Iowa Agriculturist April/May 1989

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Recreation areas felt the drought, too
Iowa State University and Pioneer... working together for a better Iowa agriculture
On the cover

Recreation areas felt the drought, too
Looking back on how the drought affected more than the row crops in Iowa...

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April/May 1989
behind the editor's desk

The editor's last words

How can this be my last issue as editor of the Iowa Agriculturist? It seems like only yesterday I walked into the office to see “Melinda Jardon, Editor” posted on the door. But in the past two years, this magazine changed from the old typesetting equipment, the old cut and paste layout system, and the old look of only black ink in the magazine to new staff members with nearly every issue, new job responsibilities with new computer and layout systems, and new deadlines to meet.

But the changes were made and the deadlines, for the most part, met. I'd like to thank all of the staff members who volunteered to work for this magazine. It's just like anything else: People get out of it what they put into it.

One person who has gotten a lot out of this magazine experience is Alissa Peitscher, a junior in agriculture journalism. Recently, she was named the editor of the Iowa Agriculturist for the next year. Currently, she is taking applications for staff members and considering stories for publication early during the fall semester. Stop by the office, pick up, fill out, and return a staff application.

Let's look at some of the stories for this issue. The cover focuses on how the drought of 1988 affected the recreational areas of the state. Turn to page 16 for more color photographs and the story. Another lead story is a two-story series about the Leopold Center and one of its projects on pages five to seven.

Biotechnology has become a big buzzword on campus, but what does it really mean for Iowans? Turn to page eight for the answer. This may be the beginning of a new department for the Iowa Agriculturist. Another buzzword that cropped up with the drought stories in all the media is aflatoxin. Turn to page 14 to learn more about what this is and means the people of Iowa.

And what better way to meet Iowa people than to work with them as a summer crop scout—see page 12. Dewayne Goldmon meets a lot of people in his recruiting job—see page 20. Also, check out the departments in the back of the book for some highlights, humor, and history.

Thanks for reading,

Melinda Jardon, editor

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Roger Chung, a junior in physics, takes time out for a few holes on the Veenker Memorial Golf Course.

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The Leopold Center begins work

The director and board of directors began work by selecting beginning projects for funding. Some of the initial research is underway for this new center devoted to conservation.

by Jim Probasco

In its first year the Aldo Leopold Center for Sustainable Agriculture and the 1987 Groundwater Protection Act gained national recognition for Iowa. The Leopold Center supports research designed to develop farming systems that combine responsible stewardship of natural resources with farm profitability.

Many farmers use potentially detrimental management practices. Educating people in agriculture may work toward voluntary protection of our land. The Iowa Legislature and the Leopold Center are working toward that education.

Environmental protection and some of the problems associated with it have been addressed by the Iowa Legislature. The Iowa Groundwater Protection Act of 1987 was a leader in environmental legislation at the state level and with it came provisions for the Leopold Center, which was named for a native Iowan who was a pioneer in wildlife management and environmental conservation.

An excerpt from House file 631, Sec.230 describes the Leopold Center: “The center shall conduct research to identify and reduce negative environmental and socio-economic impacts of agricultural practices.”

Provisions set forth by the Act allow for unbiased research and development of alternative techniques that are environmentally sound yet maintain a high level of agricultural output. The Iowa Cooperative Extension Service is presenting the information to the general public.

The first season of research took place in 1988 to 1989 with more than half of the research projects directly involving Iowa State’s College of Agriculture faculty and staff.

Research projects also are conducted by the Agricultural Experiment Station, University of Iowa, and private industry. Dennis R. Keeney, director of the center, and three of the 12 members of the Leopold Center’s advisory board were appointed by ISU President Gordon Eaton.

Funding for the first year included $800,000 in oil overcharges that companies were required to refund to the state. About $725,000 was spent directly on research projects.

Future funding will be obtained from fertilizer and pesticide fees as established by the groundwater act and from grants from public and private non-profit organizations.

The Leopold Center advisory board selected 19 proposals for initial research projects. The areas of study stressed energy conservation, biomass production and use, soil and water protection and conservation, pest control, and fertilizer management.

One of the projects consisted of 23 on-farm demonstrations organized by the Practical Farmers of Iowa. These demonstrations showed traditional agricultural practices compared to those compatible with sustainable agriculture.

Reduced nitrogen application rates, chemical and non-chemical weed control, manure application trials, and cover crop usage were all approached resulting in research techniques giving degrees of error of less than 3 percent.

The results obtained from these types of trials can be considered valid and in some cases suggest a positive alternative to traditional techniques. The public was encouraged to see first-hand the results at the various farms. The field-scale trials are said to have “high credibility” with producers, something that is vital in changing established ideas and practices.

A Leopold Center project taking place at the DeSoto National Wildlife Refuge involves monitoring entire ecosystems and observing the combined influence of agriculture and habitat management. The effect of water quality on aquatic wildlife, biological pest control, plant nutrient management, and pesticide applications are some of the aspects of this study.

The U.S. Fish and Wildlife Service has been using sustainable agriculture techniques on the refuge’s 5,000 acres... continued on page 22
Growing wood...

Iowa farmers may find a better economic return for their land investment by growing wood to use for heating and other energy needs in farm buildings.

By Scott Davis

Iowa farmers are ignoring a crop that is growing on more than 5 percent of their land. Those 1.5 million acres are Iowa's forest land.

Iowa State University Extension forester Paul Wray hopes to demonstrate that Iowa's forests can be used as a renewable energy source. He is working with several other researchers on a biomass system, which is essentially a furnace that burns wood chips to heat water. The hot water can be used to heat a home and other buildings.

The biomass system is being developed at the Iowa State University McNay Memorial Research Center. The center is in Lucas County, about 50 miles south of Des Moines. The nearly $125,000 cost of the biomass project is being shared by the university and the Leopold Center for Sustainable Agriculture.

But researchers plan to do more than provide an energy source with the biomass system. Wray hopes the project will help promote good
timber management and encourage the use of Iowa’s renewable forest resources. Many of Iowa’s timber lands are used for the grazing of livestock, a practice which decreases timber production, harms wildlife, and encourages soil erosion. The biomass system may show farmers an economically feasible use for their woodlands, Wray says, and as another benefit, cut Iowa’s dependence on imported fossil fuels by substituting Iowa grown wood.

Tom Greiner, ISU Extension ag engineer, is working on the furnace that burns the wood chips and the piping that carries the heat to the buildings at the McNay center. The biomass system is being used to generate heat for a grain drying facility, a house and a combination shop and meeting center at the McNay farm.

The biomass project is looking into the feasibility of increasing Iowa’s forested acres by establishing energy plantations on Conservation Reserve Program land. In the CRP the government pays farmers to take erodible land out of production for 10 years. Iowa has more than 1.6 million acres enrolled in the CRP.

This land is generally too hilly for row crop production without causing erosion problems. But the land is well suited to the production of trees, and the government has offered some cost-sharing incentives to encourage the production of trees on CRP land.

As a part of the biomass system, researchers are planting an energy plantation on the CRP land at the McNay center. Energy plantations are made by planting roughly 1,000 fast-growing, hardwood trees per acre.

Wray says these fast growing trees, such as silver maple, poplar, cottonwood, and green ash, make a good alternative crop for erosive land. The trees will grow on the CRP land for 10 years, and then will be cut off at the base and made into wood chips that can be burned in the biomass furnace.

