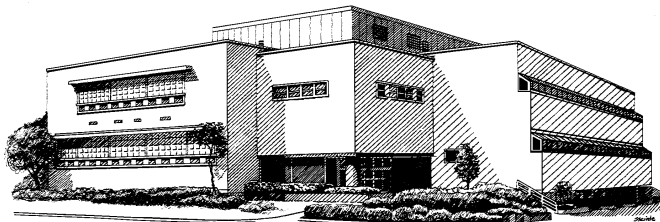


Department of Food Science

June 1998



NEWS ABOUT FORMER STUDENTS AND RESEARCHERS

ELLIOT RYSER, formerly of the University of Vermont, is now an Assistant Professor of Food Microbiology in the Department of Food Science and Human Nutrition, Michigan State University, East Lansing, MI...

MICHELLE SCHACK-MALONE is in charge of starter culture research at SKW Biosystems, Inc., Waukesha, WI...

MICHAEL LIEWEN, after working at General Mills facilities in Iowa and Kansas, has returned to Minneapolis where he is Manager of Quality and Regulatory Operations for the Yoplait-Colombo Division of General Mills...

BERNARD PRIOR, formerly with the University of the Orange Free State, is now a professor in the Department of Microbiology at the University of Stellenbosch in Stellenbosch, Western Cape, South Africa...

DAWN MANTHEI is a food technologist with the Eskimo Pie Corporation in Waukesha, WI...

WILLIAM BREENE is an emeritus professor (since July 1, 1995) in the Department of Food Science and Nutrition,

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Food Science Newsletter

INTRODUCTION

Once again we greet you from Babcock Hall, the home of the Department of Food Science on the campus of the University of Wisconsin-Madison. An unusually large number of changes have occurred or will occur in the coming months.

First, Joachim von Elbe is retiring and also completes his service as departmental chairman. James Steele will succeed von Elbe as chairman.

Second, Roger Wyse resigned as dean of the college, Neal Jorgensen postponed retirement to serve as dean until the new dean, Elton Aberle, began his duties at the beginning of this June.

Third, Barbara Ingham joined the Food Science faculty as an assistant professor.

Fourth, it is likely that four additional new faculty will be hired in the next 12 to 24 months.

Fifth, remodeling of Babcock Hall continues.

Sixth, several of our colleagues and friends have gone on to their eternal rest.

All of the forgone are described in greater detail in this newsletter. Also mentioned are activities of some former students and the current program of the Food Science Club. Several research reports of faculty with joint appointments and reports of new developments in the Center for Dairy Research, the Aquaculture Program and the Food Research Institute appear in the newsletter. Food Science faculty again have been selected for numerous national awards and also have published several books look for details in the newsletter.

Some readers completed and returned to us the questionnaire that appeared in the 1997 newsletter. We thank you for responding to our request; information you provided appears in this newsletter. Another questionnaire appears at the end of this newsletter. We invite you to complete the questionnaire and return it to us so we can share the information you provide with readers of next year's newsletter.

We thank all persons who provided material for this newsletter. Elmer Marth and Yvonne Bushland organized the newsletter and Dr. Marth served as editor. Publication and distribution of the newsletter was supported by the Wisconsin Agricultural and Life Sciences Alumni Association (WALSSA).

University of Minnesota, St. Paul, MN...

FRANCIS TAGNEY retired after 30 years with the Pillsbury Company; he lives in St. Louis Park, MN...

MATT TAYLOR is a senior scientist working on beverage technology at the Procter and Gamble Company, Cincinnati, OH...

F. XAVIER MALCATA was promoted to Associate Professor of Food Science and Engineering, College of Biotechnology, Portuguese Catholic University - the promotion with tenure became effective July 6, 1997; in 1996 he was appointed as Associate Director of the Graduate School where he oversees M.S. and Ph.D. programs and also research and development projects...

G E R A L D SCHELLPFEFFER

retired from Oscar Mayer and Company in Madison and lives in Cottage Grove, WI...

LAURA LEDERMAN ROTHMAN teaches courses in integrated science and in water science, Department of Agribusiness and Natural Resources, Vincent High School, Milwaukee; she also is co-advisor for high school science olympics...

LAURA PALUCH is with KalKan in Vernon, CA; she lives in Yorba Linda, CA...

WILLIAM MICKLE is retired and lives in Phoenix, AZ...

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AN INTERVIEW WITH THE CHAIRMAN

Once again Chairman Joachim H. von Elbe shares his thoughts on a variety of topics in this interview.

J.H. von ELBE: Before I answer any of your questions let me, as usual, thank you for again undertaking the task of preparing this year's newsletter. Without your efforts and constant prodding the newsletter would not see the light of day. I know, I am joined by all who read the newsletter when I say a big thank you.

E.H. MARTH: *Another year has passed in the history of the Food Science Department. What are the highlights of this past year?*

J.H. von ELBE: Elmer, The greatest highlight is our students. Their scholastic achievements are outstanding and have been recognized by a number of fellowships and scholarships. Our students were winners in every category in which IFT offers fellowships and scholarships. In addition, many of our undergraduates were awarded a number of privately funded scholarships. Not only have our students excelled academically, they have been involved in various activities of great interest to the department. The product development team for the first time, has been selected to compete at the National IFT new product development competition. The team spent numerous hours to develop their "Pro•crunch" product, and I know the team is a winner. The members of the Food Science Club have had a very busy and active year. This year the Club sponsored the 12th Annual Food Science Club Symposium. It was a great success and much of the success must be attributed to the professional manner with which the symposium was conducted. The students are also involved in all-campus activities. The Food Science Club members were one of the first volunteer groups to "adopt a block". In this program, the volunteers adopt a specific campus area and keep it clean and neat. I wish all of our readers could participate in one of these events, I think you would be as proud of our students as I am.

Second, I continue to be proud of our faculty. Dwindling resources do not make their tasks easier. Despite shortages in both personnel and funds, they do their job extremely well. The national awards, I think you write about these elsewhere in this newsletter, are one indication of the faculty's excellence. I am also encouraged by the fact that we are in a hiring mode. We have two positions, both in food chemistry, approved and are actively recruiting. An extension position with a specialty in processing has been developed and is in the campus approval process. We are also developing a position in food processing. I am confident the last two will be approved and that we will be recruiting for these position in the very near future.

