. But if you produce that same electricity with wood chips, you are going to get your energy for 50% less than you are paying now. That's what is going to bring people around to it. And our technology is getting better and better, while the price of fossil fuel is only going up.

Speaking of electricity from wood chips, that is Carl's most recent project — one which has been consuming his time for the last three years. The big idea is to gasify wood chips and burn the resulting gas to generate electricity. The engineering challenge of this project has been in getting all the details right and maximizing connectivity – such as excess heat from the burners being fed back to the wood chips to pre-dry them as they are entering the burn process.

The process takes advantage of the fact that, whereas carbon dioxide is the product of complete combustion of wood, carbon monoxide is what you get with incomplete combustion of wood. Only one oxygen atom is taken up for each carbon atom. The interesting thing about carbon monoxide is that it contains about two-thirds of the energy of carbon. The oxidation of carbon to carbon monoxide gives off energy to only one third of the extent of oxidizing carbon all the way to carbon dioxide. So you still have 2/3 of the energy of the carbon, but now in the form of a clean, combustible gas.

Bielenberg's process converts wood to charcoal but then it supplies only enough oxygen that the charcoal is converted to carbon monoxide. Since carbon monoxide is a poisonous gas, the entire system is operated under suction. Rather than store the gas, you need to consume it as you produce it, at the same rate. So it is immediately used to generate electricity.

"There's a lot of literature on this process of gasification," Carl says. "Even by the First World War they had the mathematics of the chemistry worked out to within one tenth of one percent. Some of the gasifiers in use in World War II started with charcoal. That is a relatively easy process. But it's harder when you start with wood, because then you can get tars and other impurities in your gas. It's really a question of maintaining the physical conditions to make it work."

Wood is 30% carbon, 30% oxygen, and about 20% hydrogen. Those elements can combine in various ways, and conditions need to be just right if you want to produce a clean carbon monoxide gas.

In Bielenberg's process the wood chips fall through burning char, themselves becoming char that ultimately, at the bottom of the burner, is converted into carbon dioxide giving off intense heat. But that heat is not lost. It's hot enough that oxygen atoms bound in the carbon dioxide are energized to dissociate and instead oxidize the incoming char, thus converting the gas to carbon monoxide – which is drawn off to run the generator.

Stripping off the oxygen atom from the carbon dioxide takes up about 2/3 of the heat produced by oxidizing the charcoal. Thus the gas leaving the gasifier has converted much of its heat energy into chemical energy. But it's still 1000 1/2 F. So that heat is used to dry the wood chips entering the process. If the chips have more than 25% moisture too much air has to be introduced into the gasifier to burn them and the heat balance doesn't work well. You end up with a gas that is mostly nitrogen and a certain amount of methane. According to Carl the difference in the process is like night and day when you get the moisture down.

The other gases produced from the combustion are sucked up, along with the tars, and injected back to be burned at the bottom of the gasifier, where the maximum temperatures of 2000 1/2 or 2500 1/2 F are achieved. At those temperatures water dissociates into hydrogen and oxygen (because the oxygen preferentially combines with the carbon to make carbon monoxide), and hydrogen is generated as a free gas.

"Not many people know you can drive a car on carbon monoxide," says Bielenberg. "They did it during World War II. It was a huge industry. In Scandinavia virtually all the boats and vehicles were powered by wood or wood charcoal. They had gasifiers that would fit on the vehicle or on a small trailer."

Carl pipes the carbon monoxide to a standard salvage yard Ford 440 cubic inch pickup truck engine. Although designed to burn gasoline, it does fine on a mixture of carbon monoxide and air which is drawn into the engine and ignited by spark plugs. To get the electricity, Carl uses a standard generator mated to the Ford motor. When the engine turns, the generator turns and makes power.

If the gasifier has been run during the last 24 hours, you just start the suction blower to draw air in and there's enough heat left in the charcoal that the carbon begins to combust. So it will start automatically without re-ignition. Bielenberg is also looking at plants that generate electricity during the day, when the demand is, but then heat a boiler at night – so you never have to shut it down for long. That also

lets people amortize their investment over 24 hours a day. Schools, colleges, and industries would be candidates.

"What we'd like to do," he declares, "is deliver a complete power plant in two containers. One would be the gasifier. The other would be the gensets – the engine and generator. You can use the waste heat of the engines to blow through the wall of chips and dry them. You could have up to five gensets in one container, to produce up to five hundred kilowatts. That's enough electricity for two hundred homes. It's fairly significant in a rural community. The amount of wood that is available in Vermont is way more than enough to produce all our electricity. Plus we could cut fast-growing poor quality wood for this use. Another container can hold the wood chips, brought to the gasifier by an auger and conveyor belt. That way the whole thing doesn't even have to be installed. It can be leased and brought to any site for freestanding operation. If you change your mind and don't like it, we can come and take it away.

"With this technology," he continues, "generating power using premium wood chips it's equivalent to paying for oil at 50¢ a gallon. Using forest-harvested wood chips (with bark and all) it's more like 35¢ a gallon. It generates electricity at a cost of 8¢ to 10¢ a kilowatt. That's still too expensive to compete in selling it at a wholesale price. But if you are reducing your own consumption then you care about the retail price. Given our high price in Vermont, you are saving about half your kWh cost. Someone buying this combination for a half a million dollars could annually save about \$100,000 on electricity at today's rates and about \$25,000 or \$30,000 by displacing fuel oil for heat. So you pay for it in four years."

According to Carl, ash is the only waste product of the system. In the sawmill chips, the ash content is quite low because there is no bark — about one-half of one percent of the weight of the chips. Thus if you burn a thousand tons of chips in a year, your ash will be about 5 tons. Ash is a good fertilizer, especially mixed 50/50 with lime, and there are established businesses that spread it, so there would be no disposal costs. He also wants to test this technology with other forms of biomass. Cotton stalks are a woody material which are currently burned in the fields. Could they be used? He wants to find out.

A few years ago Carl started a newsletter to unite people interested in his inventions and other designs for appropriate technologies. Called the "Better World Workshop" his effort has drawn together a small group of people doing similar work all over the world.

"Probably twice a day now," he says, "I get calls from people who hear what I'm doing and want to work with me somehow. I got a call this morning from a guy who is working on the Amazon with a religious organization. He wants to use vegetable oil to power boats on the Amazon River. He's introduced a boat technology from Thailand called a "long-tailed boat". It takes a canoe and makes it into a motorboat. They currently use a diesel engine to power these things, but they're looking at ways of replacing the diesel fuel with fuels they can produce in the Amazon forest. So he was asking about the oil press. They have some natural varieties of oil palms they're considering.

Bielenberg hasn't kept up with his newsletters for awhile, and hasn't gotten around to doing anything on the Internet. "My problem, he says, "is that I've been working by myself. Recently, however, I learned that I've been awarded a Department of Energy grant to develop the gasifier. It won't pay for my time, but it pays for the equipment I need and people to help. I can really start moving into high gear now."

One option he is considering is to have people from Africa come and work with him. They can learn design skills, and he can benefit from their relatively inexpensive but highly motivated and capable labor. Another option is to start reaching out to the technical schools in Vermont to attract students who are interested in working on concrete ideas that can benefit their own local communities. Any one interested?

Putting the Farm to Bed

by Lou Johns

Why would anyone, let alone a young farm couple struggling to make ends meet, want to walk down a blind alley? Compaction, shallow silt and clay loam, poor plant performance, mud, inexperience; compassion for soil life and compunction about causing environmental harm...

Dealing with these issues on our newly acquired farm in the Finger Lakes region of New York while we were trying to establish ourselves as reliable organic vegetable growers became troubling. After 3 or 4 years we could see that the nature of our farming practices, particularly the frequent tractor traffic, full width tillage, constant foot traffic, overhead irrigation, working soils in less than ideal conditions (early season planting, or harvesting in inclement weather), would continue to have detrimental effects on our soils, and ultimately on our crops and our pocketbooks. We needed to make some changes, and trading in the farm for some sandy river bottom wasn't an option. Nor was finding a book, farm magazine, Cornell expert, or experienced farmer who offered a solution. While we knew that deep chisel plowing could remediate compaction, we wanted something more; a long term fix, something that could address the issues at the front end of the process rather than at the tail end. We were looking for a new approach, a routine that would be sustainable, rather than a rescue treatment for an ongoing problem.

We decided to convert our fields to permanent planting beds with grassy strips in between where all tractor, foot and irrigation pipe traffic would be concentrated. This was accomplished with one major modification to our tractors, widening their wheel tracks to allow them to straddle the 70" swath that our Kuhn rotovator makes. Four of our five tractors (David Brown 995 65 HP, Case 1210 4WD 65 HP, Hines cultivating tractor, which is similar to an Allis Chalmers G, and Farmall 350 with belly mounted cultivators) were modified with the help of a local welder, or more simply by utilizing the manufacture's designs, i.e. sliding wheels on axles or flipping the dish of the wheels. The rotovator was new at the time that we made the conversion, so we gave little thought to trading it in for a different width. In hindsight, a narrower bed would be easier to manage from a hand weeding and hoeing perspective.

In the initial year of the conversion we created the bed system out of fields that had been under full width tillage practices, so it was all bare ground starting out. The large rear tires of the David Brown set the width of the paths. We thought that they should be kept as narrow as possible, but after a few years of struggling to till straight enough to keep the



photo courtesy Lou Johns

Celeriac and red cabbage in the late fall



photo courtesy Lou Johns

Leeks in early fall.

rotovator from encroaching onto the tire tracks, or driving onto the adjoining beds, we started remaking beds with wider paths. After working with this system for 12 years, we are now making 60" wide paths. This change is partly driven by the issue of encroachment, but also by learning what it takes to maintain the vegetation growing in the pathways. Our stony soil hasn't helped. Stones getting onto the paths from tillage operations have wrecked many a mower; cheap hand-pushed, modified cheap hand-pushed, mid level self-propelled, and heavy duty walking tractor mounted BCS types. Today we're making our paths with an International Cub Loboy 154 with a belly mounted 60" Woods mower, and also keeping the self-propelled and BCS type mowers for maintenance. Obviously, it has been a long struggle to find the right tool for this job.

The time involved in mowing has constantly pushed us to upgrade mowing equipment. Now with almost 10 acres under the permanent bed system and 5 acres of fallowed ground to manage, moving to a more powerful riding mower allows us to accomplish this important task quickly and efficiently. This is especially important in the spring when paths are growing lushly and need to be mowed every other week.

Though learning how to maintain these paths has been a headache, the farm has realized many benefits since their establishment. The clippings from mowing add significant organic matter to the beds. The paths also create habitat for beneficial insect and spider populations, and widening them will only increase the habitat. Our sloping, undulating land was prone to erosion under the former tillage practices. With the bed system, which was designed to have the beds running across the predominant slope of the fields, erosion has been eliminated completely, even in the heaviest summer thunderstorms.

Much of the equipment we use for vegetable production is standard, off the shelf stuff with a few modifications to address use in our system. The rotovator has been heavily shielded on both sides to keep all tilled soil in the beds. We also have a Lilliston rolling cultivator mounted on either side, and just behind, to rake the soil that escapes back into the bed. Our sloping fields exacerbated the problem of dirt sloughing out of the rotovator. Not only was simple gravity at work, but we found that the corkscrew pattern of the rotovator's tines have a tendency to move soil under the machine from left to right. The effect is that when you till across the slope with the right hand on the downhill side, soil

gets pushed out around the shielding onto the path. The surface of the bed is also left with a rise on the downhill edge, leaving an unwanted stair step to the beds. Tilling in the other direction actually allows the rotovator to work against the affect of gravity by moving the soil uphill. Little or no dirt gets pushed outside the shielding. The solution has been to till the beds in one direction. Our longest beds are 400', (most are 250') so the added time to drive back to start another bed is minimal. This problem only exists when running the rotovator; all other tractor operations can be done in both directions. Another small point about the rotovator is that all gauge wheels and leveling skids have been removed, and we make the tractor's 3 point hitch carry all of it's weight, which transfers it onto the sod paths through the wheels.

Our direct seeded crops are planted with a belly-mounted gang of 4 Planet Junior seeders on our Hines tractor. The only modification needed for this operation was a radical axle extension both front and rear. This tractor is solely dedicated to seeding, partly because the axle extensions don't allow it to carry heavy cultivators.

The Farmall 350 was much easier to fit into the system. It was originally manufactured to allow the user to create a wide stance by sliding the rear wheels along a long solid shaft rear axle. The front axle was made with telescoping tubes to change the front wheel track. We use beet and bean knives from Bezzerides Brothers on the Farmall's cultivator tool bars. The rear mounted wheel track erasers were replaced with small Lilliston rolling cultivators (2 spider gangs, one on each side), that clean up the outside edge of the bed. They are set to move soil that the outermost cultivating knife pushed out back into the bed. This tractor is used for the first and second cultivations in direct seeded crops, and the first cultivation in transplanted crops.