The trees regrow from the base and are ready to cut again in about six years. Wray says this process can be repeated for five rotations for a total of about 30 years before any trees must be replanted.

Establishing an energy plantation on CRP land is especially attractive, Wray says, because of a government program that will pay for up to 50 percent of the cost of planting trees on highly erodible land.

Starting an energy plantation is only one part of the biomass project. The project also is looking at ways of mechanizing the harvesting and chipping process. In mechanizing the process, the researchers chose equipment that farmers would be able to attach to their tractors. As a result, much of the equipment looks like miniaturized logging equipment.

The trees are cut, loaded, and moved to the building site where they are unloaded to a storage bin that automatically feeds into the biomass furnace. When thermostats in the various buildings measure a need for heat, the system automatically starts a conveyor that loads wood chips into the furnace.

The burning wood chips heat water in a boiler. The hot water is pumped through specially insulated plastic tubing buried four feet under the ground to the building that requires heat.

The piping carries the water throughout the building. Radiators warm the rooms. The heat turns off the thermostat. The cooled water goes back to the furnace to be reheated.

Greiner says the only limiting factor is the amount of storage space available for the chips.

“Our system is designed to have a week’s storage of chips,” Greiner says, “enabling it to automatically run for one week in the coldest weather and even longer in warmer weather.”

The drawback to the mechanization and automation is cost. The cost of the furnace/boiler unit is $30,000. When all of the piping and chip storage and feeding equipment is added, the total comes to more than $70,000. Greiner says, however, that individual farmers could save money with a much smaller system and possibly a used boiler.

The expense of the tree harvesting equipment is about $14,000. “The thought on the equipment is that an individual farmer will not buy it,” Wray says. “But, if we can get either a county conservation board or a farmer’s cooperative to invest in the equipment and then rent it at a nominal fee to individual farmers, that’s when it becomes feasible, because it doesn’t take long to chip the wood.

Wray estimates that all of the

---continued on page 22
Biotechnology

Researchers are studying and people are wondering what this new technology really will mean to Iowa State and Iowa's agriculture economy.

by Jo Patterson

Biotechnology is today's newest agricultural science, both in the United States and at Iowa State. Efforts to improve agronomic crops are certainly nothing new—but the research techniques are. The application of biotechnology to plant agriculture employs high technology resources to increase crop yields, to improve crop quality, and to increase plant resistance to pests and environmental conditions.

Walt Fehr is the biotechnology coordinator at ISU. He defines agricultural biotechnology as "the application of 'molecular biology' to the development of useful products and processes for agriculture." Molecular biology in high-tech laboratories deals with the artificial manipulation of plant cells and genes, primarily at the chemical level.

"The heart of biotechnology is the gene," Fehr says. "It is the DNA (genetic material) of the cell which people are now beginning to understand in detail and because of that are able to manipulate genes in a planned manner."

Attempts to understand plant cell structures and genetic processes began thousands of years ago when primitive farmers noticed that all the seeds from similar plants did not produce the same yield. These farmers had no idea why this was so, but over centuries, the hand-selection of seeds slowly resulted in improved crops.

In the 19th century, researchers began scientific experiments with plant breeding techniques. A major breakthrough came in the 1930s with the introduction of hybrid corn plants in Iowa.

Today, exciting new developments are taking place in molecular biology and genetic engineering. Biologists are working at a molecular level, as compared to traditional plant breeding by sexual reproduction. As a result, new genetic engineering techniques are combining with conventional plant breeding techniques to produce many changes in agriculture.

Over the past 30 years, molecular biology has advanced from that identification of the DNA found in all cells to understanding the relationship between the DNA molecule and the structure of proteins, the final product of genes.

Modern technology allows scientists to move single or multiple genes from the cells of one organism (plant or animal) and insert them into the cells of another species—altering genes deliberately to diversify commercial agricultural products and their eventual end use.

"We have the ability to produce different crops for agriculture," Fehr says. As soon as it became possible to identify the gene at the chemical level, isolate it, and move it to another species or to other individuals of the same species, a new array of possible agricultural products and processes opened up. "The implications for agriculture are far-reaching," he says.

Current research at ISU involves moving a gene for insect resistance from the potato into the soybean. "Using traditional plant breeding, this is not possible," Fehr says. Biotechnology, however, provides the capability to transfer genes artificially, skipping the sexual process used in traditional plant breeding.

A major breakthrough came in the 1930s with the introduction of hybrid corn plants in Iowa.

If everything works out, the soybean will have the same insect resistance as the potato. Ultimately, ISU hopes to develop soybean plants that don't require protection from insecticides.

ISU researchers are working together to apply biotechnology to specific areas of crop production. Randy Shoemaker, a USDA research geneticist and assistant professor of genetics specializing in tissue culture, is one of them.

Shoemaker's laboratory is develop-
ing a detailed “road map” of soybean chromosomes (structural units of DNA that carry the genes in a linear sequence) to correlate changes in the DNA to specific regions of a chromosome and then correlate that region with a specific agronomic characteristic of a plant—disease resistance or lodging, for example.

“Many agronomic characteristics are difficult for plant breeders to work with in the field,” Shoemaker says. “But when we can tag these characteristics in the laboratory, it allows breeders to assimilate a higher number of favorable characteristics in a shorter time.” Shoemaker says the most exciting part of his work is the genetic transformation of the soybean. Plant breeders are limited to what they can do although they use diversity from germplasm collections. Those collections are specimens of a crop plant collected from all over the world.

“If they desire a characteristic and want to breed for it, that characteristic must already exist in the germplasm collection,” Shoemaker says.

With biotechnology, however, that is not the case. “We can bring in a resistance to a virus that may not exist in the gene pool, clone that gene, transform the soybean cell with that gene, and the cell would make that protein and become immunized,” Shoemaker says.

“We don’t do anything plant breeders haven’t been doing for 100 years,” he says. “We construct combinations of genes like they do—we just
Serving Iowa Agriculture

Farm Bureau has been the voice of Iowa agriculture for decades. That's because it was organized by farmers to serve farmers. And it's run by farmers.

Grassroots involvement is the strength of the organization with the opinions of thousands of farm families reflected in Farm Bureau policy at the state and national level.

And in every county in Iowa there are committees made up of local members who make sure the farmers voice is heard on important local issues such as county budgets, school policies and rural health.

Farm Bureau has a strong emphasis on improving net farm income and the quality of rural life. this is done by developing programs that provide marketing assistance for hogs and cattle, farm record keeping advice, feeder cattle procurement, grain and livestock marketing advice and by being involved in local governmental issues.

Farm Bureau also works on state and national legislative and regulatory affairs; in consumer education; in rural crime prevention and in economic services to members, including life, health and casualty insurance; farm supplies and mutual and money market funds.

For more information about how you can become a member of the organization representing a majority of Iowa's farmers, contact your county Farm Bureau or the Iowa Farm Bureau.
do it differently."

For farmers, Shoemaker says, the benefits of biotechnology research probably are going to come about by altered quality of the product, plus disease and insect resistance. "But the real exciting things are going to be in alternate products for soybeans. Things we can't imagine today are going to be in the field in five years," he says.

Basil Nikolau, assistant professor of biochemistry and biophysics, also works closely with Fehr. Nikolau's expertise is oil synthesis. His work deals primarily with the enzyme acetyl-CoA carboxylase, which controls the biosynthesis of oil. For the past 10 years, he has been trying to discover how the enzyme works, what regulates it, and what its structures and functions are.