We have also made improvements in our facilities. Room 36, the pilot plant and drying tower, has been completely overhauled. It looks like a completely new facility with new floor, lights, electric outlets, etc. It will be a great help to the faculty and hopefully will also serve our industry friends. The pilot plant known as room 12 has a regouted floor, and work is in progress to refurbish the refrigeration equipment on the second floor. In the dairy plant, we are in the process of replacing the entire refrigeration system. This is a major project and hopefully will be completed early in 1999.

Last year was not an easy one, but I give the year an "A".

E.H. MARTH: *In June of 1997, Roger Wyse resigned as dean and since then Neal Jorgensen has served in that capacity but will continue to do so only until his replacement is on board. How has this administrative shuffle affected the department?*

J.H. von ELBE: The College was extremely fortunate that Neal was willing to delay his retirement and serve as our dean. As you know, he has served in that capacity before and in the interim had a leading position within the College. I don't know of anyone within the college faculty that is respected more than Neal. For me

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the change was very minor. To work with Neal was like working with a friend. He knew our department well in his role as Executive Associate Dean and certainly understands food science. We moved ahead with our agenda, and as you heard from our accomplishments, Neal was our greatest supporter and helped the department to reach its goals.

E.H. MARTH: *Some remodeling remains to be done in Babcock Hall; has any progress been made on this during the past year?*

J.H. von ELBE: Upgrading our facility is a continual process. I am not sure it will ever be finished. We need to constantly review our facilities and assess the needs, set priorities and keep trying to get the needed funding. As I indicated earlier, we have made substantial progress. In addition to what already has been said, we are installing new fume hoods in two of the lower floor laboratories. We have remodeled one of our class rooms on the first floor, and we have upgraded our computer capability. There are some major project needs. One is the entrance to our dairy store. It is in great need of remodeling and modernizing. We are working very hard to identify the needed funds. I have a beautiful architectural concept drawing in my office. I am very hopeful that this project will get underway within the near future. A second major concern is our air handling system. Portions of our building are air conditioned and others are not. This situation presents major problems of water condensation and water damage to ceilings. Its a problem that needs to be addressed.

E.H. MARTH: *Has there been any appreciable change since last year in enrollment of undergraduates or graduate students?*

J.H. von ELBE: Let me start with the graduate students. Our graduate student enrollment over the past years has been relatively stable. We average 5 graduate students per faculty member, which, by the way, is the average for the college. Presently we have 12 faculty members, not counting myself, and 66 graduate students. This number is low, but our faculty numbers are also low. As we add new faculty, we will increase this number. If we get the positions filled for which we are recruiting, our graduate enrollment will likely grow to the upper 80s. You might be interested to know the college faculty has been downsized from 345 to 273, and you will find that the college graduate enrollment is also down. Our undergraduate enrollment is slowly increasing. Much of the credit goes to our recruiting efforts, and I must give credit to our students who have been are very active in the recruiting process. The present enrollment is 70 students. All of us would like to see this number reach 100. We have a lot of work to do, and I would encourage anyone to take the time and talk to potential students and explain the opportunities food science has to offer.

E.H. MARTH: *Some progress has been made in hiring new faculty members. Will the department be able to hire any faculty members beyond replacements for the retired Professors Fennema, Mennes and Olson?*

J.H. von ELBE: All departments within the College have undergone downsizing to meet the budget cuts. The net result is the college faculty has been reduced by more than 20%. In this situation, it is not realistic to talk about replacements. We need to look at the needs of the college and set priorities. If a need in food science becomes a high priority, we will get additional resources to hire faculty. Personally, I think food science is well positioned within the college and our present hiring plans would support that.

E.H. MARTH: *Recently you announced your retirement both as professor and chairman. In looking back at your years in these positions what comes to mind that you wish to share with our readers?*

ROBERT MARQUARDT is retired and lives in Hudson, WI.

HAROLD LINDEN worked for the U.S. Department of Agriculture, Dairy Inspection and Grading Service, is now retired and lives in Minneapolis, MN...

EMERSON SEAVEY, after working for the U.S.D.A., joined First National Stores and then worked for St. Regis Paper Company for 22 years; he is retired and lives in Minneapolis, MN...

MAHESH GOEL continues as Director of the Public Health Laboratories, Paterson, N.J.; he also is the founder and chief operating officer of an international charitable organization, "Hands to Clinical Laboratories of Third World Countries" - its mission is improve diagnostic facilities in developing countries...

JUAN MANUEL GONZALEZ is with Bromo International, S.A., Coral Gables, FL...

JILL SNOWDON is an investigative scientist with the California Egg Commission where she directs the California egg industry's food science research...

ROBERT BRACKET begins his term this August as president of the International Association of Milk, Food and Environmental Sanitarians...

BARBARA WRY is the plant manager of pet food factory operated by Safeway Stores and located in Emporia, KS.

JAD ARSAN is now with General Mills, Minneapolis, MN; as a graduate student he was a member of the successful departmental college bowl teams and also was one of the primary architects of the Food Science Department web page...

DAVID THOMAS, formerly with the Pillsbury Company, is now director of the International Food and Beverage Division of Ecolab in St. Paul, MN...

AHMED YOUSEF received the Plimpton Outstanding Teaching Award from the College of Agricultural and Environmental Sciences at the Ohio State University; Ahmed is an associate professor of food microbiology...

J.H. von ELBE: The decision to retire was not an easy one, because I have enjoyed the many years at this great university. I have been involved, I feel, in all phases of university work • teaching, research, extension and certainly in the last ten years, in administration. Each presented unique challenges, I enjoyed them all and I believe I have been able to contribute to each. One of the greatest privileges in my professional life has been to have had the opportunity to work with young people • our students. Through the years I had the opportunity to watch their careers develop, and I am proud of their achievements. I look at the students with whom I had the most contact as my extended family. Working with the faculty and staff, both past and present, has been a joy to me. Each of our faculty has his/her own specialty and expertise, each has made major contributions to his/her area of interest, each has been recognized nationally and internationally. Can you give me a better environment to work in? I feel very fortunate to have had the opportunity to spend my entire professional career on this campus.

E.H. MARTH: *What are your plans for retirement?*

J.H. von ELBE: I am not a golfer or a fisherman, but some tell me its never too late to learn golf. Who knows I may be on the senior tour. As you know, I been involved in teaching the confectionery course for 35 years. I plan to spend some time writing a book; in fact, it is supposed to be done sometime in 1999. In addition, I hope to help the department in achieving certain goals that will require some private financial support. There are also a number of places in our country and in Canada that I want to visit. The first will be the Maritimes. Carol and I are planning a trip after Labor Day. It will be fun to leave when every one else is starting to teach again.