The third and fourth cultivations in four-row cropping is accomplished with a 6' wide three point hitch mounted Ford/Ferguson field cultivator. This is set up with wide sweeps running between the rows. The outside edges of the bed are worked with a narrow shovel and another set of small Lilliston cultivators that were mated up to a pair of shanks off the cultivator by our local welder. This cultivator also has a pair of gauge wheels for depth control mounted on the outside of the front corners, so the wheels themselves travel on the sod paths.

Some of our cropping is done in a 2-row configuration. The rows are 36" apart, centered on the bed.

Potatoes, winter squash, strawberries, tomatoes and peppers are planted this way. In these crops we use a combination of cultivators to accomplish mechanical weed control. Generally early cultivations are done with a gang of four 16" (5 spider gang) Lillistons. These lend themselves nicely to the bed system because you can control the soil movement so well. Often they are set to stir and move the soil towards the crop rows, so the outside two gangs are working the edge of the bed at the same time they are cultivating next to the crop row. Late cultivation in these crops is done with another 6' field cultivator that has sweep arrangements to match the two crop rows and the same small cleanup spiders and gauge wheels. Potatoes are hilled with a modified gang of three standard style hillers - a deep cutting shovel with broad soil moving wings on either side set in a "V". What's been changed is that the two hillers that work the outside of the two rows have been cut in half, one wing removed, and shielded so they only move dirt towards the row. The middle hiller is left alone and is simply cutting a deep furrow between the two rows. Some sloughing off of soil occurs with this cultivator. I'm working on a better shielding and may incorporate a set of cleanup Lillistons. As always this is a work in progress.

For compost spreading we use an older New Idea manure spreader, a gift from a neighboring dairy farmer. Surprisingly, it fit into our routine perfectly. Its wheel track could be widened just a bit for now it works fine. The box is 5' wide, 12' long and 3' deep, with beaters that push the material straight down rather than picking it up and throwing it. As long as we spread in relatively dry conditions the spreader tracks quite straight behind the David Brown 995, and we're able to drop all the compost in a nice even sheet over the bed.

The sod paths really shine when it comes to irrigation. We use overhead sprinklers on 20 or 30 foot 2" aluminum pipe, set in single runs that water 4 to 6 beds at a time. These pipe sets are always laid out in the sod paths, which in this situation have two advantages. One; the ground under each sprinkler is always firm and relatively level and will stay that way throughout the watering period. Two; when the pump shuts down the set can be moved immediately without having to walk into muddy soil as is common in clean cultivated fields, again avoiding soil compaction.

We do our share of hand weeding here, and most all of the crops are hand harvested. Here, again, the sod paths offer advantages not found in clean cultivated fields. All of our weeding operations can be accomplished without stepping or kneeling on the planting beds, eliminating compaction especially after rainfall or irrigation. The paths also provide a place to put weeds after pulling where they don't have the chance to re-root. For harvesting, in our case lots of bunched greens, cut heads of lettuce and spinach, or pulled root crops, all have a clean grassy strip to be laid down on prior to being boxed in the field. All



photo courtesy Lou Johns

Newly transplanted lettuce.



photo courtesy Lou Johns

Fields in late summer.

the foot and tractor traffic needed to move the harvested crops out of the field is concentrated on the sod paths. The same is true for tractor assisted harvesting, such as lifting garlic, loosening carrots or parsnips, or digging potatoes. Many of our crops are fall harvested as late as possible for storage, when our fields are often at their muddiest. The permanent bed system makes it possible for us to get these late crops out of the field without making a mess.

The blind alley has lost its shroud of darkness here at Blue Heron Farm. After 12 years of trials and errors we are feeling much more comfortable with this system. It has been quite a learning experience, sometimes more costly than we would have liked, (mostly from having to redo or remake ideas set in steel), but one that's paying off now. We see our soils growing in richness and vitality; our insect and disease pressures reduced to minor, occasional problems, our yields expanding, and our crops being recognized as consistently high quality. One other benefit of the bed system is that it really helps us to keep track of planting rotations. All the beds are numbered, with flags marking every 10 beds, and mapped by field. Well worth the effort, in our minds.

To those who might be considering an endeavor such as I've described, here is my wish list if I were starting anew.

1. Use a 5' rotovator, or a spader. Spaders are slower, so operations of 10 acres or less might get away with it.
2. Use 4 wheel drive tractors. They track much straighter than rear wheel drive and utilize the engine horsepower better.
3. If you plan on using a manure spreader for compost or manure, get two tractors. Use one to pull the spreader and one with a bucket loader for picking up and loading the material.
4. For mowing the sod paths, if you're going to crop 5 acres or less, get a heavy-duty (no less than 6 HP) self propelled lawn mower with side discharge and bagging capabilities. Honda makes a nice machine. Make your paths at least two mower's width wide. For operations over 5 acres bite the bullet and get a reliable riding mower. It will help you keep up with path maintenance easily, along with mowing roadways, headlands, and your lawn, which you probably can't keep up with either.
5. Your seeding and cultivating patterns have to match up exactly. Don't plant anything you can't cultivate.
6. Use 1 or 2 cropping patterns, no more. This keeps

you from having to change cultivators around all the time.

7. If you have a sod or native weed & grass field to start with, simply till open the beds and leave the existing vegetation in place for the paths. Sod paths are very hard to establish in clean tilled soil, annual weeds will plague you for many years. If you're starting with bare ground, use your tiller and mower to lay out the beds and seed the paths to a mix of hard red and creeping fescue grasses and white Dutch and alsike clovers. This is best done in late summer to early fall, or early spring. The idea is to get the vegetation established before they get a lot of foot traffic. Though it takes quite a while, they will eventually fill in.

8. I'm available to answer questions one on one, and glad to help anyone who thinks they might want to take this idea on.

Lou Johns
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Making the Right Equipment Decisions

by Jean-Paul Courtens

During the winter, I get a few calls from fellow farmers asking me what I think about a particular piece of equipment. The farmers call me due to my reputed ownership of lots of toys/equipment. Our farm is a combination of the talents that Jody and I bring to it, and the natural resources it has to offer. Equipment is a means in getting the full potential out of the land and us, in order for the farm to become a successful enterprise. Sometimes our gut tells us if a piece of equipment will benefit our farm or not. Other times we need more guidance. In considering all the factors that determine if a significant piece of equipment is appropriate for our farm or not, we ask ourselves a number of questions. This article is an attempt to let you in on the process on how we get there.

Can nature do anything that you want your equipment to do?

Farming is about transforming nature into food. Sometimes we cooperate with nature and other times we manipulate her to our advantage. Early in my farming career, I learned an important lesson from an older farmer. He said if I wanted to grow old farming, I needed to learn to stop lifting anything. He advised that it is easier to go down and that we should try to avoid bringing anything up.

Working with or against nature comes up with almost every decision we make:

- Irrigation is just one option to deal with drought. Raising sweet potatoes or alfalfa, instead of spinach or grass is a lot less expensive than pumping water.
- When the soil suffers from deep compaction, it can be shattered with a sub-soiler or you can opt to seed it down with a crop of Sweet Clover. Sweet clover roots can break through a hard-pan unlike any other plant.
- Instead of cutting grass, the animals can graze it off. Grass, yields higher when mowed, but cutting it on a daily basis requires large equipment and is very costly.
- Within the new organic regulations, vegetable growers are required to create aerobic compost. Instead of purchasing a turner, we can chose to get a few pigs and bury some corn in the manure. The pigs will do an excellent job of getting the aeration process started. After this, the turning becomes a piece of cake, and can be handled with much smaller equipment.
- We have seen a dramatic decrease in weed populations by increasing our land base, allowing for better rotations, bare fallow periods and long periods of cover cropping. We already have the equipment needed for weed control but we use it less frequently, reducing the number of trips we make going back and forth over our crops, and therefore reducing compaction as well.
- Incorporation of large amounts of organic matter often demands the use of larger tractors and tillers developed to do a good job. A spader does an excellent job in mixing a cover crop into the topsoil. Many small vegetable growers stay away from letting cover crops mature, due to their inability to incorporate them. By making a change in your farming system, you might see that you do not need expensive tools to incorporate the organic material. One farmer allows his crop of rye and vetch to mature, and leaves it on the surface for a full summer and winter. In the spring, the rye and vetch have partly broken down through decomposition, and only a light tool is needed for incorporation. The advantage is that the organic matter feeds the microorganism where they are most active. The disadvantage is that there is no time for a bare-

fallow period, which increases the weed problems, unless it is done in the same year as the cash crop.

At times, we decide to use equipment instead of what nature has to offer us. When we make that decision, our dependence will shift from relying on nature to using technology. Dairy farmers in Holland, short of land, feel that mowing allows them to stay at the scale they need to be. For vegetable & flower growers, early crops always pay a premium, but it involves laying plastic, creating raised beds, applying row-covers etc. When it became clear that lifting at our operation was hard to avoid, we first built a loading dock, and later purchased a forklift to defy gravity.

What is your personal goal with this farm?

We all have a dream of what we want our farm to be like. Creating a crystal-clear picture in our mind will help us in deciding if a particular piece of equipment fits our life style. Operating equipment can mean that you spend hours each day in isolation with a machine that can be noisy, spew smoke, etc. There is not much socializing going on when you plow a field. A spader is a tool that replaces a great number of people doing the same job by hand. Some people love the isolation and others feel cut off from their experience in being with nature and people. Others want nothing to do with petroleum-powered technology. For these folks there is the opportunity to develop bio-diesels tractors and equipment, fired and lubricated with natural oil compounds. Some farmers have reservations about owning any powered equipment at all. They will chose human and or horse powered equipment.

When you are not quite sure you want to go down the road of owning any equipment, consider asking neighbors to perform certain tasks on a custom basis. They might be surprised to find that it is more profitable to perform custom work than raising crops.

At Roxbury Farm, our goal is to raise vegetables with the lowest possible financial input without compromising soil health, the worker's standard of living, and the quality of the produce. Jody and I raise 30 acres of vegetables and 40 acres of soil improvement crops, with the help of 4 apprentices and 2 seasonal workers. That is close to four acres of vegetables or nine acres of land per worker. We do not like to work more that 45 – 50 hours a week during the peak season or 40 hours during the other months. As a result, we have replaced a lot of manual tasks with a mechanized version. Has our farm become more profitable because of it? I do not think so, but we have attained our goal in reducing our hours on the farm, and created a work environment that does not strain our bodies.

Do you enjoy fixing and maintaining equipment?

Before you buy, research the different makes & models. Call farmers who use the equipment to find out the pros & cons of its operation. Make sure there are dealers in your area that stock or can order replacement parts for your particular equipment. When something breaks down and you have to wait weeks for the parts, you can end up losing a lot of income.

If you are unfamiliar with a new piece of equipment, have a farmer or a dealer come to your farm & teach you how to use it. Even new equipment will break down very quickly unless someone takes the time to make sure everything is in working order and knows how to operate it.

At our farm, each apprentice maintains one tractor, and is responsible for the upkeep of other specific pieces of equipment. The only way a machine stays in good working condition is because we maintain it and replace worn parts. Before you take the equipment out to the field, look it over, check the fluids, the belts, the bearings etc. When you operate it, listen for any noise that sounds unfamiliar. Operating equipment can be fun. Fixing and maintaining it means getting your hands full of grease, and busting your knuckles on hard steel. Some people have great much fun doing it; they love hunting for bargains at auctions so they have something to fix.

Is the new piece of equipment part of the total system of the farm?

You must decide what the ideal system for your farm is before you spend a nickel. Purchasing any equipment narrows your options for future purchases. For a dairy farm, this might be the choice between making haylage or hay bales (and then square or round bales).

It is important to be realistic about the scale you will be operating at and allow for improvement. Every time you increase the scale of your operation, you will experience growing pains, unless you allowed for improvements. Questions you might ask when you want to increase your production:

- Do you have the ability to move more produce through your washing and packing facility?
- Do you have enough space in your cooler, delivery truck, etc?
- How many more people do you need to employ, and do you have the management skills to handle the larger crew?
- Do you have a good system for your farm administration since this will become more complex and stricter requirements for taxes and insurance will start applying to larger operations?

Buying the right tractor depends a lot on what you want to pull, or carry with it. Four wheel drive tractors can pull 30 to 50% more per HP than two wheel tractors. Your equipment dealer will be able to tell you how much power, and/or weight, you need to pull a certain piece of equipment with, which can vary with soil types. Many farmers fill their tires with CaCl, to gain weight and increase their pulling power.