"For the last couple of years, we have concentrated on isolating the gene for this enzyme from carrots and tomatoes," Nikolau says. "Now we are trying to do the same thing with soybeans." If this enzyme does in fact regulate oil by synthesis, one possible outcome may be an increase in the percentage of oil in the soybean.

Another possible outcome of Nikolau's work is altering soybean oil to be more like rapeseed oil, which is high in erucic acid. "Erucic acid is important for industrial purposes, especially in making nylons," he says.

Nikolau cautions that he is in the very beginning stages of his research work with soybeans. "The route we identify now to get where we want to go may change," he says.

While Nikolau is trying to increase the amount of erucic acid in soybean oil, another ISU researcher is trying to decrease the oil's linolenic acid content. Earl Hammond, professor and head of food technology, says that linolenic acid is one of the main constituents in soybean oil that causes it to develop off-flavors when it reacts with oxygen in the air. "It gives the oil kind of a 'beany' flavor," he says.

Hammond and biotechnology coordinator Fehr have been working on the development of a low linolenic acid soybean since 1968. "Our procedure has been slow and tedious."

"But we hope the advancement of biotechnology will change all that," Hammond says. "Instead of planting thousands of soybeans treated with a mutagenic agent [a substance that increases the occurrence or extent of a fundamental change in heredity] and then searching the individual plants, we can do our work in a much more directed, efficient, and economically beneficial way," he says.

Most normal soybean varieties contain 8 to 9 percent linolenic acid, according to Hammond. But Hammond and Fehr's research efforts have paid off in substantially lower levels. First, they developed a variety that ran about 3 to 3.5 percent. Then by crossing lines selected for high palmitic acid, they brought the linolenic acid level down to less than 2 percent.

"It was a completely unexpected result," Hammond says. "We're still trying to grow enough of these seeds to get a reasonable amount of oil to test its stability." At the same time, Hammond and Fehr are working to incorporate this new characteristic into some high-yielding beans.

"In this particular instance, the market for soybean oil is limited in certain ways because of its flavor instability compared with sunflower oil, cottonseed oil, and corn oil," Hammond says. All are more stable and sell for noticeably more per pound than soybean oil. "I think biotechnology research will open up new markets for soybean oil and help us to penetrate those markets," he says.

ISU has demonstrated successfully the capability to transfer genes into soybeans artificially, skipping the sexual process, according to ISU biotechnology coordinator Fehr.

The first breakthrough in soybean biotechnology research on record occurred 18 months ago when researchers at Agracetus, a private research company in Middleton, Wisconsin, successfully transferred a gene that codes for protein into the soybean plant. Today, the company in transferring genes for nematode resistance, insect resistance, fungus resistance, increased yield, and drought tolerance.

Biotechnology is here to stay. Whether farmers take advantage of its discoveries remains a personal decision. In the decade of the '80s, every country is trying to develop a competitive market in the world for agriculture. Biotechnology very well could give Iowa and U.S. farmers that competitive edge. ■
Searching for summer crop scouts

Many companies are looking for summer crop scouts. This may be the perfect summer internship for many students in the College of Agriculture.

by Tom Christensen

The demand for summer crop scouts had grown because of changes in United States agriculture. There is potential for more growth in agriculture-related summer employment.

“I’ve never seen such demand for crop scouts,” says Roger Bruene, placement officer for the College of Agriculture at Iowa State. “We have both lots of firms and firms looking for lots of people,” he adds.

According to Bruene, between 20 and 30 firms have sent job announcements to the placement office looking for summer crop scouts and more than 15 have come to campus to interview. He has announcements from firms looking for two to 20 people for summer field scouting work.

Brad Buchanan, coordinator of the crop consulting service offered by Merchants National Bank of Cedar Rapids, says there are two main reasons more farmers are hiring crop consulting firms. One reason is that technological advances in agriculture seem to come at an ever increasing rate. Farmers want someone to keep up on the changes in technology for them. Farmers look to crop consulting firms and crop scouts for up-to-date information on the severity of a problem, such as last year’s spider mite problem, and possible solutions.

Another reason for the increased demand for crop scouts is that, on the average, farms are becoming larger. As farms become larger, each farmer has more to do and less time to do it. A farmer can rely on a crop scout to watch some or all of the acreage. Farmers with livestock operations may want to devote more time to livestock management, and they will hire a crop consultant to watch the condition of some or all of the crops.

Many agricultural firms hire summer crop scouts. Crop scouts may be hired for the summer by seed corn companies, ag chemical dealers, firms specializing in crop consulting, or even vegetable and ornamental producers. According to Bruene, most of the crop scouting jobs announced at his office are located in the Midwest, but he has heard from individuals wanting to hire crop scouts to work in Colorado and New Jersey.

People hiring crop scouts usually prefer students majoring in “plant sciences,” Bruene says. Buchanan says he prefers to hire students majoring in agriculture, but has hired from other areas, including a student majoring in chemical engineering. Buchanan and Bruene agree that as the demand for summer crop scouts grows, firms interested in hiring will have to expand the number of disciplines they consider when hiring.

In addition to plant science skills, Buchanan emphasizes that, “crop scouts must be able to communicate well in both oral and written form.” The crop scouts Buchanan supervises talk directly to the farmer and write reports.

Crop consultants work with large amounts of information and find computers useful for handling data. Buchanan says computers are becoming increasingly important to crop consultants. As this trend continues it will become more important that crop scouts have a working knowledge of computers.

Many crop scouts gather information in the field and present it to both their supervisor and the farmer. Buchanan calls the crop scouts under his supervision “my eyes and ears in the field.”

Pat Tranel, a crop scout during the summer of 1988, says “We looked for weeds, insects, disease, and checked plant populations.”

Tranel says he also would report other things that he noticed in the field, such as herbicide injury or...
broken tile lines.

In addition to scouting for problems and pests, many crop scouts must convey what they have found to the farmer. Tranel says, "The farmers we dealt with expected us to know quite a bit."

This contact with the farmers is considered to be one of the most important aspects of the job. Bruene referred to this experience in dealing with the customers as a "hidden payoff" of crop scouting. Buchanan says firms in sales, especially chemical companies, look for people who have had this type of customer interaction.

Crop scouts learn more about the problems and pests associated with the crop and farming practices they are observing. If a crop scout works for an employer located west of Iowa, the job may involve working with and learning about irrigation. Bruene says with some employers, crop scouts "get exposure to vegetables, ornamentals, and turf."

As crop scouts, students may learn about different farming practices and crops as well as practicing the art of communicating with customers. Bruene and Buchanan say that the demand for crop scouts has potential to grow.

Above: Two crop scouts check soybeans for herbicide damage. Right: Checking a young corn plant.
AFLATOXIN: 
Perennial Problem or Drought Dilemma?
Farmers and consumers have heard much about the dangers of aflatoxin, which increased due to the Drought of 1988.

By Nancy Freund

The buzzword in agriculture this year is aflatoxin. The carcinogen has infected corn crops across Iowa, posing a potential health hazard to humans and animals who ingest it.

In its aflatoxin survey of country elevator operators, Iowa State Extensions Service scientists concluded in October that “Aflatoxin contamination is geographically widespread but sporadic.”

On February 23, The Wall Street Journal reported: “One-third of the official samples from the 1988 crop tested in Iowa and Illinois have been found to contain dangerous levels of aflatoxin.”

Nolan Hartwig, extension veterinarian and chairman of Iowa State’s ad hoc aflatoxin committee, says that the aflatoxin problem is about the same as it was last fall.