E.H. MARTH: *Do you have any other thoughts that you wish to share with our readers?*

J.H. von ELBE: Elmer, I came to this country as an immigrant in 1950 and to this campus as a freshman in 1953. I have been a member of the faculty for 34 years and served the last 10 years as chairman. With the exception of some army time, I have spent my entire adult life on this campus. To me it has been "The American Dream". To all who made this possible, I am most grateful, and I can only say to all of you the two simple words in our language, "Thank you."

RETIREMENT CELEBRATION

A retirement celebration for Professor Joachim (Joe) H. von Elbe is scheduled for Friday, 24 July, 1998 at the Monona Terrace Convention Center. Joe has been a member of the UW•Madison faculty in the Department of Food Science for 34 years, serving as Chairman since 1988, and as the Fritz Friday Chair Professor for vegetable processing research since 1992. He has made major and lasting contributions in resident and outreach/extension instruction, research, and professional and community service. It is fitting that this retirement celebration will be held on the last day of his last Confectionery Short Course, a course von Elbe taught for 35 years and for which he was honored as the only academic recipient of the Stroud Jordan Award given by the American Association of Candy Technologists. Please mark this date on your calendar when we will honor this loyal Badger (and hockey fan). A late afternoon reception, followed by a dinner, with the "roasted" honoree being the featured selection, is planned. If you would like to write a letter for a memory book please send it to Barbara Kamp c/o the Department of Food Science, 1605 Linden Dr., Madison, WI 53706. For more information, or to receive an invitation, please contact Barbara Kamp at 608•263•6388 (FAX 608•262•6872; or e•mail <bakamp@facstaff.wisc.edu>).

FOOD SCIENTIST IS NEW CALS DEAN

Elton D. Aberle, who holds a Ph.D. degree in food science from Michigan State University, has been named the new dean of the College of Agricultural and Life Sciences (CALS). Aberle, who once taught courses in food chemistry and meat technology, has held several administrative positions.

From 1967 to 1983, Dr. Aberle was a member of the animal sciences faculty at Purdue University. Since 1983 he has been head of the Department of Animal Sciences at the University of Nebraska-Lincoln. In 1996-1997, he served as interim associate dean and associate director of the university's agricultural research division.

Aberle said he comes to CALS with no preconceived goals and priorities. He will rely on input from faculty, staff and students to set new directions. Aberle replaces Dr. Neal Jorgensen who came out of retirement to serve CALS as dean after Roger Wyse resigned unexpectedly in June of 1997.

BARBARA INGHAM JOINS FOOD SCIENCE FACULTY

Barbara Halpin Ingham attended Clemson University for one year and then transferred to Virginia Tech where she obtained the B.S. degree in Food Science in 1981. Barbara moved on to the University of Massachusetts and obtained the M.S. degree in 1983. She earned her Ph.D. at Cornell University, graduating in 1988. In June of 1988, Barbara married Steve Ingham (currently a faculty member in the Department of Food Science at UW-Madison) and the same year they moved to Baton Rouge, Louisiana where Barbara was a postdoctoral fellow in Horticulture at Louisiana State University. Barbara studied physiological factors affecting seed germination and production of volatile compounds during and after ripening.

In 1989, Steve and Barbara moved to Saskatoon, Saskatchewan where Barbara worked as a postdoctoral fellow in the departments of Applied Microbiology and Food Science, Geology, and Soil Science. Her work focused on anaerobic microbiology, first involving biohydrogenation of canola oil, and later using anaerobic microbiology to study production of methane and other greenhouse gases associated with global warming. In 1994, the Inghams moved to Madison where Steve accepted a job as Assistant Professor and Food Safety Extension Specialist in the Department of Food Science. Barbara worked from 1994-1997 as research program coordinator first in the Department of Radiology at University Hospital and Clinics, and later at the Center for Dairy Research. Barbara joined the faculty of the Food Science department in August 1997 as an Assistant Professor and Food Science Extension Specialist. Her current programming relates to use of distance education technologies and development of curricula for food safety education. Her research interests include analytical food chemistry and the application of gas chromatography to the differentiation of foodborne bacteria. Barbara's teaching responsibilities include serving as co-instructor in Food Science 120 (the introductory course in food science).

PROMOTIONS

Steven Ingham, Department of Food Science, and Charles Kaspar, Food Research Institute, will be promoted to associate professor effective July 1, 1998. This promotion means both faculty members will have tenure, a form of job security at universities, including UW-Madison. Independent of their promotion, both Ingham and Kaspar have been appointed to 3-year terms on the editorial board of the Journal of Food Protection.

WILLIAM EICHENBERGER of Louisville, KY died on June 23, 1996...

JOSEPH SARTORI, 80, died in March, 1998 in Jupiter, FL. Sartori, a 1938 UW graduate in dairy industry, was the co-founder of both Sartori Foods and Sargento Cheese Company of Plymouth, WI. Sartori was active in the American Producers of Italian-type Cheese Association, the Wisconsin Cheese Makers Association and the National Cheese Institute. In 1975, he received a Marschall Honorary Award for his contributions to the Italian cheese industry in the United States...

FOOD MICROBIOLOGY RESEARCH FROM THE LABORATORY OF ASSOCIATE PROFESSOR JOHN LUCHANSKY

(Editor's Note: Dr. Luchansky's primary appointment is in the Department of Food Microbiology and Toxicology; he holds a joint appointment in Food Science.)

Spoilage of chub-packed ground beef

In collaborative studies with investigators at Kansas State University, we have profiled the microflora from chub-packed ground beef stored at refrigeration temperatures to identify those organisms that potentially contribute to gaseous spoilage. Ground beef from four processing plants was analyzed for total aerobic and anaerobic counts, lactic acid bacteria, Gram-negative bacteria, H₂S producers, and *Clostridium* spp. Using ground chuck at ratios of lean:fat 73:27 or 81:19, counts varied greatly among the selective media, and microbial spoilage was delayed longer during storage of chubs at 1°C compared to 7°C. The following gas-producing isolates were recovered: *Citrobacter*, *Hafnia*, *Serratia*, *Aeromonas*, and *Enterobacter* species. Experiments are ongoing to identify sources of these organisms and to implement strategies to control their growth and prevalence.

Control of Escherichia coli O157:H7 in fermented meats

A 1994 outbreak in California and Washington linked to consumption of pre-sliced, dry, fermented pork/beef salami contaminated with *E. coli* O157:H7 prompted regulatory action that required sausage manufacturers to ensure a 5-log₁₀ reduction of this pathogen during processing. As outlined briefly below, the Food Research Institute has conducted several studies to evaluate the behavior of this pathogen in a variety of fermented meats. Collectively, these data will assist manufacturers of fermented meats in selecting options for validating the safety of their respective processes.