Once you decide on the right size tractors, you determine what wheel spacing you will operate your farm under. The ideal row and wheel spacing is one that suits your particular crops. Check if the harvesting and cultivating tools of your choice are made to fit your system (i.e. can they be set up to cultivate & harvest your bed width & the row spacing of all your crops and fit on your tractors). At Roxbury farm, we have a raised bed system. All tractors have a wheel spacing of 72 inches, allowing for a bed top of 54 inches.

This bed allows:

- One row of squash, tomatoes, melons, etc with 72 inches between each row.
- Two rows of potatoes, corn, cauliflower, celery, fennel, etc with 36 inches between the rows
- Three rows of beets, onions, carrots, broccoli, cabbage, kale, etc with 18 inches between each row
- Five rows of spinach, salad mix, culinary herbs, arugula, radishes etc with 9 inches between each row.

The beauty of this system is that you can plant and weed many different crops all within one cropping system, saving you time and money. We never take away a seeder, we just don't fill one of the hoppers, neither do we change the cultivating tools for each row setting; we just add a beet knife for each row that did not get seeded or planted.

Roxbury Farm Wheel Spacing System

Another successful row system is where the cultivating tractors have a wheel spacing of 42 inches with the larger tractors set at 84 inches. The 42-inch wheel spacing allows for one row with 42 inches between the rows; two rows with 18 inches between rows; and three rows with 9 inches between rows.

Tillage equipment is a reflection of your soil fertility plan. If it involves mature cover crops and bare fallow, it needs to include equipment that can incorporate organic matter and others that harrow the soil to eliminate weeds. At Roxbury Farm, we use a chisel or a spading plow depending on the total plant mass on the surface. A chisel plow can get clogged up when there is too much plant matter on the surface. In both cases, we flail-mow the cover crop first to reduce any long stems. After incorporation, we use a Perfecta II harrow to reduce weed pressure. Farmers that are mostly dependant on granular fertilizers need a tool that creates a seed bed that only works the top four inches of the soil.

When do you buy equipment?

Try to discover what the weakest link on your farm is. The chain breaks at the weakest link. Out of this you create a list of priorities of equipment to purchase. At our farm we are very dependent on a good plant establishment from transplants. For years we set our plants out with a water-wheel planter. As we grew in size, this method developed problems: it was time consuming, the planter was not ergonomically well designed for long periods of work, and plants would not get into the fields when we had only small windows of opportunity. Our field production suffered, so the process of transplanting became our weakest link. Reducing the number of transplants was in our case not an option. We bought a high-speed carousel planter that allowed us to increase the efficiency of transplanting by 300%

Buy a piece of equipment before you really need it. If you are desperate for something, most likely you will end up paying too much for it or buying something that does not quite do the job.

How much value does the equipment generate?

Some of you might have heard about the rule that you have to put at least 500 hours a year on a tractor to justify ownership. How about setting the rule for each tractor to pay for itself by increased production, never mind how many hours it takes. When you figure the cost of equipment you figure the total cost divided over its life. From this perspective a \$20,000 tractor gets divided by the number of years it will operate on your farm. The larger the engine the higher the number of hours you can put on it without having to overhaul the engine. Every make has its own life expectancy, given that you do not work it harder than the manufacturer's specs. If you work equipment too hard, you end up spending more money on repairs and actual depreciation, than acquiring something that fits your scale, or is just a hair bigger than what you need.

How you decide when it is time to replace the hand hoe with a cultivating tractor is another issue. One factor might be that you lost money and crops during your last season because you did not have the labor available to weed your crops. Another reason might be that your available labor is more valuable harvesting your crops than weeding them. In any case, each acre of vegetables can require up to 200 hours of hand labor to keep clean. A cultivating tractor will be able to weed 80 to 100% of that in a matter of hours or minutes depending on the crop and the cultivating tool.

A more difficult example is the choice between direct seeding and transplanting crops. Buying transplanters can be very costly, and raising plants is time consuming in the greenhouse. From a clinical cost-analysis perspective, planting can only be justified when we receive higher prices due to earlier crops and the reduced cost of labor in weeding and thinning. But other deciding factors are

the real life situations you deal with like the quality of your land and the undependable weather factors. The more uniform your soil, the higher the rate of success with direct seeding of vegetable and flower crops. When your land is okay, but not the best, and you add the loss of crops due to bad weather conditions, the cost of transplanting pays for itself, and more, when we spread the cost of fertilizer, irrigation, land taxes, etc. over a guaranteed plant establishment.

How do you pay for the equipment?

If possible, reserve loan money for land and buildings. Making payments on a piece of machinery might influence your business decisions. Before you realize it, the equipment ends up dictating what you grow, instead of having the freedom to respond to changing markets and opportunities. Once you buy the larger tractor and equipment with a loan, you can't back out of your decision to increase your scale. Are you ready to employ more workers to handle the increased production? Can your washing facility handle the increased production? If you are free from debt, you have the ability to modify your farm systems as needed.

If your intention is to invest, equipment is a terrible choice to make. Its value is in its use. The moment you take it off the lot, its value has decreased. An exception is some of the much older tractors. My first tractor was a Farmall Super C. I bought it in 1989 for \$1,500 complete with a set of cultivators. Five years and a new hydraulic pump later, I sold it for \$1,800. It had worked hard for me during the five years I had it. Due to its age quite some time was spent to keep it running, which was one reason I sold it, but I have regretted it ever since. The tractor would have been able to semi-retire, which would have reduced the maintenance bill. These days a fully equipped Super C can cost up to \$3,000. Having held on to it, I would have had the use of it, and made a better return than most people have had during the last three years investing in the stock market

The IRS allows you to itemize \$25,000 worth of equipment through filing schedule 179. If at the end of the year you want to reduce your taxable income you can decide to make an equipment purchase which can be qualified as a farm expense. The other advantage is that dealers often offer large discounts at the end of the year. For example, if you happen to have \$20,000 in your bank account, and you do not need it for living expenses, just letting it sit there will make you bring at least 30% of it to the IRS. Figure in to that an additional 10% discount from the dealer and you have saved \$8,000 (30% + 10% x \$20,000) on this purchase.

Is the equipment in good working order?

Check the bearings, belts, shields, bolts, etc. When buying a tractor, get a decompression test done at your local tractor dealer, and have them check it. Even better, buy a tractor from them. Sometimes jumping on a "good deal" can cost a lot of money. I once bought 4000 feet of six-inch pipe for \$5.00 per twenty-foot length. The pipe was in great shape but old, and not part of a big brand, so it took a year to find a supplier that understood which gasket was needed for this particular pipe. During that year, a lot of time was wasted, trying to make the pipe work with the faulty gaskets it had come with.

Another mistake can be assuming something is a minor repair. When I bought a Case 5140, a 100 hp high clearance tractor, it was checked all through, and a leak in the wheel bearing and some other minor things were discovered, which the dealer fixed. The local Farm Credit loan officer looked up its book value, and I negotiated a price \$4,000 below that. When I picked up the tractor, I noticed that the emergency brake was still not working properly and asked about it. He explained that he took care of all the other things and complained he was already losing money on this deal (I've heard

that one before). He said there was nothing he could do at this point. I let it go, not fully understanding why he made such a fuss. I should have called my local Case dealer to ask how much it would cost to fix it. When I finally inquired, I learned that they had to break the tractor apart to get to it. The cost of the part was minor compared to the labor it took to replace it. If I had bought this tractor at a local dealer, this would never have happened. Unfortunately, high clearance tractors are a rarity in our part of the country, so the repair cost was acceptable due to the value of the tractor.

Conclusion?

In the end one might ask, "How did I end up with all of this equipment?" Answering this question is not unlike answering a more basic question, "Why do we love to farm?" Some of us love to grow vegetables; others love to work with animals, some like both. Working with equipment is a personal choice and a reflection of who you are. So the answer is not just about "how" but if all that equipment is still a true reflection of who we are.

A Thirty Year Love Affair with Iron

by Jack Lazor

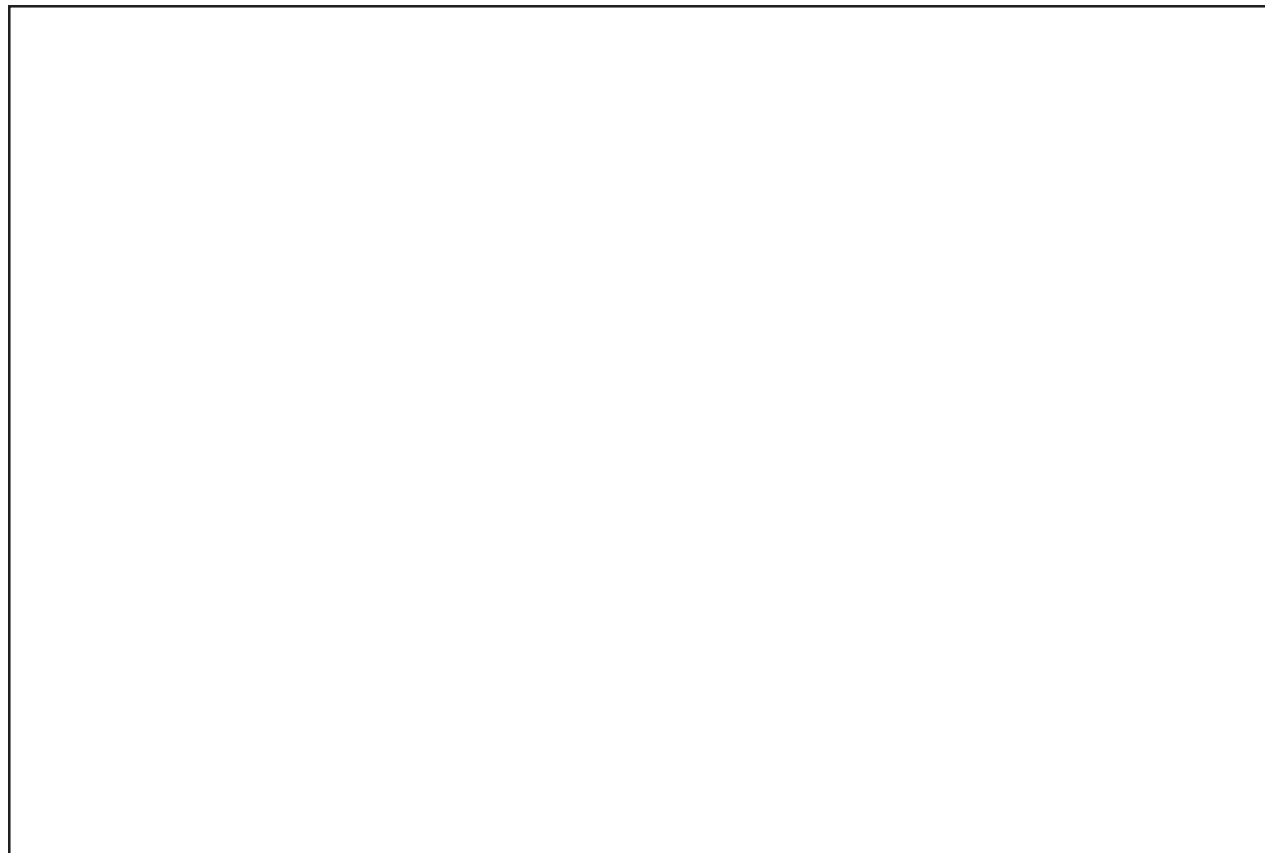
I love my job of farming and stewarding the earth. I think about compost, humus, and soil fertility constantly. The process of growing crops delights me from seeding to harvest. Hay production treats the eyes to varying shades of green from the first sprig of grass and clover to the dry windrow at haying time. Farming is process and process requires tools and the skill to operate them.

Farm equipment is integral to making most agricultural systems work smoothly. I love the stuff and, much to the dismay of my wife Anne, I always seem to need just one more machine. We began our farming careers when we rented a small farm in Irasburg, Vermont in 1975. The two of us came into agriculture with a lot more historical perspective than actual practical experience. We had both worked on the living historical farm at Old Sturbridge Village where we milked cows into wooden buckets and cut grain with a reaping sickle and threshed it on the barn floor with a flail. I had used old equipment like hay loaders and flat belt driven silo fillers at the Warden Farm in Barnet, Vermont. Anne had milked and hayed for Ray Davidson in Charlton, Mass. Together we had spent time with John Ace, a dairy farmer using horse drawn equipment in southern Wisconsin where we did a little corn picking and watched oats being seeded with an old wooden wheeled grain drill.

In May of 1975 we sort of “graduated” from Wisconsin and moved to the Northeast Kingdom of Vermont. We loaded up our wood cook stove and a whole lot of essential items like chicken feeders and a treadle sewing machine onto an old 1937 Chevrolet truck and headed east to seek our fortune. It didn’t take long to begin acquiring machinery. After the first family cow came our first piece of haying equipment—a steel-wheeled New Idea hay loader for \$50. People looked twice when they saw a couple of hippies loading loose hay onto the ‘37 Chevy truck with the ancient hay loader. Soon after the hay loader came a \$200 1947 9N Ford tractor. The price tag was so cheap because the tractor had been in an accident. It had rolled away down a hill and smashed into a tree. The rear housing hadn’t survived the crash so our bargain tractor came in pieces. Thus began my education of finding parts and repairing machinery. The \$200 tractor turned into an \$800 one.