“One-third of the samples from two states do not represent the whole country. The biggest concern now is moisture causing stored grain to mold. But we haven’t seen any cases of aflatoxin poisoning come into the veterinary labs. We usually have a few every year,” he says.

The extension service survey recorded that out of 80 samples received, 29 or 36 percent contained aflatoxin in levels above 20 parts per billion(ppb). Twenty ppb is the allowable level of toxin in corn consumed by humans and immature animals.

Hartwig says the results do not necessarily indicate that 36 percent of Iowa corn is tainted with aflatoxin.

Because it only takes a small amount of toxin to infect corn, you’d need to sample all the corn in Iowa to get accurate results.

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The mold Aspergillus Flavus (A. Flavus), present throughout soil, produces aflatoxin. A. Flavus doesn’t necessarily make toxins. However, high temperature and humidity during kernel and corn silk development last summer made ideal conditions for aflatoxin production. The fungus’ spores became airborne and entered corn through cracks in its parched kernels. A. Flavus thrived when the corn started to silk. It eventually formed thread-like mycelia in the kernels’ embryos. It was during this stage that the greatest amount of aflatoxin was accumulated.

The toxin was first discovered in 1960 in the United Kingdom when turkeys became ill after eating peanut meal tainted with aflatoxin. The Iowa State University Extension Service’s publication “Potential Corn Mold and Mycotoxin Problems,” warns that aflatoxin is a potent liver toxin and is carcinogenic with prolonged exposure.

Animals ingesting the toxin may suffer from reduced feed intake, anemia and reduced milk production. In severe cases, loss of appetite, difficult
breathing, and death can occur. However, these situations are rare. Aflatoxins also make animals more susceptible to infectious diseases by suppressing natural immune systems. The FDA has set acceptable levels of toxin for corn sold in interstate commerce. In uses besides consumption by humans and immature animals, the aflatoxin concentration may be more than 20 ppb. Mature poultry and swine and cattle may ingest corn at levels of up to 100 ppb. For swine more than 50 pounds, the level is 200 ppb, and for feedlot cattle, corn containing up to 300 ppb may be fed.

Hartwig stresses the substance's extreme toxicity. "To understand how small of an amount 20 parts per billion is, imagine a distance between here and the United Kingdom—about a billion centimeters, or ten thousand kilometers. If you traveled 20 centimeters of that distance it would be a proportion of 20 parts per billion. With most toxins, we talk about parts per million: aflatoxin is potent carcinogen."

Hartwig adds that the FDA is taking elaborate precautions to deep aflatoxin out of the food supply by maintaining a wide safety margin in allowable aflatoxin levels.

The Wall Street Journal cites evidence from its five-month investigation into grain trading: "Many farmers and grain elevators are trafficking freely in untested corn. Others who make an effort to test for aflatoxin use procedures so flawed or sloppy that contaminated corn slips into commercial channels anyway."

Craig Meyer of the Farmer's Co-op Exchange in Otley says he hasn't found much grain testing above 20 ppb. "There could've been some that slipped through—we don't have an eagle eye on everything that comes in, but we do on grain that goes out. The grain terminals we deal with are very careful about the corn they take."

Ron Gates, grain merchandiser at the heart of Iowa Co-op elevator in Roland says, "The last few loads we've shipped out, we haven't had a bit of problems, and it's been corn from 1987 or 1988. We have had some that's above the 20 ppb limit, but we've been able to find a home for it at a local cattle feeder. Most of it tests about 40 ppb."

Alternatives are available for corn containing aflatoxin in levels above 20 ppb. To reduce toxin levels, farmers may clean grain by screening out broken particles which are highly susceptible to mold invasion. Depending on aflatoxin concentration, the grain can be fed to livestock. The ISU Extension Service reports that aflatoxin in dairy cow diets is diluted by a factor of 1:200 in milk. In beef cattle, the dilution in meat is 1:14,000.

The Iowa Farmer Today reported that the Drought Assistance Act of 1988 makes farmers eligible for relief payments for corn severely damaged by aflatoxin. If levels are between 20 ppb and 100 ppb, farmers may feed the grain to mature, non-lactating cattle, or destroy the corn and collect relief payments. Destroyed corn, and corn at levels above 100 ppb, will be counted as zero yield by the U.S. Department of Agriculture (USDA). Farmers may collect a disaster payment on zero yield corn crops.
Recreation areas felt the drought, too

Looking back on how the drought affected more than the row crops in Iowa—the golf courses and fishing holes felt it, too.

by Brien Murphy

Even though last summer was among the warmest and driest on record, Iowans spent as much time outdoors on recreational activities as they did in previous years.

Attendance at state parks and beaches, fishing areas, and golf courses stayed near normal levels despite intense heat and below normal precipitation.

"There was a trade-off between lack of rainouts and the heat," says John P. Newton, course maintenance manager at Veenker Memorial Golf Course in Ames. "More people came earlier in the day, and the afternoons were pretty quiet, but the overall attendance was about normal for the summer."

Big Creek State Park had near normal attendance also, despite the heat. "Attendance was about the same," says Brent Laning, an employee at Big Creek's main office. "We had more people than usual [fishing and camping] in the spring and early summer because it was warmer earlier, and that offset the decrease in attendance in July and August."

Compared to other areas of the country, Iowa's recreation industry had plenty of customers. Worlds of Fun amusement park in Kansas City, Missouri, showed lower attendance in

Roger Chung, a junior in physics, takes time from studies for a few holes on the Veenker Memorial Golf Course.
the late summer that was not offset by high attendance in the early summer. California fisheries had to shut down because water was needed for human consumption, hurting the fishing industry in that state.

Neither Big Creek nor Veenker shut down, but both had problems on the grounds due to lack of precipitation. “It was very hard to keep the course playable,” Newton says. “Heavy traffic on the turf hurt in a big way because it was so dry.”

Newton says that without rain, not much can be done to replenish the missing groundwater. If another dry year follows, Newton says, the course may be asked to close until conditions improve.

Laning says he is concerned with the lake level at Big Creek. “The levels were down, and some fish, like crappie, had trouble spawning. The beach was down, but that just gave people more space to put towels down. Some trees died, and some grass was burnt, but the grounds are in good shape, so our main concern is the lake level. Fortunately, it didn’t affect fishing.”

Harold Swanson at Ames Distributing Company agrees that a normal number of people fished and caught fish, but the sales of fishing equipment at his company were down. “The heat had little effect other than it hurt an already depressed economy,” in central Iowa, Swanson says. “We have to go to the bigger cities, like Minneapolis and Omaha, where people have money to spend,” on fishing equipment. He says another hot summer would not help business.

Mark Engstrand at Des Moines Boating Center in Ankeny says business there was not affected by the weather. “We had about the same amount of traffic in the place.” He said the heat did not force boaters inside and away from the area’s lakes. “I don’t know how other businesses did, but we did just fine last year,” Engstrand said.

Another drought is unlikely this year, according to Iowa State University Extension climatologist Elwynn Taylor, because the immediate cause of the drought is absent this year. When the prevailing winds shifted from westerly to southerly last March, as they do every year, the usual amount of moisture from the Gulf of Mexico was absent, cheating eastern Iowa out of a large amount of precipitation. Higher pressure over Bermuda was weaker and farther east than usual, and this caused the decrease in moisture pumped north, Taylor says.