Pepperoni-I. The viability of *E. coli* O157:H7 was monitored after stuffing, after fermentation, after thermal processing, and after drying. Fermentation and drying alone were only sufficient to effect a 1-2 log₁₀ unit reduction in the pathogen. To achieve the required 5-log₁₀ reduction, it was necessary to heat the chubs after fermentation to internal temperatures of 145°F instantaneous or 128°F for 60 minutes.

Pepperoni-II. In related studies, the fate of a serotype O157:H7 cocktail was monitored in pepperoni sticks as well as slices of pepperoni stored under different atmospheres (normal, CO₂, vacuum) and at different temperatures (-20, 4, and 21°C.) As in Pepperoni-I, fermentation and drying alone were only sufficient to cause a 1 to 2 log₁₀ unit decrease in pathogen numbers. During storage, the temperature rather than atmosphere had a greater effect on pathogen viability, with the greatest decreases observed at 21°C. To cause a 5-log₁₀ reduction, it was necessary to store pepperoni slices at 21°C for at least 2 weeks under normal atmosphere.

Summer sausage. All-beef summer sausage batter was fermented at 105°F to pH 4.6 or 5.0 and the resulting chubs received a low-temperature cook (130°F for 0, 30, or 60 minutes). Regardless of the final pH, fermentation alone was only sufficient to reduce the population by 1.5 log₁₀. Fermentation to pH 4.6 and pH 6.0 and then heating to an internal temperature of 130°F instantaneously reduced counts by 7.0 and 3.2 log₁₀ units, respectively. For chubs fermented to pH 5.0, it was necessary to hold them at 130°F for at least 30 minutes to achieve a 5.0-log₁₀ reduction.

Use of nisin to control Listeria monocytogenes in Queso Blanco cheese

Hispanic-style cheeses, such as Queso Blanco (QB), present an elevated threat for listeriosis because of relatively high pH and moisture levels, as well as the potential for use of raw milk and the considerable handling during manufacture. As an added safety measure, we incorporated nisin during manufacture of QB to control the growth/survival of *L. monocytogenes*. The nisin was added via whole milk pre-fermented with a nisin-producing starter culture or by direct addition to whole milk or curd. The data revealed that regardless of the delivery method, counts of the pathogen decreased by about 1-3 log₁₀ units during storage at either 4 or 12°C for up to 21 days. In nisin-free control batches, counts of *L. monocytogenes* increased by about 1.3 (4°C) and 3 (12°C) log₁₀ units within 21 days. The data indicate that nisin can be an effective hurdle for controlling low numbers of *L. monocytogenes* in Queso Blanco cheese.

MYCOTOXIN RESEARCH FROM THE LABORATORY OF PROFESSOR FUN SUN CHU

(Editor's Note: Professor F.S. Chu has his primary appointment in the Department of Food Microbiology and Toxicology (Food Research Institute); he also holds a joint appointment in the Department of Food Science.)

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Analysis of cyclopiazonic acid

Cyclopiazonic acid (CPA), a toxic secondary fungal metabolite produced by several aspergilli and penicillia, has been found in a number of foods and feeds. To minimize the potential risk to human and animal health, a simple and rapid method for routine screening of CPA is needed. Previous studies at the Food Research Institute have developed antibodies against this mycotoxin and also an indirect competitive enzyme-linked immunosorbent assay (ELISA) for analysis of CPA in corn, peanuts, and mixed feed. Two new approaches were used for preparation of enzyme markers; one involved coupling CPA-bovine serum albumin (CPA-BSA) conjugate to horseradish peroxidase (HRP) using either the glutaraldehyde (GA) or the periodate (PI) method, and the other involved conjugating a CPA carboxymethyl oxime (CPA-CMO) derivative to an ethylenediamine-modified HRP using a water-soluble carbodiimide (WSC) method.

The dc-ELISAs using CPA-BSA-HRP prepared by either the PI or GA method were most effective and subsequently used for analysis of CPA in corn, peanuts and mixed feed. Four extraction solvent systems with 70-80% methanol in different buffers at pH 7 to 8.5 gave extracts that could be directly used in the assay. Using CPA-BSA-HRP prepared by the GA method in the dc-ELISA, detection limits of CPA in corn, mixed feed and peanuts were estimated to be ~100, 300, and 600 ng/g (ppb), respectively. The mean analytical recoveries (200-5000 ppb range) for CPA added to corn, mixed feed, and peanuts were 97.6, 92 and 93%, respectively.

Effects of wheat scab on deoxynivalenol in Wisconsin winter wheat

An epidemic of *Fusarium* head blight (scab) of wheat occurred throughout Wisconsin in 1996. To study the effect of the scab on wheat quality and formation of deoxynivalenol (DON), a collaborative study was conducted by scientists from the Food Research Institute and the departments of plant pathology and agronomy. Samples at three locations in Wisconsin were surveyed for scab severity, DON concentration, germination rate (%), grain quality, and infection by four *Fusarium* species. Among the varieties sampled at each location, scab severity and DON concentration averaged 48.4%, 7.8 µg/g; 35.9%, 4.7 µg/g; and 12.2%, 1.8 µg/g (Arlington, Janesville, and Racine, respectively).

Fusarium graminearum, infecting >50% of kernels sampled at Arlington, was the most commonly occurring fungal species isolated from grain samples. DON concentration was positively correlated with scab severity and infection by *F. graminearum* in the combined analysis of results from all varieties and locations. Germination of grain harvested at Arlington, averaging <80%, was negatively correlated with scab severity ($r = -0.29$, $P = 0.026$) and infection by *F. graminearum* ($R = 0.32$, $p = 0.01$). More than 50% of kernels from Arlington exhibited symptoms of scab infection such as chalky white coloration. DON was detected in all samples at all locations and no variety averaged less than 0.8 µg DON/g of sample. These data suggest that analysis for DON may be justified even at low scab severities (ca. 4.5%).

FOOD ENGINEERING RESEARCH FROM THE LABORATORY OF PROFESSOR SUNDARAM GUNASEKARAN

(Editor's Note: Dr. Gunasekaran's primary appointment is in the Department of Biological Systems Engineering (formerly Agricultural Engineering); he holds a joint appointment in Food Science.)