These were the humble beginnings of my collection of agricultural iron. One of the first rules learned was that one man’s trash was another man’s treasure. Since we wanted to use the technology of yesteryear, we were in the market for everyone else’s castoffs. Machinery that had been relegated to the stone wall or the back forty was either free or very cheap. Our yard began to fill up with old iron—old mowers, rakes, manure spreaders, a belt driven saw rig. I went to an auction in December of 1975 and came home with a gem—a wooden wheeled “Hoosier”: grain drill just like the one we had seen in Wisconsin. The price was \$25 and I was walking on air. Even more valuable than the farm equipment were the associations with the people who had owned and worked with these old antiques. We heard stories about bygone days and old farming methods. We made many new friends from a past generation that was quickly disappearing. Finding and acquiring farm machinery was almost as much fun as using it.

We always asked a lot of questions about how things used to be. One recurring theme from our conversations with old farmers was that most people had grown grain (mostly oats) twenty to forty years before. In Wisconsin, we had watched the local Amish around New Glarus harvest their grain with a grain binder. The sheaves of grain were stood up in shocks in the field to dry and then put through a stationary threshing machine. So in our ongoing recreation of the history of agriculture we had to grow grain in the same pre-combine manner. We bought the beginnings of our present farm in Westfield late in the summer of 1976. The next winter we journeyed forty miles northward to Coaticook, Quebec



Jack reaps barley with a grain binder in the summer of 1981.

Photo courtesy Jack Lazor

and brought home a PTO powered John Deere grain binder and a Dion threshing machine for \$250. In the spring of 1977 we seeded our first six acres of wheat and barley with our old grain drill pulled by another one of our early prizes—a John Deere 40 tricycle tractor. Tillage was done by a Farmall Super M pulling McCormick trailer plows and disks. We reaped the wheat and barley with the grain binder and the little John Deere. The bundles of grain were “stoked” by leaning four bundles against each other. When the grain was dry, we had our first of many yearly “thresheres”. The Super M was connected to the thresher with a thirty foot flat belt. The belt travelled between two pulleys and was given a half twist to change the rotation of the threshing machine. The thresher had loads of smaller belts and pulleys on its sides. Low and behold we actually got all of this equipment to function. Several older farmers came over to help and watch. Wheat was coming out a spout into burlap bags and straw was being blown into a pile. What a great feeling it was to make and eat whole wheat bread from our own flour.

Early successes and a bit of beginner’s luck gave us the confidence to continue with our agricultural endeavor. We were on our way to becoming growers of grain. Haying wasn’t quite as glorious, however. The Massey Ferguson three point hitch mower worked pretty well on the John Deere tractor, but none of the other machinery performed satisfactorily. The New Idea rake twisted the windrows into tight knots which slowed down hay drying. The Grimm tedder was pretty “grim” when compared to all of the new Kuhn eggbeater style tedders on neighboring farms. The John Deere 14T baler with Wisconsin engine only worked part of the time. Despite the marginal machinery we still managed to do our haying. When the baler wouldn’t tie properly we would switch over to the hay loader. Although loose hay was harder work, it was simpler and we knew how to use pitch forks. Looking back, it’s hard to believe we kept at it. Our young age, personal energy, and naive optimism gave us the perseverance.

Needless to say, our agricultural history lifestyle began to wear thin after several seasons had passed. We bought our first combine (an IH McCormick#64 pull-type) at an auction in 1983. The machine was built in 1954. It had its own engine and a bench where a rider could sit and tie off the bags of grain which flowed from the combine. The exhaust from the combine engine went directly into the face of the bagger operator. The machine broke often, but fortunately there were two more of these models parked in the woods in Derby for parts.

In 1984 we finally splurged and bought a mower-conditioner—a New Holland 489 haybine. This

machine had stub guards so it wouldn’t plug and a “Norelco” style floating head which allowed it to float over rocks and obstructions. The haybine was two years old. The \$4500 price tag sent us to the bank for a loan which took a couple of years to pay off. What a revelation—a modern day mower. Now we could quickly mow down acres of hay, but none of the rest of the haying machinery was good enough to process large amounts of hay. This could only mean one thing—more machinery.

I’ve been on this endless treadmill of machinery acquisition almost from the very beginning. Through the 1980’s better equipment followed. First came a new rake and tedder, followed by a nicer New Holland baler. In 1988, I journeyed to Winchester, Ontario and bought a bigger and newer tractor. A Farmall 656 with loader joined my two 1950’s tractors. Sixty-five horsepower was a lot more “oom-pah” than we had before and it allowed me to “tool-up” in other departments. We replaced our belt driven buhr mill grain grinder with an IH 1150 grinder-mixer which we still use today. The process of shoveling manure and compost became quicker and easier with the stronger bucket and hydraulics of our newer tractor.

In the late 1980’s I had another bout with the machine mania disease. Life was not going to be right until I could do a better job with the tillage of my grain fields. The old plow, disk, and lightweight field cultivator just weren’t digging deep enough. I think I had spent too much time sitting in the bathroom staring at slick John Deere promotional literature. I wanted to be just like those Illinois boys pulling their chisel plows and field cultivators across the “black dirt”. In the summer of 1988, I went to an auction in Alburg, VT. to purchase a newer rubber tired grain drill. On the way home I stopped at Rene Fournier’s equipment lot in Swanton to check out the iron. There it was—a 12 foot Glencoe field cultivator from Indiana. It wasn’t as shiny as those in the promo pamphlets, but it was still love at first sight. I didn’t have the \$1400, but managed to put down a small deposit. As usual, Anne couldn’t understand all this passion for a piece of iron. By fall I came up with the rest of the money and brought home my prize.

I couldn’t wait for spring in 1989 to try my new field cultivator. I hooked it up to my 656 and headed for my barley field. After travelling about ten feet I had another one of those moments of revelation. My “big” tractor didn’t have enough power to pull the cultivator. I managed to limp through the spring tillage that season, but knew that I had an excuse to get an even bigger “horse” sometime in the future. I also acquired my first self-propelled combine that season—an Oliver model #25 made in the late 1950’s. Luckily, Clarence Huff, the former owner

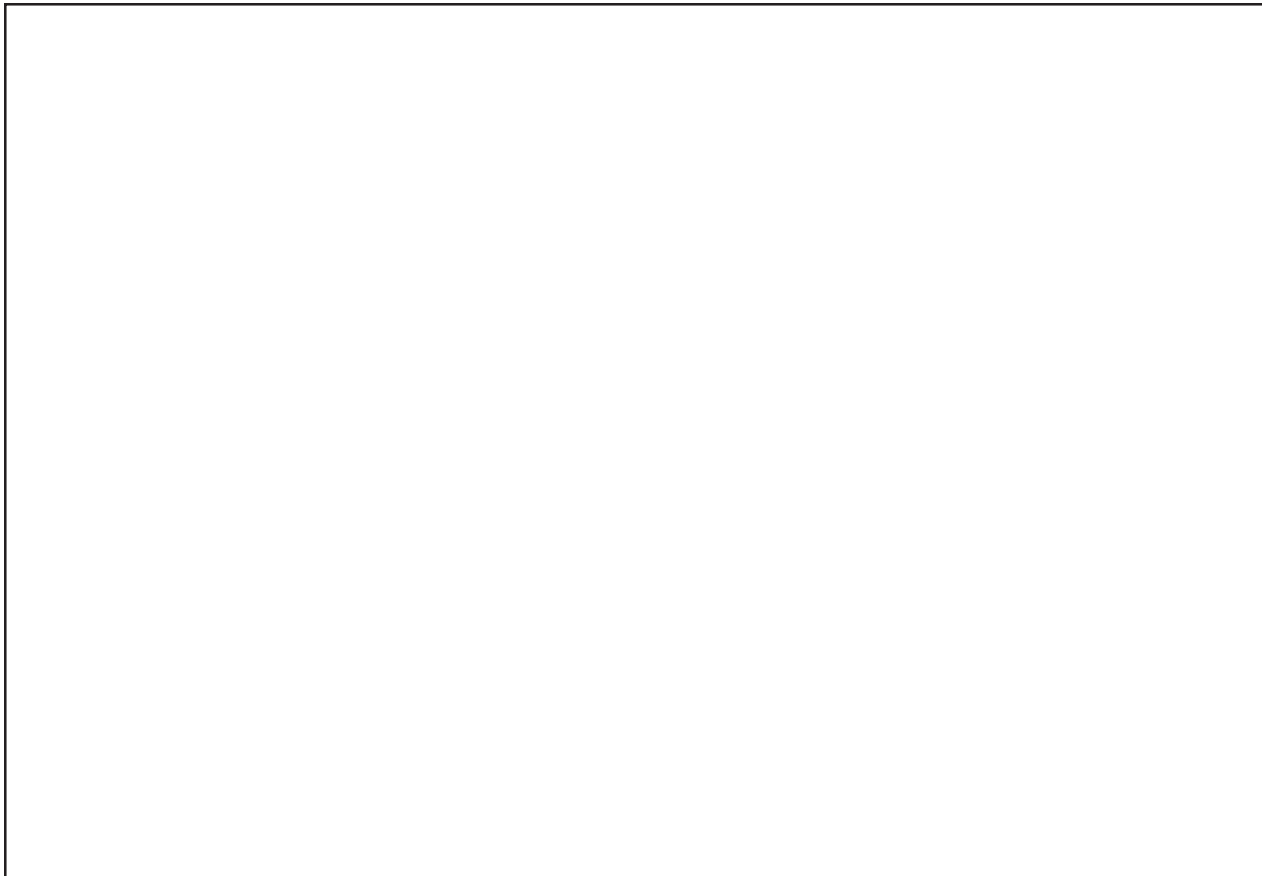


Photo courtesy Jack Lazor

Combining wheat in 1997.

from Compton, Quebec came down and did all of our combining that first year. By the late eighties we were just on the edge of entering the modern agricultural era.

In the spring of 1990 I went to an auction at a nearby farm and did what Anne considered unthinkable—I bought the bigger tractor. The Farmall 856 was two sizes larger than my 656. It sported a cab and cranked out just over 100 horsepower. The price tag of \$6700 seemed reasonable enough and it pulled my field cultivator with ease. By this time my banker was getting accustomed to my need for short term farm machinery loans. The only problem with having a bigger tractor was that now I needed bigger plows and harrows. Anne thought I had really flipped my lid when I went out and got a second loan for these items.

After a while this farming/ farm machinery thing begins to snowball. Once a person has bigger and better equipment, they need more land to exercise their toys. This is basically what happened to me throughout the nineties. Grain acreage has increased from 20 to 240 acres. In 1992 I purchased a 1977 John Deere 3300 combine from a neighboring dairy for \$5000. Shortly thereafter came my first grain dryer. In 1994, I ventured off of our hilltop to rent land and plant crops on stone free and warmer climed riverbottom land. In the fall we switched from picking and cribbing ear corn to combining and drying shelled corn. This necessitated erecting two outdoor steel grain silos as well as purchasing a corn head for the combine and another grain dryer. This story starts to get pretty predictable after a while.

Farming has certainly been an adventure for close to three decades now. The process of searching for a piece of machinery is as much fun as actually using it. Several years ago, my friend Alex Brand and I spent three days driving around southern Minnesota and Wisconsin looking for mid-mount cultivators for 1960's Farmall tractors. We found two sets of these rare items and got to talk to lots of older farmers who had cultivated their corn thirty years earlier. Farm machinery promotes fellowship that transcends political and ideological differences.

As we have obtained more and more modern equipment we have been able to find good homes for most of the older machines that served us so well. We're up to seven tractors now—all of them older Farmalls from the 1960's, except for one from the 50's and one from the 70's. Just this past season I finally purchased a John Deere 6620 combine built in 1988. Throughout all of this we have continued learning. There have been mistakes, weather related catastrophes like flooding, and crop failures. I have unknowingly bought some pieces of equipment that have needed more work than I realized. All in all however, things have gone quite well. I've learned how to use cultural practices and machines to keep the weeds from smothering my crops and can honestly say that my crops look just as good if not better than those of my conventional neighbors. Farm machinery and the process of using it has been a large part of my agricultural passion since the beginning of my farming career. So if you're wondering about a piece of equipment (especially grain machinery)—let's talk. I'm sure we can learn lots from each other. Farming has been a blast. I'm going to crop 'til I drop.