Climatologists and meteorologists knew 1988 was a prime candidate for a drought because of a phenomenon called El Nino, Taylor says. El Nino is intense high pressure over Bermuda and occurred in 1987. The year following El Nino, anti-El Nino, usually, but not always, brings drought conditions because weak high pressure fails to pump moisture north. El Nino and anti-El Nino occur in approximately five-year cycles, but do not always bring drought weather.

Taylor says 1989 looks normal so far, and he predicts a normal precipitation year. Iowa can use a surplus, however, because the state averaged only 21.65 inches of precipitation, or 10.44 inches less that the normal of 32.09 inches.

Ames fared better than most of the state, however. It received 22.24 inches, or 9.45 inches less that its normal rainfall of 31.69 inches. Most of Story, Polk, Jasper, and Hamilton counties never had a drier year on record than 1988.

“There’s no indication now that we’ll have another dry year,” Taylor says. “And the heat should be down.” That means good news for Iowa’s recreation industry. Laning agrees: “I think we’ll be fine. If they came out last year, they’ll come out for everything.”
Here's the Beef

Iowa State researchers are making a combination chip that may soon compete with tortillas for consumer attention.

by Amy Lund

It's midnight. Your stomach growls. You and your roommate look at each other. You desert the books and papers, hop into the car and head for the all night grocery store for pop and chips.

More than 10 different brands of chips confront you as you walk down the snack aisle. They come in flat and wavy shapes and in flavors such as barbeque, cajun spice, jalapeno pepper, cool ranch, and nacho cheese.

Now researchers at Iowa State University are adding to this overwhelming variety of snack foods. Researchers in animal science and food technology have been working for the past year and a half to find the best mixture for making a beef-corn chip that would not be fried as are regular corn chips. This new chip would bring consumers a snack with more protein and create a new market for Iowa beef producers.

Ricardo Molins, assistant professor in the Department of Animal Science, has been working with food technology graduate student Rodrigo Tarte to determine what proportion of lean beef and corn products would produce the best looking and best tasting chip. The work is supported in part by the Iowa Beef Industry Council.

Molins and faculty from the Meat Export Lab were looking for ideas to increase the demand for Iowa meat. Iowa agriculture gets a slightly greater proportion of its income from animal production than from vegetable production, Molins says.

After the proposal for the research project was approved, Molins and Tarte began working in the fall of 1987. They started by creating a mixture of various proportions of lean beef, corn meal, corn starch, and corn flour. The beef used is in chunks, which are tender and flaky enough to grind up with the corn products.

Molins and Tarte took the mixture to Buhler-Miag, an agricultural equipment manufacturer in Minneapolis, to put it through an extruder that processed it into chips. Most corn chips are pressed and fried, Molins explains. An extruder, however, can create a chip without adding the oil of frying.

The extruder cooks the ingredients while forcing the mixture through a two to three-foot-long barrel under high pressure. When the cooked ingredients emerge from the barrel they puff and expand. Many breakfast cereals today are made this way.

There are two kinds of extruders. In a single screw extruder, a large screw turns against the barrel forcing the ingredients through the machine. This action generates a friction heat that makes the starch in the corn products gelatinize, thus cooking the mixture. A twin screw extruder is similar, but the two screws allow the operator of the machine to control the heat, speed, and pressure. Running the extruder is "still more of an art than a science," Molins says.

So far Molins and Tarte have run four sample runs of the beef-corn mixture. For the first two, they used Buhler-Miag's twin screw extruder. The next time they used a small, single screw machine on the ISU campus that was originally used to pelletize animal feed. Then in January, the researchers went to Des Moines to use a larger, single screw extruder at Insta-Pro, an extruder manufacturer for Triple F, Inc., manufacturers of animal feed and some human foods. Research now is aimed at finding a workable single screw formula, because those machines are more available than twin screw extruders, Tarte says.

For each run, Molins and Tarte changed the proportion of dried beef to corn products. They wanted to find...
out how much meat can be put into the blend before the end result changes from crunchy to chewy. They have found that as much as 20 percent beef can be added to the mixture before that happens.

They will be doing one more run in March in Des Moines, this time using fresh beef instead of dried. Dried beef has only half the moisture of fresh beef. They are hoping this will work, because fresh beef is much less expensive than the dried beef jerky they have been using. Dried beef is more expensive because it takes twice as much fresh beef to create the same amount of dried beef, Tarte explains.

Although the beef-corn chip will be more expensive than regular corn chips, using fresh beef should keep the price within bounds, while “using jerky makes it almost unmarketable, because of the cost,” Tarte says.

The researchers say they are hoping that the increased nutritional value of the beef-corn chip over regular chips will appeal to consumers. Their research shows that the beef-corn chips have about twice as much protein as regular corn chips, while the fat content remains about the same at approximately 1 percent of the total content. The fat content in fried chips comes from cooking oil, while the fat in beef-corn chips is from the beef.

Students, faculty, and staff members from food technology and animal science have participated in taste test panels for the four different sample runs of chips. These were conducted to identify the chips with the best texture and flavor.

The flavored beef-corn chips have a slightly beefy taste. The added spices sometimes leave a strong aftertaste.

Flavor can be determined by the kinds of spices used and when they are added. “You can flavor however you want, for example, pizza, taco, or jerky flavors,” Molins says. “You can put in the spices before extruding or dust them on afterwards, depending on the intensity you want.”

The texture of the beef-corn chips depends on how the molecules are aligned during extrusion. “Controlling the ingredients, heating and cooling changes, speed, and pressure gives different textures to the product,” Molins says.

After the chips are made, they also are tested for shelf-life stability. They are packaged like regular chips—in bags flushed with nitrogen, which protects them from oxidation. Three months of tests have shown these chips are “as stable as anything,” Tarte says.

“Chips in general are very stable, but we were concerned about the beef content,” he says.

Molins and Tarte plan to do their last sample run this March. Molins said that several companies are interested in this product. He and his team are not able to patent their research findings because there patents already are held on some of the processes used. In order for manufacturers to produce the chips, they would have to buy the patents. Therefore, it may take some time before these chips are manufactured for consumer use.

However, this will not prevent Molins from continuing in the area of extrusion. “I would like to do research into production of extrusion foods,” he said.

Most new products come from extrusion, and during the past five years, there has been a new product explosion. Molines says this was made possible by the refinement of the extrusion process.

“Extrusion can mix, puff, or make a high density product like macaroni,” he said. “Eighty percent of cereals, half or more snack munchies, chocolates, oils, sauces, pasta, and M&M’s are created this way.”
by Regina Hendrickson

If Dewayne Goldmon could have his wish, in a few years there would be no need for a program like the one he works with at Iowa State—that of recruiting minority students to the College of Agriculture.

Goldmon is a minority graduate student in agronomy who is working with the college to do something about getting more minority students actively participating in agriculture.

The Minority Student Development program which Harold Crawford, assistant dean for academic programs, coordinates with Goldmon, came about as a result of a Fall 1987 meeting of faculty members who had become concerned about dwindling enrollment in the College of Agriculture.

Declining numbers of high school seniors and a dismal attitude by many had caused enrollment in agricultural schools to drop nationally.

“We know there are not a large number of minorities in this state,” Crawford says. “But the point is, there are some that we think have a need for us, and we have a need for them.”

Although Crawford’s program was enacted about the same time ISU President Eaton announced an 8.5 percent Universitywide minority goal, Crawford says his interest in increasing minority enrollment goes beyond figures on paper.