The Schreiber test is widely used in the industry to evaluate meltability of cheese. In this test, a plug of cheese, placed in a Petri dish, is heated in an oven set at 450°F for 5 minutes. The melted cheese is cooled for 30 minutes and the largest diameter of the area of melted cheese is taken as an estimate of its meltability. Thus, it is an empirical and a poorly controlled test. Nonetheless, the Schreiber test provides a satisfactory comparison of the meltability of cheeses of widely varying melt properties. However, it is grossly inadequate to study minor variations in the melt behavior. The problems of using the Schreiber test are even more serious when reduced-fat cheeses are evaluated, because the reduced-fat cheese tends to bubble up and flow rather unevenly.

We have designed and developed an apparatus named the UW Meltmeter. Briefly, it is made of aluminum and has a moveable outer cylinder (76-mm diameter) equipped with an electric heater. This cylinder can be moved up and down around a stationary center position (30-mm diameter) by means of a lever. During the start of a test, the outer cylinder is raised forming a 7-mm deep 0-mm diameter sample well. A cheese sample of the same dimensions (7-mm thick; 30-mm diameter) is placed in the sample well so that the top surface of the cheese sample is flush with the top surface of the outer cylinder. A 66-mm diameter circular plate attached to an LVDT (linear variable differential transformer) is lowered to cover the cheese surface and to maintain constant contact with the sample during the test.

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When the sample is heated to the preset temperature of 140°F, the lever is activated lowering the outer cylinder and exposing the cheese sample to be squeezed out by the weight of the circular plate. This causes the melted cheese to flow. A computer data acquisition system collects information on the sample height vs. time. From these data, viscosity of cheese melt, an objective rheological property, is calculated. To date, our tests indicate fairly successful discrimination of cheese samples of different meltability (based on different composition, age, pH, etc.).

The softening point can be defined as the temperature at which cheese begins to flow. It signifies the temperature at which cheese turns from a non-flowing to a flowing semisolid. The UW Meltmeter configuration also can be used to determine the softening point. For softening point determination, the cheese sample is placed on a flat plate instead of the outer cylinder mentioned earlier. The entire set-up is placed in an oven at a certain temperature. The temperature of the cheese (as it is heated in the oven) and the change in its height (as it begins to flow) are simultaneously recorded. The cheese height vs. time curve exhibits two distinct linear regions • an initial slow-changing part and the later fast-changing part. We constructed these two straight lines. The temperature of cheese at the intersection of the straight lines is taken as the softening point.

Stretchability can be defined as the extend and ease with which the melted cheese can be pulled to form string(s). Thus stretchability is a uniaxial elongational property. We have developed a simple test to pull the melted cheese by means of a T-bar attached to the crosshead of an Instron (or a texture analyzer). The cheese is held in a Petri dish clamped down in a water bath to maintain constant cheese temperature. The advantage of this method over the previously reported methods is that it is suitable for shredded and block cheeses. The maximum force, the velocity of stretching (crosshead speed) and the failure strain are the data obtained. Using a very sensitive load cell we were able to identify breaking of strands of cheese during stretching. Peak force, the failure strain, or the work done in stretching can be used as a measure of stretchability. A better stretch index would be the one that combines all of the above.

EXTENSION/OUTREACH UPDATE

As we indicated last year, the Food Science Extension program is going through a major revision. The heading above is one change that has taken place in 1997. We are addressing our continuing educational mission as a total faculty and staff in the Food Science Department. With our educational efforts in the FS 120 program (introductory course in food science) and activities in the Center for Dairy Research, along with our traditional Cooperative Extension program, we felt that we could better approach the "Wisconsin Idea" as a total unit.

This year also finds us going through some significant changes in our Extension faculty. On August 25, 1997, Dr. Barbara Ingham joined our faculty as the Extension Food Science Specialist to service the Family Living area previously covered by Mary Mennes. Barbara has picked up the traditional program that Mary had going with the county-based Extension Family Living agents to service consumer questions in foods and food safety. Barb also will take responsibility for the FS 120 class (food science course for L&S and other students). The distance educational activities that Barb and Jim Steele use in FS 120 should crossover into the Extension areas very nicely. Barb is currently working with UW-Platteville to provide the FS 120 course to students on the Platteville campus through distance education. She is also working with the two Wisconsin Native American land grant universities to set up some food educational programs for those new students.

Steve Ingham, our Food Safety Specialist, has been working with Barb to address the various food safety issues coming up in the press, e.g., pathogens in meats, apple cider, produce and Hispanic cheeses. Steve, Barb and Dennis Buege, of our UW Meats Lab, have developed a videotape series in English and Spanish for training in sanitation procedures in meat plants. Steve is now coordinating the Better Process Control School for canners and freezers and will be coordinating future brewing short courses in the department.

Joachim von Elbe will be retiring at the end of June 1998, so we will be searching for an Extension Food Processing Specialist this next year to cover some of the programming in the canning and freezing area along with processing activities in other food related areas. Obviously, the food canning industry has changed significantly since Joachim joined the faculty in the 1960s. With the constant change and evolution within the food processing industry, the Food Science faculty felt we could better service our future clientele with a discipline-oriented position. Joachim has done an outstanding job over the years in adding some "color" to the area of veggies. We wish him and his wife, Carol, good health and happiness in their retirement. We also suspect that you will be seeing Joachim around the food industry in a number of capacities in future years.

The dairy foods extension area continues to grow with Bob Bradley and Bill Wendorff. The Wisconsin Master Cheese Maker program has increased the demand for dairy manufacturing short courses since each student is required to take at least seven short courses. The value of the program is starting to show since 15 of the 72 winners in the recent World Cheese Contest were graduates of one of our dairy manufacturing short courses within the past 3 years. Bob continues to work with the International Dairy Federation and AOAC on analytical procedures for dairy products and Bill continues to concentrate on emerging environmental concerns of the dairy industry.

With the possibility of 3-4 new faculty members joining the department in the next two years, we will be assessing and redefining our educational mission for the department. One area that will have significant growth is that of continuing educational short courses for food industry personnel. If you have specific areas of need that you feel we should be addressing, please let us know. We are here to serve the industry with whatever expertise we may have.

DAIRY PRODUCTS EVALUATION TEAM

This year the competition was held at Kraft (Glenview, IL) for the regional contest with 11 teams and at the Dairy and Food Expo (McCormick Place, Chicago) for the national contest with 16 teams. One new dimension was added to the competition in that any team could also add one graduate student as a competitor. All graduate students competed as one group and their scoring was independent of the undergraduate team. Seven graduate students competed at the regional and 10 at the national contests.