Electric Farm Machines

by Jim Coate

I've often thought that electric tractors, and electric machines in general, would be a great match for the small farm. Somehow using petroleum fuels while taking good care not to use synthetic fertilizers doesn't seem quite right (at least from the comfort of my chair). Some have avoided this issue by using draft animals or by fueling their machines with biodiesel, but out of necessity many use either gasoline or regular diesel in their Internal Combustion Engines [ICE for short].

Why Electric?

The down side of petroleum fuels is often discussed – the environmental impacts of extracting and burning it, the societal costs of “protecting our interests” in distant countries, and so on. I'm also not that fond of working on greasy engines, and now drive an electric pick-up truck.

Electric vehicles, tractors, and other machines are clean, simple, and quiet to operate, and arguably cheaper in the long run. But wait, where does that electricity come from? If you get your electricity from “the grid” (local electric company) then yes, somewhere, someplace, in someone else's backyard, coal or oil or natural gas is being burned or a nuclear power plant is splitting atoms to make your electricity. Various studies have analyzed this issue, and the bottom line is that less fuel is used and less pollution is generated by the electric power plant. Think of it this way – the power company generally keeps their equipment in top shape and (with some nudging) has installed sophisticated pollution control devices. That 10 year old ICE car or 30 year old ICE tractor just doesn't follow the same standards, and that ICE powered log splitter follows almost no standards.

What I like most, though, is that electricity can come from many other sources as well – local sources that you directly control. If not for cost, anyone could put solar panels (photovoltaics) on the roof. Those who are in the right location can also use wind or small-scale hydropower. If you are on the grid, you sell power back to the electric company when you have extra and buy when you need more, but at the end of the year you have generated as much as you used. If you are off-grid, then you need to maintain battery banks to store power for when the sun doesn't shine and the wind doesn't blow. Either way, once set up you have your own source of clean quiet power. It may be expensive up front, but you know where it comes from.

Electric Tractors

Plenty of electric tractors have been made over the years. A late 1800's *Scientific American* article showed farm tractors in South America being run on electricity from overhead wires, cultivating large fields. More recent versions, built for college research projects or in regular production, are all battery powered for greater independence. The extra weight of batteries and low-end torque of electric motors are great features for a tractor. Electric motors don't waste any energy when you aren't moving and the torque is greatest when you first start moving, right when you need it the most. As a result, electric tractors are known to beat the gassers in tractor pulls. I own a 30-year-old “Elec-Trak” and have been very impressed by its performance (see next section).

Electric tractors for towing and for lawn care are fairly easy to come by, with several models now on the market. The larger electric machines, with 10-15 horsepower motors, can rival the power of a small cultivating tractor and be used for a variety of agricultural purposes. They are generally limited more by traction and ground clearance than by strength (www.econogics.com/ev/evtools.htm).

One of the more versatile electric tractors in production is the “Electric Ox” manufactured in Canada. Available with a limited selection of accessories, it can mow, sweep, grade and plow. It can tow any cart, spreader, or other implement with a standard hitch socket. With some creative welding it could likely pull any sleeve-hitch ag implement as well. The Ox has a top speed of 5 mph, a fiberglass body over a steel frame, dual motors, electronic speed control with regenerative braking, uses 6 deep-cycle golf cart batteries, and weighs 760 pounds. It can mow for about half a day on one charge or tow for up to a full day, depending on the load. The tractor alone costs \$6400 - \$6800 depending on the model, and accessories are extra. The manufacturer reports that their dealers in British Columbia have been active in the local organic market (Electric Tractor Corporation, 877-533-4333, www.electrinox.com).

The “Gorilla EV”, made in California, is a cross of an ATV and a mini-tractor. It seats two and can tow carts and spreaders. The optional pin hitch accepts garden tractor attachments with 1/2" and 5/8" pins. It uses a series-wound motor geared for a top speed of 12 mph, and a peak power of 9 horsepower. With 3 batteries to power it, the range would be somewhat less than the Ox, but easier to recharge from an off-grid system. Similar to the Ox, it has a plastic body over a steel frame, uses an electronic speed controller, and weighs 550 pounds. The utility vehicle version costs about \$5800 and is shipped directly from the factory, fully assembled and ready to drive. Additional information can be found in the February/March 2003 issue of *Home Power* magazine, which reports that the majority of sales so far have been to small farms (Gorilla Electric Vehicles, 714-377-7776, www.gorillavehicles.com).

A dedicated electric asparagus harvester is made in Italy. These machines are designed so that the driver sits low to the ground to easily reach the plants, and provides shade with a canopy overhead. Some may recall seeing one of the green asparagus harvesters on display at the 2001 Summer Conference. The designer's calculations show it costs a third as much to operate as a gas tractor



photo courtesy Steve Heckerroth

This Yanmar tractor was converted to electricity by Steve Heckerroth, generating up to 60 horsepower with a 3-point hitch and PTO.

per harvest season of 33,000 pounds. At a cost of about \$5000, I'm sure it would be justified on a large operation but of limited use on smaller, more diversified farms (Bagioni Alfiero, +39 543 702182, www.asparagus.it).

Made specifically for golf course upkeep, the “E-Plex II” is an all-electric greens mower. It is sold under the Jacobsen and Ransomes brands for about \$16,000. It is advertised as having a range of 15 to 20 greens per charge, depending on the terrain. It is made in Europe, but can be found in the US, and at substantially lower cost if it is used (Ransomes Jacobsen, +44 (0) 1473 270000, www.ransomesjacobsen.com).

Over the years, people have converted various tractors to electric, including the older Farmall Cadet, Allis Chalmers G, New Holland, and Massey-Harris machines. If you are somewhat mechanically inclined, and choose a tractor that has the engine separate from the frame, it wouldn't be too hard to round up some golf cart parts and convert your own. When a three-point hitch is needed, a second electric motor can be added to drive the PTO at constant speed. This would be a great way to get a larger machine that can navigate rough ground.

After converting a Yanmar tractor to electric, Steve Heckerroth worked with Professor John Fabel (of the biodiesel ‘G’ fame) at Hampshire College and several major manufacturers to make a prototype “Solar Tractor”. It was designed as a multi-purpose farm tractor, with a solar panel canopy that helps recharge the batteries while providing shade. It has up to 60 horsepower at peak,



photo courtesy Steve Heckeroth

Here's the Yanmar by a solar shed where it can park & recharge.

and includes a Category I three-point hitch and PTO. He predicted a cost of \$15,000 - \$25,000, but has never gone into production (Homestead Enterprises, 707-937-0338, www.renewables.com).

The Elec-Trak

I have an Elec-Trak E-20 which can do a surprising amount of grunt work. I have used mine with a tiller on back to break up heavy sod and a blade on front to push the dirt around. Although tricky in the corners without a bucket, it still did an impressive job re-grading the area. I've read about other owners winning tractor pulls (1750 pound load), towing cars, and hauling logs with their ETs. One ET owner reports being able to pull a filled 160-bushel grain wagon (8000+ pounds) on level sod as long as he didn't try to turn at all. It seems that 1000-2000 pounds, or about 200 gallons of water, is the practical limit for towing on mostly level ground. It is rare to stall the motor, although it is easy to do a wheelie, lifting the nose off the ground when there isn't enough weight on the front of the tractor.

The Elec-Traks were made by General Electric in the 1960's and 1970's, and then sold to Wheelhorse who continued producing them for a few years. Although no longer made, many can still be found used, most often with a mowing deck or snow thrower. The cost can be a few hundred dollars and up for a running machine, depending on condition. Replacement parts and manuals are still available from Bill Gunn in Wisconsin (Technical Service & Parts, 7898 North Pineview Drive, Edgerton, WI 53534, 608-868-6220).

The E8m, the smallest model at 500 pounds, uses three batteries and is basically a riding mower rather than a tractor, good only for lawn mowing and light plowing. It produces up to 8 horsepower and travels up to 4 mph, and is rated for up to 1 acre of mowing per charge. The E10m and larger models all use six deep-cycle golf cart batteries. The E10m is the middle of the line, with greater range but still limited accessories and uses.

The large frame tractors (E12 through E20) have beefy DC motors and can produce 12 - 16 horsepower or more. This allows the use of a huge variety of accessories, such as mowing decks and reels, snow throwers, dozer blades, V-blades, tillers, sweepers, bucket loaders, fork lifts, and of course carts and spreaders. A line of small accessories including a drill, hedge trimmer, cultivator, chain saw, and even an arc welder were made to plug into the 36 volt accessory outlet. These larger tractors weigh in at 800 - 900 pounds, reach speeds of 6 - 9 mph, and can mow up to 3 acres per charge or till up to half an acre per charge.

For heavy pulling of ag implements, an optional sleeve-hitch bracket is mounted to the rear of the frame, and an optional rear lift controls the height. GE originally partnered up with Brinly-Hardy for the disc harrow, row crop cultivator, tiller, and other ag implements. All of these, except the tiller, are still available new today (Brinly Hardy, Inc., 800-626-5329, www.brinlyhardy.com).

The Elec-Traks all use contactor controllers, rather than electronic controllers. This is basically a series of relays and resistors to give 3 to 8 speeds. The large frame models have a 4-speed transmission, for 12 to 24 total speeds available. After years of neglect, the electric circuits may need some cleaning up, but the parts are relatively inexpensive to replace. Some owners have retrofitted their tractors with more modern, and more expensive, electronic controllers so as to gain finer control of the speed and greater reliability.

All the models have steel frames with sheet metal bodies. After 30 years, most will show some rust, particularly around the battery boxes. If too severe, replacement sheet metal parts are available from Bill Gunn.

If you do get a hold of an Elec-Trak, make sure to track down an owner's manual and service manual, as these will provide invaluable tips for keeping the machine going. If you have internet access, there is an Elec-Trak owners club web site with lots of information and for-sale listings (www.elec-trak.org) and there is an e-mail discussion list with plenty of good advice (groups.yahoo.com/group/elec-trak).

Other Electric Machines

For a small operation, or a big home garden, there are some other interesting choices. The "Sun Horse" is a walk-behind electric machine that can plow, seed, cultivate, and haul. The battery is recharged by a small built-in solar panel or, I assume, can be plugged in for a faster charge. The variable speed drive provides much greater control than an ICE tiller, allowing for "surgical weeding" as designer Tom Lopez described it to me. He also told me of one CSA where the subscribers enjoy using the Sun Horse. The base price is \$2300, or



photo by Jim Coate

This is my 30 year-old Elec-Trak E-20 (now out of production) which I have used to till up heavy sod and regrade a landscape.

up to \$4700 for a complete package with all accessories (Free Power Systems, 303-651-3184, www.freepowersys.com).

If you are working near enough to your house that you can run a long extension cord out the back door, there are a variety of corded tools (and even a Caterpillar bulldozer) that can replace their ICE counterparts. These include fairly common tools such as 14" and 16" electric chain saws made by Remington, McCulloch and others. Remington also makes a 10" wide, 2 horsepower walk-behind corded electric tiller called the "Garden Wizard" (www.desatech.com/remington/home.asp).

A variety of electric chipper/shredders are available, such as the McCulloch MCS 1400 (www.mccullochpower.com, 800-521-8559). However, these are only good for leaves and small branches. If you need to grind up major branches, the only electric option may be to convert an ICE chipper yourself.

To split wood, there is at least one company making an electric version. The "Super Split" is available from a Massachusetts company in several versions with 1 to 3 horsepower farm-duty rated electric motors. These wood splitters use an ingenious flywheel system rather than hydraulics for greater speed and strength. (GFX Corporation, 508-427-5800, www2.shore.net/~logsplit).

If you already have an electric tractor, you can add an inverter and plug in any regular 120-volt AC tool wherever you go. For a small drill or a weed whacker, it is easier to just get the cordless version that has its own built in battery. When you need a larger hammer drill or chain saw, it is great to be able to power it from the tractor's battery.

Inverters need to match the voltage of your battery pack (36 volts for an Elec-Trak) and the power of the tools you want to use (1500 watts would handle most tools). The inverter needs to be rated to provide the surges required in order to start a motorized tool. Rotary inverters (basically a motor and alternator in one unit) are very robust and have been around for many years but aren't as common any more. Electronic inverters, readily available from any renewable energy dealer, are generally smaller and more efficient than rotary inverters, but a bit more expensive. The Elec-Trak was originally available with a rotary inverter and the Electric Ox is available with an electronic inverter as a factory option.

There are a variety of electric vehicles such as my electric pick-up truck that could be useful on a farm. On-road vehicles range in size from small one-person pods to full size city buses. And yes, there are people who specialize in go-fast electric cars (National Electric Drag Race Association, www.nedra.com).

For \$4000 to \$9000 you can find a pickup truck that has been converted to electric or convert one yourself using several kits that are available. By keeping the number of batteries down, this could be useful for hauling larger loads around your own land, or with more batteries could carry lighter loads longer distances to pick up supplies in town. There are some cute Renault delivery vans available in France for around \$7000 that would be ideal for bringing produce to the local farmer's market, although I'm not sure if legal to import into this country (www.evalbum.com).