“I am not anxious to count numbers, I am anxious to provide the education for minorities because there are opportunities here—that is my philosophy,” he says.

To get the word out, Crawford and Goldmon in cooperation with George Jackson, assistant vice president of student affairs and director of minority student affairs, contacted high schools and community colleges across the state. They talked to counselors, teachers, students, and parents about the benefits of attending Iowa State.

Because many high schools with a sizeable minority population are in urban areas, ag career opportunities such as management, economics, journalism, and science, including biotechnology, genetics, chemistry, and biochemistry were stressed.

Roger Bruene, placement officer for the College of Agriculture, says the nation is now in a situation where as many as 4,000 jobs in agriculture are going unfilled annually because of decreasing enrollment in agricultural studies and increased activity in the ag employment market. He says the potential job market for agriculture students is the best it has been in the past five to 10 years.

“Employers in total are making efforts to find and seek out minority candidates for career opportunities—period,” Bruene says. “I think the fact is that we have not had the breadth in a lot of agricultural firms. As we move through the era of trying to broaden the employment base and making all professional areas available to all people, there has been a very major emphasis on attracting qualified people that haven’t been there before.”

This year, more intensive minority recruitment is being planned. Along with visits to high schools and community colleges, counselors from 10 schools in Iowa with large minority populations will be invited to bring students to the ISU campus April 27 for Minority Student Awareness Day. Business and industry officials will be on hand also to help promote career opportunities available through ISU.

A new interactive “info-window” video system, highlighting minority recruitment, women in ag, and transfer students in ag, will be taken to community colleges and malls.
The Monsanto Company has provided a grant to help fund scholarships and promotion. Alumni and student ambassadors, as well as minority faculty members, are helping the College of Agriculture reach prospective students in areas of the state and country with which they are familiar.

Crawford and Goldman both agree that progress toward increasing minority enrollment in the ag college has been slow. Undergraduate enrollment numbers for fall of 1988 had increased to 36 students, from 20 students registered in the fall of 1987. However, minority students still account for less than 2 percent of the total ag student body.

"I hate to say it because I like to be optimistic, but one of the problems— the main problem—is the stereotype that people tend to have about agriculture, that agriculture is farming, or cows and so forth," Goldman says.

"It is not only the students, but we find, too, that the problem is common with counselors, teachers, and parents. Those people are the ones who really influence which areas students want to pursue when they go on to college," he says. This is one of the areas on which Goldman is concentrating.

"Minority students with different backgrounds can sometimes have difficulty adjusting to Iowa State," Goldman says. "We are seeing that sometimes they are not accustomed to being in a predominantly white environment, and that alone can cause stress."

Goldman is available to help these students, along with their academic adviser, and the office of Student Minority Affairs.

Felicia McCullough is a freshman from Gary, Indiana, who has had problems adjusting to the College of Agriculture and Iowa State.

"It's been hard for me. It is a nice place here, but my major is kind of getting me down. Most of the classes I was doing pretty bad in were the classes that dealt with agriculture. My instructors taught the class as if everyone had farm experience. A lot of minorities have not grown up on the farm. And that made it real hard." McCullough says at this time she is not planning to stay in agriculture and may leave ISU.

Crawford admits the demographics of students are changing. "For years, 80 to 90 percent of our students were from the farm. That number has dwindled, and we are right around 50 percent," he said.

"If we have (a large portion) of our students who have never been on a farm, and we, in our entry level classes, start referring back and making assumptions, we have got some problems." Crawford says as curriculum is revised that will be taken into consideration.

Even though enrollment numbers are small, Crawford and Goldman are certain in time they will reap the benefits of this program.

"The gains we have made, in the communities and in the high schools, in my opinion are immeasurable," Goldman says. "I think we have made progress in areas of awareness around the state, and I think the program will continue to be a success in the future...The opportunity for minority students is great."

Crawford raises an imaginary pebble in his hand to show his optimism of the project. "We are just about right in here where you drop a pebble into the water...you wait and see, you'll see those ripples come all the way around to here." □
Leopold Center, continued

of crop ground for nearly 10 years. This new cooperative effort between state and federal researchers will strengthen the undertaking and increase knowledge at both levels. Other projects undertaken by the center are similar in nature and scope. All projects are intended to promote a deeper and more thorough understanding of agricultural activities and their interaction with nature and natural processes.

Several of last year’s Leopold Center projects are designed to take place over a period of several years. All ongoing projects are subject to annual approval and funding by the Leopold Center’s advisory board. Sources say most extended projects will be funded and additional research may be approved.

The information gathered from the Leopold Center’s research may require several years of study before solid conclusions may be drawn about specific agricultural practices. However, the Leopold Center is a start for applied environmental science.

Farmers grow wood, continued

McNay farm’s energy needs can be met using the chipper only five days a year. Since the chipping process takes such a short time, farmers might consider selling wood chips.

Wray says that several small manufacturing companies currently are burning wood chips for heat, and it could turn into a substantial market for wood chips.

But one of the questions that people ask, Wray says, is the environmental impact of burning more wood in Iowa. There is concern about air pollution and the depletion of Iowa’s trees. Wray says that the long term environmental effects of this project will be positive.

He says we may see a conversion from non-renewable resources to renewable resources. We might see an increase in the number of acres planted to trees, and since these acres are marginal for traditional row-crop production, we would see a reduction in soil erosion and water pollution and an increase in wildlife habitat.

Also, Greiner says the furnace used in the biomass project is more efficient than the wood-burning stoves used today, resulting in less smoke. To test the efficiency of the furnace and to monitor the environmental consequences, special devices will be used to measure the temperature and the chemical makeup of the emissions in the research project.

Wray says the biomass project is not breaking new ground in research. “We have got bits and pieces of information, but no one has put it all together in one system. I think once we do that, the goal is to come out and say if natural gas is greater than a certain price per gallon a biomass system will have a positive payback,” Wray says.

He says the system will be tested this summer. It will go into full use next fall. He says widespread use of biomass systems is unlikely, but he is optimistic that the ISU biomass system will be cost effective and that maybe some day these systems will make wood an alternative crop for Iowa’s farmers.
More than 35 representatives from curriculum and interest clubs in the College of Agriculture comprise the ISU Agriculture Council. The Council is a meeting ground for the many diverse organizations in the agriculture college.

The Council organizes college activities and promotes the college in outreach programs. It also acts as a liaison between administration and students.

The Ag Council Veishea display features a variety of activities based on the theme “Blast from the Past.” The display will include posters from ag clubs, old pictures of the campus, and displays on new developments in the college.

Be sure to drop by the Ag Council Veishea display for a guide to other ag organizations and displays about the college. It will be located just west of Curtiss Hall, south of the sidewalk.

Ag Council sponsors:
• Ag Week
• Ag Student/Professor Get-together
• Freshman Barbeque
Census shows 105,180 Iowa farms in 1987

Early data from the 1987 Census of Agriculture show that the state had 105,180 farms, 82,631 of which had annual product sales of $10,000 or more. Land in farms totaled 31,638,130 acres, 95 percent of them in farms with $10,000 or more in sales, the Commerce Department's Census Bureau reported.

The Census showed that the state's farmers and ranchers sold $9 billion in agricultural products and that farms with $10,000 or more in sales averaged $106,945 per farm.

The agriculture census obtains information on all identified farm and ranch operations in the United States. The Census Bureau defines a farm as any place where $1,000 or more of agricultural products were produced and sold or normally would have been sold during the census year. Sampling is used to collect data for selected items and to account for nonresponding farm operations.