The 1997 team from the University of Wisconsin was Justin Balousek, Amy Steiner and Tracy Tuler with Rachel Adelman as the graduate competitor. At the regional contest, Justin Balousek won first place individual in Cheddar cheese which ultimately lead to first place team in Cheddar cheese by over 11 points. Tracy Tuler was second individual in ice cream and the team placed fifth in all products combined. Rachel Adelman brought home first place in butter in the graduate competition.

At the 76th National contest two weeks later, the Wisconsin team rebounded with Tracy Tuler winning third place in ice cream and fifth place in all products. The team placed third in ice cream and third in Cheddar cheese. Among the 16 competing teams, Wisconsin was fifth in all products combined. Rachel Adelman won butter again (our butter queen)) and placed fourth among the ten graduate students in all products.

Jessica Jacobsen, a former competitor in these contests and now a graduate student, was the assistant coach. Her skills proved valuable to the team training.

FOOD SCIENCE CLUB NEWS

The UW-Madison Food Science Club had an eventful year as the club increased its participation in campus and community events. Business meetings were held monthly, with speakers from Tetra Rex, Rhone-Poulenc, Bancroft Dairy, Food Concepts, the UW Dairy Plant, and the Wisconsin Center for Dairy Research. In addition, representatives from General Mills, Pillsbury, Kraft, and M&M/Mars gave informational presentations about their respective companies.

Club members had the opportunity to learn more about the diversity of the food industry through several tours. This year the club visited Dean Foods Technical Center, SteriGenics, Goelitz Confectionery Co., and Tetra Pak Research Center. Other tours included Wollersheim Winery, Sprecher Brewery, Etes-vous Prets Coffee Roasting, and the Wisconsin Center for Dairy Research milkfat fractionation pilot plant.

Fund raising efforts increased this year as the club experimented with several ideas. The main project was the annual holiday gift box sale co-sponsored by the Babcock Hall Dairy Store. The club helped plan, market, and assemble the gift boxes that were shipped nationwide. Other smaller fund-raisers included Food Science Club clothing sales, a bake sale, and taste panel participation for a local sensory service.

Throughout the year, the club participated in many campus and community events. Club members volunteered time at the Taste of Madison, the FFA Dairy Food Judging Contest, and sponsored a children's coloring contest. Others participated in the UW-Arboretum Prairie Restoration Project, Homecoming Charity Run, Second Harvest Food Drive, and Adopt-a-Block campus litter removal.

Promotion of food science was a major emphasis this year. The club recruited new members by sending letters to students, speaking at freshman orientation, and having displays at the Ag campus picnic and student organization fair. Club members helped increase the awareness of food science careers by giving departmental tours, visiting

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area high schools, and speaking at science and career fairs. Food Science Club increased its visibility by increasing club newsletter publication to four times per year and submitting press releases for use in campus and community newsmedia. The club also maintained its website, departmental display case, and brochure.

The twelfth annual club symposium was held in April. The theme, "Foods That Deliver", emphasized some of the current trends in food science. Over one hundred students, faculty and industry representatives attended the event held at the Monona Terrace Convention Center.

This spring the club hosted the IFTSA Midwest Area Meeting and College Bowl competition. Although the UW team did not win, club members enjoyed meeting and socializing with the other teams. The club was very excited to be selected as a finalist in the Product Development competition this year. Team members are looking forward to the presentations in Atlanta.

Besides academic activities, the club planned one social event per month. Members attended the annual fall and spring picnics, Halloween party, tailgate party, ice skating evening, and massage clinic. The International Dinner was a success once again, and the ice cream social/board game night had a large attendance.

Food Science Club had a very successful year. Members learned to work as a team, develop skills useful for future employment, and make new friends through participation in club activities.

NEWS FROM THE DAIRY PLANT

In 1999, the University of Wisconsin will celebrate its sesquicentennial. Although the Dairy Plant has not been around for 150 years, it started in 1891 at Hiram Smith Hall; we will nevertheless participate in the celebration. We are working with the Wisconsin Alumni Association on developing a commemorative design for our cheese gift boxes. The new design will feature vintage photos of early dairy students at work in Hiram Smith Hall along with a printed insert discussing the early dairy program and other sesquicentennial facts. We will also produce a commemorative ice cream flavor resulting from a statewide naming contest conducted by the Wisconsin Alumni Association. Look in *On Wisconsin* for your opportunity to participate. There are no guarantees that Food Science alumni will have any advantage in the naming contest, although they have probably sampled more Babcock Hall ice cream than graduates from any other department.

Most alumni are aware of the new Kohl Sports Center on campus. We are particularly pleased that the Center has agreed to serve Babcock Hall ice cream at all sporting events. One dipping station was set up on the food concourse level of the Center and was immediately overwhelmed by customers. Food service management at the Kohl Center is considering one or two additional ice cream stations so more fans can enjoy their favorite ice cream. The Dairy Plant also developed a 12-ounce chocolate malt cup for sale at the Kohl center. It is available at all 18 food service stations and at food service units around campus. Sales have exceeded our expectations.

This summer construction will begin on a new refrigeration system for the Dairy Plant. Food Science alumni may remember occasional events of refrigeration system failure and getting a whiff of ammonia now and then. The ancient system is finally being replaced with funds secured directly from the State. The new Freon system is scheduled to go on line next March or April.

We continue to participate in the Taste of Madison festival each Labor Day weekend. If you are in Madison on that weekend, stop at our booth on the Square. If you are in Madison at any other time, come to Babcock Hall for a visit and an ice cream cone.

RICHARD HARTEL RECEIVES CRUESS TEACHING AWARD

Professor Richard Hartel has been selected to receive the William V. Cruess Teaching Award at the 1998 annual meeting of the Institute of Food Technologists. Hartel joined the UW Department of Food Science in 1986 and currently teaches courses in food process engineering, chemistry of food lipids, and phase transitions in foods. Additionally, he teaches portions of courses in food processing and food engineering. He also lectures on critical thinking and problem solving in a course on professional practices in food science.

Hartel has kept himself up-to-date on new teaching methods and styles during his years at UW-Madison, and has successfully implemented many new teaching practices in his classes. Dr. Hartel's style of teaching is interactive rather than just use of the lecture format. This brings an added depth to the learning process in his courses because students must apply skills taught in class to real food industry situations. Hartel's student evaluation results have always been outstanding, showing that his students are very enthusiastic about his courses and teaching style.