Randy Holmquist puts together very nice commercial electric trucks up in British Columbia. The "Might-E Truck" and the Izuzu NPR can be custom configured and are generally designed for larger payload capacity and speeds under 25 mph (Canadian Electric Vehicles Ltd., 250-954-2230, www.canev.com).

Batteries

Rechargeable batteries are the only practical way to store electricity and carry it around with you. Fuel cells have received a lot of press recently, but are still decades away, as are portable flywheels and other experimental concepts.

The common lead-acid battery, found under the hood of every car, has been around for over 100 years. As a result, plenty of recycling options are in place for disposing of old batteries. If trying to make an electric car with more than a 200 or 300 mile range, then exotic batteries are a must, but the tried and true



photo courtesy Sun Horse web site

This walk-behind electric tractor and the right accessories can plow, seed, cultivate and haul.

lead-acid battery is great for electric tractor applications. The lead is of course heavy, but that just reduces the amount of dead weight that is added to the front of the tractor or in the wheels.

Lead acid batteries come in several varieties – flooded, gelled, and absorbent glass mat (AGM) and can be tailored to different applications such as a car starter battery, marine use, and deep-cycle. The flooded deep-cycle versions, with caps you can remove and see the electrolyte inside, are the most practical choice for an electric tractor. Gel cells are sealed so there is no mess to deal with, but are more expensive and would not last long in a tractor. AGMs are also sealed and even more expensive, but would perform very well although with slightly less range. The up-front cost of the AGMs and the cost of the sophisticated charger required make them hard to justify.

Many other battery chemistries have been developed, but aren't likely to be used in an electric tractor. Some options, such as nickel-cadmium (NiCad) have been around for years. Companies like SAFT that make the larger flooded NiCads have an aggressive recycling program in place and an excellent environmental record. NiCads are solid performers, but the higher price for lighter weight is difficult to justify when weight isn't a problem.

Newer battery chemistries, such as Nickel Metal Hydroxide, Nickel Zinc, and Lithium Ion are common in small sizes for cell phones, laptop computers and other consumer electronics. Larger versions useful in electric vehicles are still very experimental and generally prohibitively expensive. Large size, relatively low cost, lithium ion and nickel zinc batteries made in China are just starting to appear on the market, but I have serious reservations about the manufacturing conditions and the reliability of these units.

Unfortunately the battery industry is loaded with products that claim to heal all that ails your battery. Liquids or powders that you add to the electrolyte do absolutely nothing. Little black boxes that pulse or resonate the battery are also of little use for most people, in my opinion. Regular AC power pulses 60 times per second and ordinary chargers pass these pulses on to the battery. However, these pulse devices may help those charging from pure DC, such as with an off-grid solar system.

In general, batteries are like people and respond well to a good diet, comfortable temperatures, and regular exercise. With flooded batteries, it is important to take off the caps every few weeks and add clean distilled water as needed. During the final phase of charging it is normal for the electrolyte to bubble and gas, but this boils off water that must be replenished before the plates get exposed.

Lead acid batteries are happiest around 80° F. At higher temperatures, they will perform better but have a shorter life and at colder temperatures the range will drop off - significantly when below 40° or 50° F. You can still use them in the winter, but expect to charge more often. The batteries should always be stored fully charged, and this is even more important in the New England winter as a discharged battery is prone to freezing and cracking.

If the batteries have gone unused for a while, expect them to seem a little sluggish at first. A few cycles of gentle exercise and charging will wake them right back up. With some basic care, the batteries in your tractor will provide years of service.

Parting Thoughts

I may be biased, but I feel that electric tractors and other electric machines are a great match to smaller farms. For a larger operation, you might consider biodiesel for the big equipment and electric for the smaller equipment. If you are interested, check out the resources listed, find me on the web, or give me a call, and I'll be happy to tell you more (www.eevee.com, jbc@coate.org, 617-484-0295).

With thanks to the members of the Elec-Trak and Electric Vehicle Discussion Lists and the NOFA folks who have talked to me at the summer conferences and at farmer's markets for all the great information and ideas!

Summer Conference (continued from page 1)

processing conglomerates. One can expect that she will expound upon this economic vision in her keynote, "The Politics of Food," on Friday August 8.

Sally is the founding president of the Weston A. Price Foundation and is also the founder of A Campaign for Real Milk. More information about Fallon and her work can be found at www.nofaic.org/conference/nourishingtraditions.php or at newtrendspublishing.com/SallyFallon. You can contact her directly at safallon@aol.com.

Following in the path of Joel Salatin's very popular pre-conference workshop in 2002, Fallon's (on Thursday August 7 from 1-5 pm and Friday from 8am - 12pm) will be an intensive, hands-on affair that will be open to the first 200 registrants, even those who cannot attend the rest of the Summer Conference. Her Thursday workshop will be "Why Butter is Better and other Surprising Facts about Nourishing Traditional Diets," and Friday's workshop, "How to Change Your Diet for the Better," will empower you to implement all the ideas she offers on Thursday. Fallon has quite a following in NOFA, and outside of our geographic area, and we expect this pre-conference to fill up quite quickly. Quite graciously, Fallon has also agreed to give two workshops during the regular conference, "The Ploy of Soy and the Campaign for Real Milk" and "The Oiling of America."

More good news: Sally Fallon isn't the only person presenting—far from it! In fact you're very likely to be able to hear someone else give a workshop about the other 'Oiling of America' (as in petroleum) and what you can do about that. The workshops—from gardening to activism, timber framing to managing chickens—are all in at this time, and when you get your much anticipated registration form you'll know what they are. Also, check this space in the Summer issue for some highlighted ones (which usually are ones I like the name of).

Ellen Kittredge, ever the early bird, has sketched out a pretty amazing menu for the conference.

Gazpacho soup and tortillas, blueberry pancakes and potato and kale frittata, BBQ sandwiches and Pizza—is your mouth watering yet? We still need to vote on it, but it sounds delicious. Ellen is trying to plan the local meal also, and she can use the help of any NOFA-certified farmers. Farmers who wish to contract with NOFA for sale of their produce will receive market price. You will be selling directly to NOFA, thus cutting out the middle person, and all conference attendees will benefit from knowing exactly where their food was grown. If you are interested in participating, please contact Ellen at (978) 355-2853 or ellenkit@wildmail.com. She needs a response by the end of March. Also, she is hoping to find a source for locally pressed oil (or oilseed that could be pressed elsewhere); please contact her if you have any leads.

In tune with the question on a large number of organic lips right now, the debate topic will be "The National Organic Program: Should We Jump Ship?" Jack Kittredge is looking for a couple of passionate speakers on each side of this topic. Ideally at least one on each side would be a practicing organic farmer and one could be a policy person like a certifier, a government official, or someone who works for an NGO in the field. If you would like be on one side or the other on this topic, give Jack a call at 978-355-2853 or email him at jack@mhof.net. Or if you know of a good candidate, let Jack know.

In other areas of the conference, this is the time when our fair starts to come together. Tricia Cooper, a conference newcomer, is coordinating the fair and would love to have the names of some folks who play music, and who entertain in a variety of ways. You can contact her at triciacoop@hotmail.com or 617-558-3322. Justine Johnson and I are looking for a few good teachers for the Children's Conference. Our email is johnsonlorenz@charter.net. Jocelyn Langer and Dan Kittredge are undertaking to make the teen conference a great intellectual and hands-on experience for the 13-18 year olds. The entertainment, coordinated by committee newcomer Randall Shaw, will be fine as always.

If you know of a place where you can put registration forms for others to pick up, please contact Julie Rawson at julie@mhof.org or 978-355-2853. We appreciate your help in getting the word out.

Another World Is Possible

Report on the World Social Forum
Porto Alegre, Brazil, January 21-28, 2003

Samuel & Elizabeth Smith of Caretaker Farm in Williamstown, MA represented NOFA as part of a 16 member US agrarian delegation to the World Social Forum and the Assembly of the Via Campesina. The following report was written by Sam along with contributions to the text by Stephen Bartlett, the Organizer of the U.S. delegation and Latin America Liaison for Agricultural Missions, Inc., an agrarian advocacy organization related to the National Council of Churches, USA.

Preface

At the end of January two major, international gatherings took place: the World Economic Forum in Davos, Switzerland and, simultaneously, the World Social Forum in Porto Alegre, Brazil. In that the two forums represent radically different perspectives as to the ordering of the earth's household, the fateful question is: which side will prevail? On the one hand, grey homogeneity, self-interest, cold calculation and a polarizing fear or, on the other, diversity, pluralism, democracy, generosity, and color.

The World Economic Forum, in which participation is by invitation only, brings together the world's economic and corporate elite who, through their wealth and power, exercise unbridled and brutal control over peoples lives and the earth's resources.

The World Social Forum, initiated three years ago by representatives of international social movements, NGOs and trade unions, gives voice to people from all over the world. Nearly 100,000 attended this year from the broadest diversity imaginable of civil society, labor, indigenous peoples, small farmers, fishers, farm workers, landless peasants, and people representing many faith communities.

While the World Economic Forum is concerned with strengthening corporate globalization, a system described by many as totalitarian commercialism, the World Social Forum has a different agenda. It deals with seeing the hurt born by the people and the Earth as a consequence of the global economic structure and with articulating practical alternatives that will bring healing instead of deeper wounds to the Earth Community. It deals with the faith that *Another World is Possible*.



Protest against the Free Trade Area of the Americas in which 50,000 people marched World Social Forum and the Assembly of the Via Campesina

The World Social Forum (WSF) is a forum of forums, a web of movements, in which one of the most visible is the Via Campesina, a coalition of indigenous and peasant movements. The Via Campesina brought to the WSF a persistent focus on the struggle for peoples food sovereignty, the right of peoples to define their own agriculture and food policies, and Humankind's yearning for secure tenure in the land. For the US agrarian delegation, participating in the Assembly of the Via Campesina and in the WSF was like acting within a beautiful and hope-filled dream. Note: While the Assembly itself only encompassed three days of our whole time at the WSF, it permeated our spirit and provided the context for our understanding of our participation and solidarity with others.

La Via Campesina: A Global Movement of Peasant Resistance

We agree that peasants are primarily agriculturists. That is to say a peasant is simply an oppressed and exploited farmer. But we also believe that the

criteria of definition must be structural and relational rather than occupational. It is not what peasants produce that is significant; it is how and to whom they dispose of what they produce that counts.

And that structural relationship is not a very benign one. Peasants are not only poor, but they are relatively powerless. Peasants know that control over them is held in some mysterious fashion by superior powers (who). . . . usually drain off most of the economic surplus a peasant creates, beyond the necessity of a bare subsistence living.

George Foster, Peasant Society: A Reader (quoted by John Dominic Crossan, The Birth of Christianity, p. 347)

The Via Campesina is an agrarian movement of more than 90 confederations of small and medium farmers, farm workers, rural women, and indigenous communities from every continent.

Its primary objective is to develop cooperation and solidarity within the diversity of its member organizations for the sake of economic, cultural, and spiritual survival in the face of the commercialization of agriculture by transnational corporations.

Its integrity and legitimacy is drawn from the diverse campaigns it has undertaken in recent years. These include, in addition to food sovereignty and agrarian reform, the recovery of traditional seed varieties as the common inheritance of humanity. Via Campesina organizations have also been leaders in the struggle against genetically modified seeds, the struggle to head off the process of militarization of the planet (such as under Plan Colombia, Plan Puebla Panamá, Plan Andean), and the struggle for peace.

The MST & The Mystical Power of Peasants

*So, friends, every day do something
That won't compute. Love the Lord.
Love the world. Work for nothing.
Take all that you have and be poor.*

*..... Swear allegiance
to what is nighest your thoughts.
As soon as the generals and the politicians
can predict the motions of your mind,
lose it. Leave it as a sign
to mark the false trial, the way
you didn't go. Be like the fox
who makes more tracks than necessary,
some in the wrong direction.
Practice Resurrection.*

*-Wendell Berry, "Manifesto: The Mad
Farmer Liberation Front"*

One of the most powerful expressions of peasant resistance, struggle, and hope in the world today can be seen in the Landless Rural Workers Movement of Brazil (MST). Indeed, the encounter with the MST will be the most enduring memory from our days at the World Social Forum

The MST, which was responsible for coordinating the Assembly of the Via Campesina, expresses in its program the meaning and centrality of land and its vulnerability. The MST strives to inhabit the land at the cost of people's lives and years in two senses. In an actual sense, the land as the place where people can be safe, secure, and self-reliant. In the symbolic sense, as the place "to express the wholeness of joy

and well-being characterized by social coherence and personal ease in shared prosperity and freedom."