Other findings: $3.7 billion or 41 percent of total agricultural sales were for crops, while $5.3 billion or 59 percent came from the sale of livestock, poultry, and their products.
Taste Buds Favor Protein Supplement Flavor

If Iowans' taste buds are an indication, a protein responsible for increased pig growth being studied at Iowa State is sure to be a hit.

Ken Prusa, a food scientist with ISU's Agriculture and Home Economics Experiment Station, conducted consumer tests at the Iowa Pork Congress in Des Moines in January.

During the first two days of the event, nearly 1,200 people evaluated bite-sized samples of standard summer sausage and summer sausage made from pigs supplemented with porcine somatotropin (PST).

On a scale of 1 to 7, with 7 indicating the most favorable response, standard summer sausage received an average score of 5.2 and summer sausage from pigs supplemented with PST received a 5.6 average score.

Prusa said the difference in scores shows a significant preference for the sausage from the PST-supplemented pigs.

Prusa also noted that 62 percent of the tasters who indicated a preference for one sausage over the other preferred the sausage from PST-supplemented pigs.

“One of the disadvantages of this test is we're not sure why they prefer the sausage from PST-supplemented pigs,” Prusa said. Additional tests are planned.

According to comments received on survey sheets, tasters indicated the sausage from supplemented pigs had more flavor, was spicier, and had a firmer texture than the standard sausage.

According to Prusa, pigs supplemented with PST produce less fat and more lean meat. Earlier studies showed supplemented animals had 63 percent lean meat and 14 percent trimmable fat. Unsupplemented animals had 52 percent lean meat.

Prusa's research is supported partially by Pitman-Moore Inc., an animal health company based in Northbrook, Illinois. PST is under development and not yet commercially available. Use of meat from PST-supplemented pigs is permitted for research purposes by U.S. Food and Drug Administration regulations.

The protein is identical to the protein produced by hogs' pituitary glands. It is found naturally in pork.

Rural Concern Hotline Extends Services

Rural Concern hotline, a free information and referral service for Iowa farm families and communities, has extended its services.

The hotline, which is sponsored by Iowa State University Cooperative Extension Service, offers information and referrals on farm business planning, new directions in agriculture, and farm crisis assistance.

Those seeking to strengthen their farm business operations can receive assistance with input costs, record keeping, tax implications, business structuring, and farm programs.

Farmers seeking to diversity can receive information about low-input farming, ag diversification and value-added farming.

Farm families undergoing financial stress, as well as families adjusting to change, also can receive information, referrals, and counseling. Hotline personnel are available to discuss financial problems, legal issues, stress, job questions, and other concerns.

Rural Concern hotline, 1-800-447-1985, operates 24 hours a day. Trained people work Monday through Friday, 8 a.m. to 5:30 p.m.
Years past

Manifold images come to mind when many Iowans see the letters V-E-I-S-H-E-A. To many, the picture painted is one of parades that delight the eye or of spectacular stage performances at Stars Over Veishea. Some still can recall the early days when Count Basie and his orchestra entertained Veishea-goers in 1948. Others remember Ronald Reagan serving as parade Grand Marshall in 1958.

The Iowa State University tradition has been entertaining Iowans and out-of-state visitors for nearly 70 years with its parade floats, competitions, and wide array of entertainment. Veishea origins reach back to 1921.

On the Iowa State College campus, a long-standing tradition had been celebration “Days” for three of the college’s divisions. Agriculture hosted the Ag Carnival, home economics held a May Day, and engineering had its own St. Patrick’s Day. Open houses, dances, and parades marked the individual celebrations.

Many faculty and administrators voiced concerns that individual events gave students too many “unauthorized holidays.” Some felt the three Days were too competitive. In 1921, a decision was made: consolidate all three into a universitywide celebration.

Frank “Shorty” Paine, an electrical engineering professor, suggested naming the event after the first letters of the college’s divisions: V for

VEISHEA

Agriculture contributes to the nation's largest student-run campus celebration.
veterinary medicine, E for engineering, IS for industrial science, HE for home economics, and A for agriculture.

Traditions from the three merged into the first Veishea. Attendees in 1922 were treated to a two-mile long parade, 33 open houses, and a dance and the Nite Show, a play titled "Scandals of 1922." The 1924 Bomb Yearbook records: "This was the only attraction during the evening and 4,000 people crowded into the Armory to witness what was probably the most attractive entertainment that has ever been given here. ... From start to finish the "Ames Scandals" was a blast of fun, color, harmony, and talent."

Over the years, Veishea has continued to grow larger and more successful. The popular springtime event has become a fixture on the Iowa State campus as it began to attract top-name celebrities.

Until 1970, Veishea crowned a Queen of Queens. In 1947, the Queen was selected by Bob Hope and Bing Crosby. The Veishea torch, a tradition throughout the 50s, 60s, and early 70s was lit by such personalities as Harry Truman, Cecil B. DeMille, and astronaut Allan Shepherd. Veishea-goers of the past were treated to entertainment by Peter, Paul, and Mary, Jimmy Dorsey, and The Who.

A host of events have come and gone with past Veisheas. Fewer and fewer people can remember the days when there was a swimming circus, polo matches, or Paul Bunyan days. Yet even those who attended the first Veishea celebration in 1922 would have little trouble spotting the same spirit, unity, and enthusiasm that still carries through modern Veisheas.

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The Creation of the Ag Monster

by Regina Hendrickson

Those people who say "A mind is a terrible thing to waste" probably never envisioned dealing with a person quite like me.

I guess it must have all begun a couple of years ago. I came to work at Iowa State and decided that while I was here, I may as well finish my journalism degree. I took out a loan, tacked an ag on the front of my journalism major, and signed up for classes.

I remember that first month of Agronomy class as if it were yesterday. I met my husband at the door one night. I was enthused about my coursework, deciding it was high time I learned exactly what agronomic methods were used on our small farm.

Before he could even say hello, I took ahold of the kitchen lamp, aimed it directly in his eyes and began the interrogation.

"OK, exactly how wide are your corn rows?" I asked, my eyes squinting in the bright light.

"Thirty-eight inches," he replied.

"What! Are you kidding me? You are nuts! That is COMPLETELY wrong. Those corn rows are supposed to be 20 inches wide. The book says so right here. That allows for the proper interception of light to the corn plant; anything wider than that is inefficient and reduces total dry weight achieved per acre!"

"HRRMMMMFF!" my husband muttered at me that night and the rest of the semester as day in and day out I drilled him on every farm practice from his use of a mold-board plow to noxious weed control. Continually he was forced to defend himself against my new bible—my Agronomy Principles & Practice textbook.

I knew at the time it was wrong, but I couldn't help myself. Even at Christmas that year when we visited my parents' home for the holiday, I noticed my husband glancing uneasily at me. I resisted temptation, and held out for most of the visit talking with Mom about mother-daughter things, but right before we left—what with all that conversation about farming and all—I could hold back no longer.

As Dad was telling my husband about the latest malady in the back 80, I jumped right into the debate.

"So Dad, did you put lime on that ground? You really should. You want to keep that pH balance up around 7.0 for that alfalfa rotation. You get your soil tested often don't you? Well, don't you?"