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Richard Hartel received the B.A. degree in physics from the State University of New York at Potsdam and M.S. (1976) and Ph.D. (1980) degrees in agricultural engineering from Colorado State University. His experience includes research chemical engineer at Eastman Kodak Company (1979-1983), research associate in the Department of Chemical Engineering at the University of Arizona (1983-1984), and research associate in the Departments of Chemical and Agricultural Engineering at Michigan State University (1984-1986). At the UW-Madison, Hartel is a professor of food engineering in the Department of Food Science. He holds a joint appointment in the Department of Biological Systems Engineering (formerly Agricultural Engineering).

The William V. Cruess Award for excellence in teaching food science and technology has been awarded by the IFT since 1970. The only other UW-Madison faculty member who received this award is Dr. Owen Fennema in 1978.

ROBERT LINDSAY CHOSEN TO RECEIVE STEPHEN S. CHANG AWARD

Professor Robert C. Lindsay, a UW-Madison food science faculty member since 1969, has been selected to receive the 1998 Stephen S. Chang Award at the annual meeting of the Institute of Food Technologists. Lindsay is receiving the award for his outstanding contributions to flavor science during the past 32 years. Professor Lindsay, a native of Colorado, received BS and MS degrees from Colorado State University. He received the PhD degree from Oregon State University where he was a faculty member until he came to the University of Wisconsin-Madison.

Dr. Lindsay's research has been concerned with flavors in dairy foods, seafoods and vegetables. His early work dealt with identifying and quantifying flavor compounds in cultured butter, sour cream and buttermilk. From here he moved on to study flavors in Italian varieties of cheese, mold ripened cheeses and low-fat and low-salt Cheddar cheese.

In other research, Lindsay defined the chemical and biochemical basis of fresh fish and seafood flavors. He has contributed substantially to development of technology for stabilizing flavors in frozen fish through barrier vacuum packaging. Professor Lindsay's research on vegetables has been concerned with volatile sulfur compounds in cabbage and with the flavor chemistry of fresh carrots.

The Stephen S. Chang Award for Lipid or Flavor Science has been awarded by the IFT since 1993. Dr. Lindsay is the first UW-Madison faculty member to be chosen for this award.

JOACHIM VON ELBE TO RECEIVE THE FORTY-NINER SERVICE AWARD

The Forty-Niners, Inc. is a service group comprised of members from several segments of the food processing industry. Annually the group chooses the recipient of its prestigious Forty-Niner Service Award. This year's recipient is Dr. Joachim H. von Elbe. The award recognizes von Elbe's many years of noteworthy service to the food processing industry, in particular the canning industry, the confectionery industry and the brewing industry.

Joachim, a native of Rostock, Germany, came to the U.S. in 1950. He received B.S. (1959), M.S. (1960) and Ph.D. (1964) degrees in Food Science at the University of Wisconsin-Madison. In 1964 he joined the faculty as assistant professor, was promoted to associate professor in 1968 and was named professor in 1973. In 1992, von Elbe was designated the Fritz Friday Professor of Vegetable Processing Research. From 1988 through June, 1998 he served as chairman of the Food Science Department.

von Elbe's research has been largely related to the chemistry of plant pigments and to vegetable processing. His research efforts have yielded nearly 100 papers published in 27 different domestic and foreign scientific and trade journals.

For many years von Elbe taught courses in regulatory and quality standards, quality control, and food processing (laboratory). As an extension specialist, Joachim organized, supervised and participated in short courses for the confectionery and brewing industries. He worked closely with celery growers, cherry growers and the canning industry to improve vegetable and fruit products.

It is noteworthy that the only other UW-Madison faculty member to receive this award was Dr. Kenneth G. Weckel in 1977. Weckel was Dr. von Elbe's major professor during his graduate studies.

In September, 1997, the National Confectioners Association honored von Elbe by recognizing his 35 years of contributions to the confectionery short course. In April, 1998 the Master Brewer's Association of the Americas also honored Joachim for his years of contributions to the brewing and malting short course and the brewery packaging short course.

NORMAN OLSON RECEIVED CHEESE INSTITUTE AWARD

Emeritus Professor Norman Olson, on January 12, 1998, received the Laureate Award, the highest honor given by the National Cheese Institute. Olson was honored for his contributions to the cheese industry through teaching and research as a faculty member in the Food Science Department since 1959. In 1976, Dr. Olson organized the Walter V. Price Cheese Research Institute and thereby obtained funds for an expanded departmental research program in cheese science and technology. A decade later, Professor Olson organized and became the first director of the UW Center for Dairy Research. As director, he was responsible for the center's management, establishment of research goals, research funding, evaluation of research proposals and awarding of grants, and acting as a liaison between the Center and the dairy industry.

Don Storhoff of Foremost Farms USA and chairman of the award selection committee said, "Norman's understanding of his field and his unique ability to transfer concepts in cheese technology to industrial uses has been an example to all who know him. He has made major contributions to our industry through his research and his writings."

NORM OLSON AND ELMER MARTH SELECTED FOR ADSA FELLOW AWARD

The American Dairy Science Association established the Fellow Award to recognize long-time (20 years or more) members for outstanding contributions to the dairy industry and/or the association. Currently, on the basis of association membership, six Fellows can be chosen in one year. Those selected for 1998 include emeritus professors Norman Olson and Elmer Marth.

Dr. Olson was recognized for his contributions to research (primarily on cheese), teaching (food fermentations, microbial physiology, and short courses) and service to the dairy industry. At the UW-Madison, Olson was a faculty member for 38 years; from 1979-1993 and from 1986-1993 he served as Director of the W.V. Price Cheese Research Institute and the Center for Dairy Research. From 1993-1997 Olson was designated a Wisconsin Distinguished Professor. He served the ADSA as vice-president, president and past-president and as a member of numerous committees. Currently he is the senior editor of the dairy foods section of the *Journal of Dairy Science*.

Dr. Marth was honored for his contributions to research (primarily on the safety of dairy foods), teaching (food fermentations, food sanitation, scientific writing, foodborne diseases and short courses) and service to the dairy industry. Marth's research on dairy foods safety dealt primarily with salmonellae, staphylococci, aflatoxin, *Escherichia coli*, and *Listeria monocytogenes*. During his 24 years as a faculty member, Dr. Marth served as major professor for 32 students who earned the M.S. degree and 32 students who received the Ph.D. degree. During his career, Marth served as author, co-author, editor or co-editor of over 650 scientific publications.