In a highly symbolic ceremony which took place in a permanent settlement of the MST, a group of campesinos and campesinas performed "street theatre" of the highest order. It was theatre in which the members of the audience, the 1,200 delegates (including the 16 member U.S. delegation) to the Via Campesina Assembly, were incorporated into the body of the drama as co-actors.

On arrival by buses at the MST settlement, we were led to a natural amphitheater in the woods. We were facing an earthen mound (i.e. the "stage") topped by a stump of what had once been a magnificent tree. The outline of a series of seven parched, dusty plots was visible just below the mound. As we settled in around the mound we were surprised by the sound of peasants coming towards us from behind making dissonant music with their hoes and machetes. The peasants wove through the audience towards the great tree stump. While we were distracted by the music and the action around us, someone placed a large object depicting Uncle Sam's top hat on the stump. The hat was labeled privatization and decorated with \$ signs.

When the music-makers reached the mound, they pummeled the hat with their hoes and machetes. As the hat broke apart, a flow of water emerged from under the stump. Using lengths of bamboo sections as pipes, the peasants channeled the water to the seven dusty plots (representing the seven continents). To our great surprise and joy, the moistened earth woke up and moved as peasant men and women covered with soil emerged from under the ground and began to sow seeds over the continents of the world. Then we heard music as if risen from the ground, and with the singing came the haunting, one word refrain "Tierra, Tierra, Tierra."

Extraordinary and emotional drama! Drama with a mystical dimension revealing a profound understanding of the human role within the earth community. This was a mystique ceremony. A mystique is a

basic cultural element within the MST celebrating the rebirth of agriculture and of the resurrection of the human being upon the earth that those present will never forget.

The drama also had the urgent purpose to initiate the Via Campesina Campaign for Seed Sovereignty, which demands the right of farmers to save their own seeds and defend their seeds from contamination by GMO or transgenic seeds.

Later, after feeding the 1,200 invitees under the shade of neem trees, having killed 8 head of cattle and some pigs the day before (all organically produced and grass fed by cooperativists of the MST in *the 30th of May* settlement) there was an international exchange of seeds. This was a marvelous event of solidarity and agronomic exchange!

The Ethically Empowering Diversity of the World Social Forum

Where to begin to describe the various cultural and political events of the World Social Forum, not to mention the hundreds of high quality workshops and seminars? There was the opening march to the Porto Do Sol amphitheater in Porto Alegre of some 100,000 people. There was the speech given by Brazil's new president Lula, with approximately 150,000 people gathered in the same amphitheater the following evening. There was the inauguration of a new progressive weekly newspaper, *Brazil de Fato*, in which the famous Uruguayan author Eduardo Galeano (author of the classic *The Open Veins of Latin America*), together with world renowned photographer Sebastiao Salgado, and the daughter of Che Guevara, all projected their hopeful and wise words to the multitudes gathered to hear them in the Auditorio Araujo Viana. And there was the penultimate event in the Gigantinho stadium, where Joao Pedro Stedile of the MST, Francisca Rodríguez of Chile and Peter Rosset of Food First gave presentations about biodiversity and the struggle to defend seeds. And finally, speeches by Noam Chomsky and the Indian writer Arundhati Roy concerning war and peace initiated the great march for peace and against the FTAA on the

evening of January 27, with more than 50,000 persons marching!

Of the concrete actions planned during the Forum, the most critical are:

- The mobilization planned to protest in Cancún, Mexico in September during the meeting of the World Trade Organization (WTO).
- International support for the Mexican farmers who have initiated a campaign called The Countryside Cannot Take Any More which demands that agricultural commodities be removed from NAFTA because of the disastrous effects of NAFTA to date on Mexican agriculture.
- The farmers of Mexico will be undertaking blockades of imports of very cheap subsidized corn from the US at the border, imports which have displaced millions of small producers on both sides of the border.
- The campaign in the US and Canada against the commercialization of GMO wheat, and
- The worldwide campaign against a further expanded war in Iraq.

In a symbolic act during the Forum, the US Agrarian Delegation burned in effigy three representative corporations, with spontaneous speeches of why we consider them to be our enemies: MONSANTO (for its GMO and monopoly control threat to the future of sustainable agriculture), CARGILL (for representing a cartel which floods the food markets of the world with grains below the cost of production), and TACO BELL (for benefiting from millions of dollars of profits on the backs of farm workers in Immokalee, Florida).

Arundhati Roy, Indian Writer and Heroine of the Oppressed

As was expressed by the new president of Brazil, Lula Ignatio da Silva, Porto Alegre had become the capital of the other, more hopeful world during the World Social Forum. But it was Arundhati Roy who shared thoughts for the long, hard journey ahead:

As the disparity between the rich and the poor grows, the fight to corner resources is intensi-

fyng . . . To corporatize the crops we grow, the water we drink, the air we breathe, and the dreams we dream, corporate globalization needs an international confederation of loyal, corrupt, authoritarian governments in poorer countries to push through unpopular reforms and quell the mutinies.

Corporate Globalization - or shall we call it by its name? - Imperialism - needs a press that pretends to be free. It needs courts that pretend to dispense justice.

So how do we resist "Empire"? Our strategy should be not only to confront empire, but to lay siege to it. To deprive it of oxygen. To shame it. To mock it. With our art, our music, our literature, our stubbornness, our joy, our brilliance, our sheer relentlessness - and our ability to tell our own stories. Stories that are different from the ones we're being brainwashed to believe.

The corporate revolution will collapse if we refuse to buy what they are selling - their ideas, their version of history, their wars, their weapons, their notion of inevitability.

Remember this: We be many and they be few. They need us more than we need them.

Another world is not only possible, she is on her way. On a quiet day, I can hear her breathing.

Postscript

The purpose of this Postscript is to bring the Porto Alegre experience closer to home and to companions in the Northeast.

Commercialize, v., 1. to make commercial in character; to make profitable. 2. To emphasize the profitable aspects of, esp. by sacrificing quality or debasing inherent nature.

- Websters College Dictionary

What are People Seeing and Experiencing All over the World?

One fact impresses itself on almost any observer of global society today: that of marked economic and social inequality and the debasement of the commons, the sacred and mystical sources of life.

Inequality, injustice, and the desacralization of life derive from the radical commercialization and commodification of all matter.

The human protest against commercialization and commodification is a cry for survival. In Porto Alegre, one heard again and again the words "Our World is not For Sale" and "Another World is Possible."

Who Is Hurting the Most or First, And Who Is Next?

Surely US family farmers (a.k.a. peasants) know that the brunt of radical commercialization is felt first by them and their agrarian companions in every part of the world. But the consequences of commercialization don't end with the exploitation and theft of the fruit of the farmers labors; no, the consequences involve everything that matters: life, land and water. Life, land, and water on every continent are becoming alienable and commodified under the impact of commercialization. This fact is central to any analysis of the state of the world. And this fact explains the pervasive unease around the world today as well as the rising call for change from progressive global social movements.

The proponents of global corporate power appear to be indifferent, if not oblivious, to the possibility of another world. Yet, they are not so much irredeemably corrupt in upholding the status quo as they are ideologically convinced that the present structure of things is necessary, fixed, and with a little more tinkering, unchangeable.

On the other hand, the members of the worldwide movements, especially those who experience the world from within an agrarian context, see things differently. In describing the social and economic context of revolutionary movements and the situation of the peasantry in the Roman Empire in the first century (C.E), religious historian John Dominic Crossan describes our own time with clarity and insight.

Commercialization makes it terribly clear that things can change, and are, in fact, changing for the worse. But, peasants then ask, if things can change for the worse, can they not also change for the better? That explains why peasant reactions to commercialization are typically also characterized by utopianism, involving far-reaching demands for equality and the end of exploitation. Peasants who have accepted subsistence living and appropriated surplus for centuries smell the whiff of doom in commercialization and reach not just for the restoration of traditional exploitation but for radical, utopian, and egalitarian visions of an ideal world. Only the changes to which commercialization subjects peasants makes them capable of believing that they can bring about social change. Having suffered adverse changes, they can demand favorable ones, and these may now go far beyond the restoration of older forms of exploitation all the way to communistic utopias. Those are, of course, visions of revolution rather than just rebellion, visions of a world without any exploitation and oppression rather than one simply restored to former and traditional levels of each.

Crossan, op.cit., p.159

Conclusion and a Proposal

While corporate globalization nears its final, destructive stage, where do the members of NOFA stand in the coming confrontation? What are the connections through which we can express our solidarity with agrarian movements within and beyond North America?

The peasants of Central America, Latin America, Asia, and Africa, are not willing to be passive collaborators. They believe that they can bring about social change. The question is: Are we, NOFA farmers and gardeners, also capable of believing that we can bring about change? Have we been subjected to enough adversity to want to join in solidarity with worldwide groups like the Via Campesina or U.S. groups like the National Family Farm Coalition? Or do we feel we are immune from future adverse changes in that we have found

minimal security outside of the brutal reach of totalitarian commercialization through our CSAs and local markets?

Our passion for CSAs and local markets is right and beautiful, but creating forms of solidarity with peasants, the exploited farmers, beyond our region may be the only way we will become capable of believing that we can bring about the humane and progressive changes we yearn for.

The US Agrarian Delegation to the World Social Forum and Assembly of the Via Campesina represented the following organizations: The National Family Farm Coalition (NFFC), Family Farm Defenders (FFD), the Community Farm Alliance (CFA), the Federation of Southern Cooperatives (FSC), the Northeast Organic Farming Association (NOFA), Women, Food and Agriculture (WFA), the Independent Center of Farm Workers (CITA) of the State of New York, the Coalition of Immokalee Workers (CIW), the Farm Labor Organizing Committee (FLOC), the Food Project of Boston, and Agricultural Missions, Inc.

Encyclopedea of American Farm Implements & Antiques

\$24.95, 395 pages

Standard Catalog of Farm Tractors, 1890 to 1960

\$29.95, 511 pages

Unusual Vintage Tractors

\$19.95, 268 pages

all by C. H. Wendel

and **The Standard Catalog of Farm Toys**

edited by Elizabeth A Stephan and Dan Stearns

\$29.95, 443 pages

published by Krause Publications, 700 E. State St.,

Iola, WI 54990-0001, 715-445-2214,

www.krause.com

reviewed by Jack Kittredge

Book Reviews

When I was searching around for books on farm implements to review and contacted Krause Publications, they were kind enough to send me these four volumes. What treasures they contain!

All four are filled to the brim with pictures and diagrams of antique farm implements and tractors from old catalogs and promotional brochures. Some of the illustrations are classic Americana: a happy farmer leaving his smiling family at the farmhouse porch as he climbs aboard his tractor for the days work, or the proud worker putting even more land under cultivation now with his new double bottom tractor-drawn plow. Those are the images that fired hope in a million breasts, and led to the industrialization of American farming!

I'm no expert, but there were more tractor companies in this country than I had ever imagined! The Standard Catalog (above) lists almost 1000 manufacturers over the 70 years it covers. Some of these were short-lived and made just one model, but of course the big ones – Ford, Allis Chalmers, John Deere, IH, etc. – made dozens of models over the years. If you ever had a grandparent or uncle in farming, you'll probably find here a picture of the very tractor you were thrilled to be given a ride on.

Some of the implements which subdued the vastness of the midwest to the hand of man are also here illustrated. Many are horse-drawn and ground-driven, developed long before the PTO and three point hitch. To a farmer (Julie would add: "of the masculine persuasion") these are fascinating. The inventive spirit, engineering discipline and functionality with which these were put together can't help but elicit admiration from anyone who practices the craft of agriculture. To a historian, I suppose, the end result of all this human energy is somewhat less uplifting – destruction of local farming around the globe as our own growth in scale drives commodity prices always lower.

But for a nostalgia trip, these books are tough to beat. The implement one covers not only large devices, but plenty of farmyard and household stuff of old, from barrel carts to dog powers to wind mills. The volume on farm toys is designed for collectors and pictures thousands of miniature tractors and farm implements by various manufacturers, including price guides helping you determine what they are worth. I imagine if I were a collector or an eBay enthusiast such a guide would be invaluable. Without further ado, let me just let some of these pictures speak for themselves.

By 1916 J. I. Case had developed a small tractor using a unit frame design and a crossmounted engine. The great selling point of the crossmount was that with this arrangement, no bevel gears were needed; all power to the drive-wheels was transmitted through spur gears.

Additionally, the Case crossmounts proved to be extremely rugged and reliable. This, together with the Case reputation, made the Case crossmounted tractors tremendously popular.

The Avery Model C, when suitably modified, became the Avery Six-Cylinder motor cultivator. Numerous companies of 1920 designed and built motor cultivators in an attempt to mechanize this farm task. While this design has certain similarities to what would later become a row-crop tractor, the design simply didn't go far enough to achieve this ultimate goal.