I continued in my onslaught of questions until I noticed my dad had stopped in mid-sentence and was staring at me. It must have been because in all my life he had never heard anything like that come out of my mouth. I knew what he was thinking: "This is the girl who throughout her adolescence the only jobs I ever trusted with were carrying buckets, bringing in the milk cows, and blowing the whistle for the driver on the mow rope of the hay fork." I recognized the look on his face. My husband wore it, too. Soon after, we were ushered out the door.

As time went on, I argued with my husband about futures trading during Econ 335, quoting Dr. Deiter to him daily. It was clear my husband didn't check enough market sources when selling his products.

When I took animal science, I begged him to let me buy a lot of strange animals. I chastised him for what I knew were surely inefficient methods of farrowing his hogs. I constantly suggested new and improved...
ways of managing and operating the farm as I took Econ 192 and 330. I checked out his book keeping, debt-to-asset ratios, and costs of production.

It got so bad that wherever I went, soon I began to alienate other people. First my family, then friends. When we were out with friends from town, during the course of the evening I would inevitably begin to argue for hours about the merits of hedging. After the couples woke up, they never called up back.

Even my daughter began to notice a change in my personality. One night she innocently came up to me and asked, “What do you want to watch on TV tonight, Mom?” I picked up the *TV Guide* and began to flip through its contents.

“Oh, I don’t know honey,” I said. “How about a soap opera like ‘As the Whorl Turn,’ or ‘Angus of God.’ Isn’t that supposed to be a movie about a heifer who has an immaculate conception and tries to hide it? Oh, here we go, how about ‘Fetal Attraction’ a flick about a gilt that has an affair with a boar and then gets jealous when he pays attention to the other sows in the feedlot and takes a pitch fork after him and...”

As I chuckled to myself, I noticed my husband had run to my husband and was hiding behind his pantleg and peering out at me.

I guess it all pretty much reached a head then. My husband, who is normally a casual kind of guy, began to scream and pull at his hair.

“I can’t take this anymore! Get a grip on yourself! I can’t take your telling me how to farm anymore! No more of these classes! No more!” He scooped up my daughter and rant out the front door.

I went upstairs and climbed into bed wondering if Iowa State offered a course in farm families in crisis. I would have to be sure and check that out in the morning. But first I needed a good rest. I closed my eyes, relaxed, and began to count sheep—Rambouillet...large frame...imported from France...known for their mothering ability...
Undergraduate Clubs

**Ag Business Club**—Open to all agriculture majors but especially of interest to ag business majors. The club sponsors Ag Career Days and regular meetings feature guest speakers. Contact Paul Doak or Ron Deiter/294-5436.

**Ag Education Club**—Professional leadership development organization to promote individual and group decision-making and cooperation among agricultural educators. Contact Robert Martin/294-0890.

**Ag Engineering Club**—The ISU student branch is part of the American Society of Agricultural Engineers and promotes professionalism in ag engineering. Contact Carl Bern/294-1270.

**Ag Mechanization Club**—Promotes an increased understanding of agricultural mechanization, leadership opportunities and fellowship among members. Contact Victor Bekkum/294-5145 or Duane Mangold/294-5025.

**Ag Communicators of Tomorrow (ACT)**—Stimulates interest in profession and facilitates the exchange of ideas among students, faculty and professionals. Contact Veryl Fritz/294-0483.

**Agronomy Club**—Promotes education and fellowship among students, faculty and other interested persons through trips, socials and speakers. Contact Russ Mullen/294-3271 or John Schafer/294-3063.

**Alpha Zeta**—An honorary dedicated to scholarship, character and leadership in agriculture. Contact Donald Woolley/294-3066 or Allen Trenkle/294-4447 or Leo Timms/294-4522.

**Block and Bridle**—Using professional procedures, the club organizes and coordinates activities which provide students the opportunity to practice leadership abilities. Contact Gene Rouse/294-5641 or Dan Morrical/294-2240.

**Dairy Science Club**—Promotes fellowship and leadership among students interested in the dairy industry. Contact M.D. Kenealy or Bill Wunder or Tom Atchison/294-6021.

**Entomology Club**—Gives interested students an opportunity to interact with one another on a personal and/or academic level. Contact Wayne Rowley/294-1573.

**Farm Operation Club**—Broadens the views and develops leadership skills of students interested in agriculture by promoting new ideas through speakers, programs and special activities. Contact Tom Bass or asst. advisor Joe Dunn/294-6924.

**Fisheries and Wildlife Biology Club/Student Chapter of the Wildlife Society**—Encourages concern for and understanding of wildlife resources; provides for interaction among interested students. Contact Dennis Scarmechnia/294-7222.

**Food Technology Club**—Promotes interest in the food industry and provides educational, social and recreational activities to its members. Contact Ricardo Molins/294-9498 or Zivko Nikolov/294-3157.

**Forestry Club**—Creates social interaction among students and develops professional interest in modern forestry topics. Contact Joe Colletti/294-4912.

**Horticulture Club**—People with a common interest in plants who gather in a social atmosphere to participate in educational activities related to horticulture. Contact Nancy Agnew/294-0038 or Nick Christians/294-0036.

**International Agricultural Club**—Open to international ag majors and others interested. Contact J.T. Scott/294-4866.

**National Agri-Marketing Association (NAMA/ISU)**—Provides opportunities to contact professionals, discover internship opportunities, explore careers and gain marketing experience. Contact Veryl Fritz/294-0483.

**Public Service and Administration**—Exists to promote information on careers and opportunities in PSA as it relates to agriculture and rural areas. Contact Eric Hoiberg/294-1922.

**Society of American Foresters, ISU Student Chapter**—Promotes professional involvement through attendance at state and national meetings of the society and with on-campus speakers and projects. Contact Richard Shultz/294-7602.

**Society of Professional Journalists (Sigma Delta Chi)**—SP promotes 1) professional standards and 2) greater public awareness of journalism’s role and responsibility in society. Contact Ken Eich/294-0500.

**Soil Conservation Society of America, ISU Student Chapter**—Addresses current issues in the wise use of our natural resources and provides programming on related topics. Contact Rick Cruise/294-7850.

**Sigma Alpha**—Provides opportunity for women to share career and academic interest relating to agricultural fields. Contact Suzanne Klocke/294-0048 or asst. advisor Julia Gamon/294-0897.

Graduate Clubs

**Agronomy Graduate Student Club**—Professional and social activities encourage cooperation, information exchange and good human relations among interested individuals. Contact Al Blackmer/294-7284 or Rick Cruse/294-7850.

**Entomology Graduate Student Organization**—Formally voices student interests and concerns, promotes professional and educational enhancement and is a peer information source. Contact Jon J. Tollefson/294-8044.

**Forestry Graduate Student Association**—Sponsors forestry graduate student/faculty social and professional function; represents department graduate students in faculty meetings. Contact Carl W. Mize/294-1456.

**Genetics Graduate Student Organization**—Affords graduate students a collective forum for discussion of new developments and issues in genetics. Contact Alan G. Atherly/294-7133.

**Graduate Organization in Agricultural Education (GO in AG ED)**—Fosters an atmosphere for personal and professional development of agriculture education graduate students at ISU. Contact David L. Williams/294-0241.

**Meat Science Club**—Stimulates interest and promotes academic excellence in meat science. Open to any interested graduate student. Contact D.G. Olson/294-1055.

**Graduate Animal Nutrition Club (GANC)**—Provides opportunities for and encourages interaction among graduate students and faculty in animal science studying nutrition. Also provides resources for a nutrition reading room in animal science to support quality academic learning. Contact Dean Zimmerman/294-2133.
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