This company dated back to the 1850s as a small firm making farm implements. When the company bought out Universal Tractor Co. in 1915, it had by then become one of the leading farm implement manufacturers. From 1915 through 1917, Moline Plow built the Universal shown here; it was of two-cylinder design, but was quite capable of plowing, cultivating, and attending to other farm duties.

In 1901, Dickey Manufacturing Co. was offering its Racine corn sheller. Billed as "A marvel of perfection." the Racine shown here was equipped with a pulley drive suitable for operation with a gas engine, steam engine, or a tractor. Outside of this 1901 advertisement, little else can be found concerning the Racine corn sheller line.

By the time this Peerless cultivator appeared in an 1878 catalog, John Deere had been in the plow business for some 40 years. The Peerless was a riding cultivator, unusual for an 1878 design.

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NOFA Interstate Council

* indicates voting representative

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Erich V. Bremer, 60 So. Main St., PO Box 886, Pennington, NJ 08534-0886, (609) 737-6848, certify@nofanj.org

Calendar

Saturday, March 8: Blue Ribbon Forum for Sheep Producers, Storrs, CT, *for more info:* 860-684-2124, www.CTSHEEP.org or bal4farm@snet.net

Organic/Biodynamic Fruit Orchard Management, by Hugh Williams. This series of Saturday workshops, in its 2nd year at Threshold Farm, Claverack (Columbia County), NY, focuses on key points in the growing season. Pre-registration required: *contact, 518-427-6537 or farmfood@capital.net.*

Saturday, March 8: (Orchard planning, planting, pruning, grafting, root stocks, fertilization)

Saturday, May 24: (Pest and disease management, spraying, soil and orchard floor management)

Saturday, October 4: (Harvesting, apple varieties, selection, deer management)

Wednesday, March 12: Transferring the Farm Workshop, Northampton, MA

Thursday, March 13: Transferring the Farm Workshop, Storrs, CT

Tuesday, March 18: Transferring the Farm Workshop, Benton, ME

Wednesday, March 19: Transferring the Farm Workshop, Concord, NH

Thursday, March 20: Transferring the Farm Workshop, Morrisville, VT *for more info: (802) 656-0233 or debra.heleba@uvm.edu.*

Saturday, March 15 & Sunday, March 16: ALBC Northeast Spring Cabin Fever Meeting and Grass-Based Genetics Workshop with Ridgeway Shin and Gerald Frye, Lincolnville, ME, *for more info on meeting: (603) 862-2625, on workshop: (207) 763-4088*

Saturday March 22: Introduction to Holistic Management, by John Gerber, Karl North & Phil Metzger, Hudson, NY. Follow up session scheduled for Saturday March 29 Pre-registration required: *contact 518-427-6537 or farmfood@capital.net.*

April 2003: Advanced Pastured Poultry Workshop, *for more info: 518-427-6537, farmfood@capital.net.*

Saturday, April 5: Growing Possibilities: Agriculture in the City, Boston, MA, *for more info: 617-442-1322 x12 or kbrennan@thefoodproject.org*

Saturday April 5: Equipment Repair for Farmers, by Milton Rodewald, Thistle Downes Farm, Greenwich (Washington County), NY. Pre-registration required: *contact 518-427-6537 or farmfood@capital.net.*

Saturday, April 26: 94th Annual Sheep, Wool, and Fiber Festival, Vernon CT. *for more info: 860-684-2124, www.CTSHEEP.org or bal4farm@snet.net*

Saturday, April 26: Getting Started with Biodiesel, with Thomas Leue, Ashfield, MA. *for more info: 413-528-4387 or mfaber5@yahoo.com*

Sunday, April 27: Sheep Dog Trial, USBCHA and NEBCA sanctioned, Vernon CT, *for more info: 860-684-2124, www.CTSHEEP.org or bal4farm@snet.net*

Saturday, May 17: Growing Greens Intensively and Profitably, with Ted Dobson, Sheffield, MA, *for more info: 413-528-4387 or mfaber5@yahoo.com*

Saturday, June 7: HerbFest 2003, Coventry CT 06238, *for more info: 860-742-8239*

Saturday, June 28 and Sunday, June 29: 5th Annual Lavender Days: Inhale Massachusetts Lavender, at private farms and gardens across the Upper Pioneer Valley, *for more info: (413) 772-0558 or marceauy@aol.com.*

Saturday, July 12: Pastured Poultry, Rutland, MA, *for more info: 413-528-4387 or mfaber5@yahoo.com*

Friday, August 8 – Sunday, August 10: NOFA Summer Conference, Amherst, MA, *for more info: 978-355-2853 or julie@mhof.net*

Saturday, September 20: Preserving the Harvest, Barre, MA, with Jack Kittredge and Julie Rawson, *for more info: 413-528-4387 or mfaber5@yahoo.com*

Saturday, September 27: The Nuts and Bolts of CSA – One Farm's Story, with Dan Kaplan, Amherst, MA, *for more info: 413-528-4387 or mfaber5@yahoo.com*

Friday, March 21 – Saturday, March 22: Passive Solar Greenhouse Workshop with Steve Moore, Spring Grove, PA, *for more info: 717-225-2489 or sandcmoore@juno.com*

NOFA Membership

You may join NOFA by joining one of the seven state chapters. Contact the person listed below for your state. Dues, which help pay for the important work of the organization, vary from chapter to chapter. Unless noted, membership includes a subscription to The Natural Farmer.

Give a NOFA Membership! Send dues for a friend or relative to his or her state chapter and give a membership in one of the most active grassroots organizations in the state.

Connecticut: Individual or Household: \$35, Business/Institution: \$50, Supporting: \$100, Student (full time, supply name of institution) \$20
Erin Amezzone, 332 Front St., New Haven, CT 06513-3206, (203) 787-7417, Email: femmedeau@earthlink.net

Massachusetts: Individual: \$30, Family: \$40, Low income: \$20, Supporting: \$100
Elaine Peterson, 411 Sheldon Road, Barre, MA 01005, (978) 355-2853, info@nofamass.org

New Hampshire: Individual: \$25, Student: \$18, Family: \$35, Supporting: \$100
Elizabeth Obelenus, 4 Park St., Suite 208, Concord, NH 03301, (603) 224-5022, nofanh@innevi.com

New Jersey: Individual: \$35, family/organizational: \$50, Business/Organization: \$100, Low Income: \$15* *does not include a subscription to The Natural Farmer
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New York: Student/Senior/Limited Income \$15, Individual: \$30, Family/Farm/Nonprofit Org. \$40, Business/Patron: \$100
 Add \$10 to above membership rates to include subscription to TNF
Mayra Richter, NOFA-NY, P O Box 880, Cobleskill, NY 12043, voice: (518) 734-5495, fax: (518) 734-4641 office@nofany.org

Rhode Island: Student/Senior: \$20, Individual: \$25, Family: \$35, Business: \$50
Karen Giles, 430 Cardina Back Rd., Charlestown, RI 02813, (401) 364-1684, recycledgold@mindspring.com

Vermont: Individual: \$30, Farm/Family: \$40, Business: \$50, Sponsor: \$100, Sustainer: \$250, Lifetime: \$1000, Basic: \$15-25* *does not include a subscription to The Natural Farmer
Kirsten Novak Bower, NOFA-VT, PO Box 697, Richmond, VT 05477, (802) 434-4122, info@nofavt.org

Spring 2003

The Natural Farmer

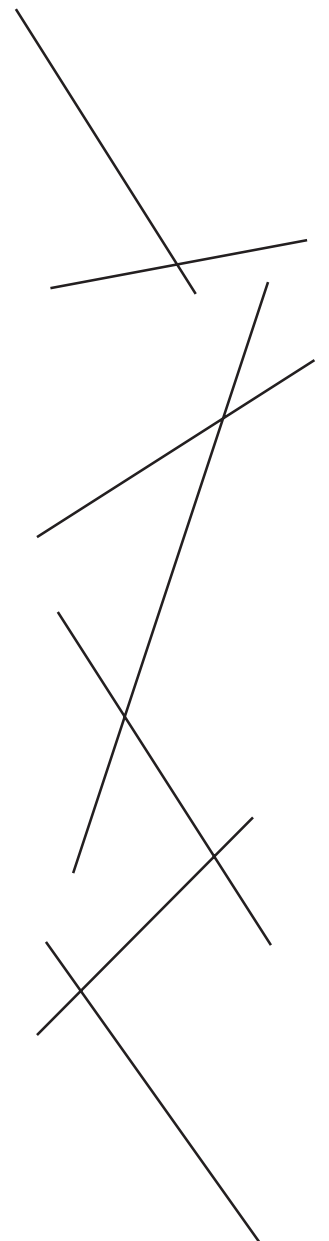
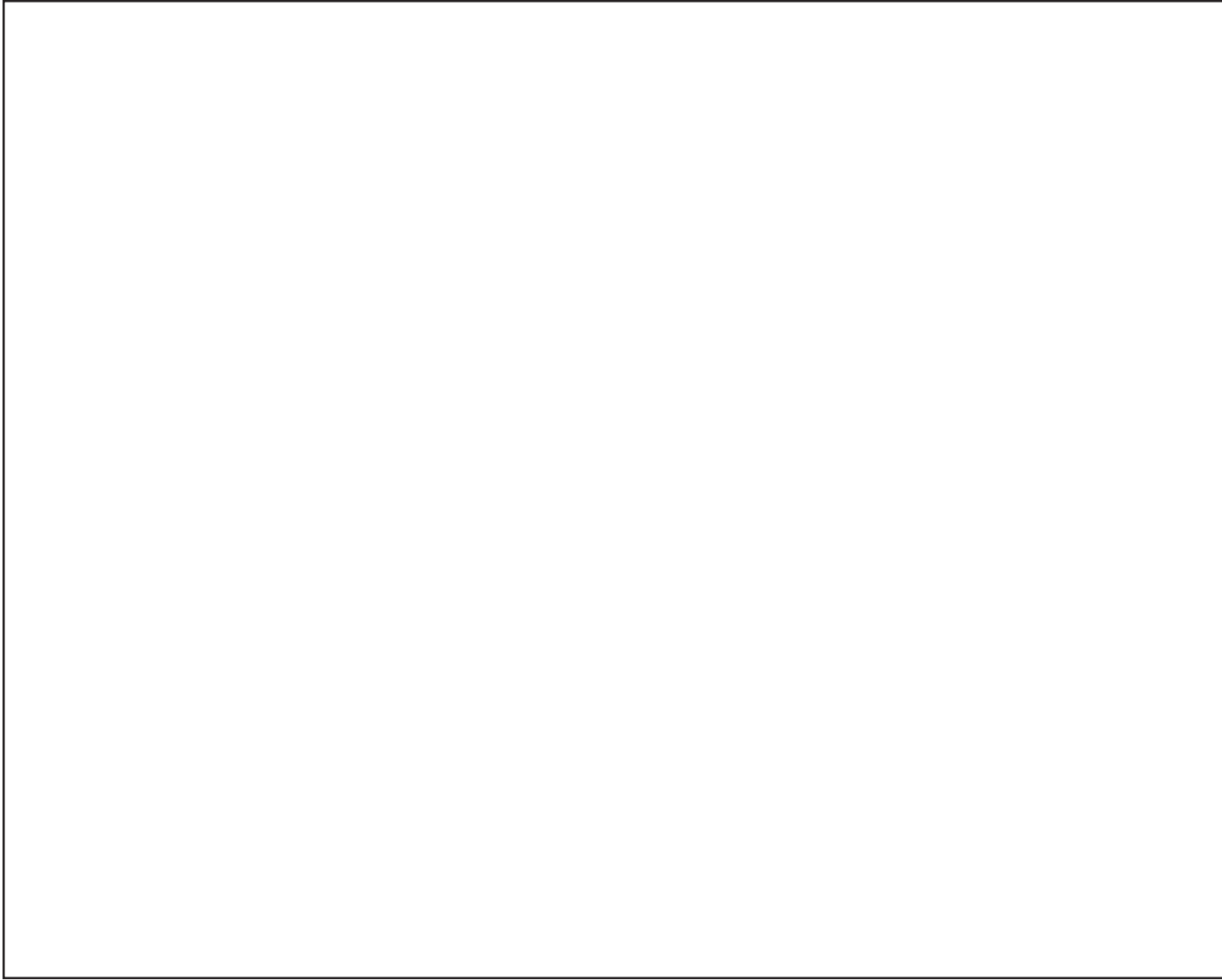


photo by Jack Kittredge

Don MacLean, New York organic strawberry grower, demonstrates his standardized system of farm equipment. All the implements, from bed former to cultivators, fit on the same tool bar and ride on the same wheels, thus assuring precision work. He designed and made this cultivator with oscillating tines..

**News, features, & articles about organic growing in the Northeast,
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Farm Equipment