BRADLEY SWENSON RECEIVES CHARALAMBOUS AWARD

Bradley J. Swenson, a graduate student in Food Science, has been selected to receive the George Charalambous Graduate Fellowship in Food Chemistry. The award, consisting of an honorarium and plaque, is given by the Division of Agricultural and Food Chemistry of the American Chemical Society. The fellowship was established to honor Dr. George Charalambous, a long time supporter and active member of the Agriculture and Food Division until his death in 1994. The award recognizes the sort of excellence that Charalambous brought to the ACS division. Swenson is the first recipient of this newly established award. Dr. William Wendorff is serving as Swenson's major professor.

FOOD RESEARCH INSTITUTE TO RECEIVE NFPA FOOD SAFETY AWARD

The Food Research Institute (FRI), at the University of Wisconsin in Madison will be the first recipient of the National Food Processors Association's Food Safety Award.

"For more than 50 years, FRI has been involved in food safety research, first at the University of Chicago, and since 1966 at the University of Wisconsin," said Dr. Rhona Applebaum, NFPA's Executive Vice President of Scientific and Regulatory Affairs. "FRI's contribution to food safety research and training has been enormous. FRI not only is active in various training activities, but also has trained numerous pre-doctoral and post-doctoral students who have gone on to work in the field of food safety. And FRI is recognized internationally for its work on *Clostridium botulinum*, *Listeria monocytogenes*, *E. coli* O157:H7, mycotoxins, food allergens, and anticarcinogens."

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The NFPA Food Safety Award will be given annually to honor an individual, group, or organization for preeminence in and outstanding contributions to food safety. Nominees must have a minimum of 10 years of involvement in the food safety arena, with achievement measured by sustained contributions in research, education and information transfer, the development of innovative and effective strategies to promote food safety, or solutions to significant food safety problems.

The Award will be presented to FRI on August 19 in Nashville, Tennessee, at the annual meeting of the International Association of Milk, Food, and Environmental Sanitarians (IAMFES). IAMFES is the professional association whose mission is to advance food protection worldwide.

IRA BALDWIN RECEIVED CALS DISTINGUISHED SERVICE AWARD

On October 24, 1997 at the College's Honorary Recognition Banquet, the Distinguished Service Award was given to Dr. Ira Baldwin, the 102-year-old Emeritus Professor of Bacteriology. Baldwin, a native of Oxford, IN, came to the UW in 1925 as a graduate student and joined the faculty in 1927 after completing work for the Ph.D. degree.

Baldwin served as Chairman of the Bacteriology Department from 1941 to 1944, Dean of the Graduate School from 1944 to 1945, Dean of the College of Agriculture from 1945 to 1948, Vice-President of Academic Affairs from 1949 to 1959, and Special Assistant to the UW President from 1959 until his retirement in 1966. After retirement, he spent 5 years working on international agriculture programs.

Dr. Baldwin's scientific interests included general and soil microbiology, industrial fermentations, and microbial physiology. He and his wife, Ineva, live in Tucson, AZ. Baldwin returned to Madison for the awards banquet and for a brunch and reception held on October 25, 1997.

FACULTY ACTIVITIES

SRINIVASAN DAMODARAN spent a 6-month sabbatical period at a university in Japan doing protein research JAMES STEELE, this past April, attended a conference on lactic acid bacteria in France KIRK PARKIN was a visiting scholar at the Institut Pertanian Bogor during April 1997; he also visited the University Kehangsaan Malaysia and PORIM to nurture developing collaborative programs; Kirk was an external assessor at the Universiti Putra Malaysia and is secretary of the IFT Food Chemistry Division - he will be the chairman-elect in 1998-1999 and chairman in 1999-2000 OWEN FENNEMA spoke at conferences in Queretaro, Mexico; Buenos Aires, Argentina; Campinas, Brazil; and Karachi, Pakistan; at the annual meeting of the Australian Institute of Food Science and Technology, Perth and at meetings of regional sections of the Institute in Adelaide, Sydney and Brisbane; Owen was a visiting professor in the Department of Food Science, Victoria University, Melbourne, Australia; he also attended meetings of IUFOST officers in Buenos Aires and Zürich, Switzerland and served on the team that reviewed the TNO Nutrition and Food Research Institute, Zeist, The Netherlands; Fennema continues as treasurer of the IFT and as chairman of the Institute's finance committee; he is a member of the Food Advisory Committee of the FDA and is a member of the Expert Panel on Alternative and Traditional Models for Safety Evaluation of Food Ingredients which operates on an FDA contract with the Life Sciences Research Office of the American Association of Nutritional Sciences, Washington, D.C.

ARTHUR J. MAURER, 1942-1998

Dr. Arthur J. Maurer, professor of animal sciences and food science, was 55 years old when he died on January 10, 1998. Maurer was born on April 16, 1942 in Winfield, PA and grew up on his family's poultry farm. Art received the B.S. degree from Pennsylvania State University and the M.S. and Ph.D. degrees in food science from Cornell University.

Dr. Maurer joined the faculty of the Department of Poultry Science at UW-Madison in 1970. He also held an appointment in the Department of Food Science. At the time of his death, Art was assistant dean for International Agricultural Programs in the College of Agricultural and Life Sciences.

Maurer taught poultry products technology, a poultry science seminar, and lectured in some food science and animal sciences courses. Art's research focused on poultry products technology, including processing, preservation, quality, marketing and product development. He and his associates developed a variety of processed poultry products and also eggs with a reduced cholesterol content.

Art's interest in international agricultural took him to 14 countries in the Americas and Asia. He often taught specialized short courses in these countries. Dr. Maurer is survived by his wife, Ellen; a daughter, Minda; a son, Brent; his mother, Blanche; and three sisters, Dorothy, Linda and Anna. A memorial service was held on January 18, 1998 at the Orchard Ridge United Church of Christ in Madison.

JOHN H. NELSON, 1926-1997

Dr. John H. Nelson retired research program manager of the Food Research Institute, died in Madison on November 3, 1997. A native of Bozeman, Montana, John received the B.S. degree in dairy manufacturing from Montana State University in 1950. He then came to the University of Wisconsin-Madison and earned M.S. (1951) and Ph.D. (1953) degrees in dairy and food industries (now food science). After a year of postdoctoral research, in 1954 John joined Dairyland Food Laboratories, Inc. in Waukesha, WI as director of research. In time he was appointed a vice president.

Nelson joined Kraft Foods, Glenview, IL in 1977 as manager of regulatory compliance. He was promoted to corporate director of quality assurance and regulatory compliance in 1979 and in 1981 was named vice president-quality assurance and regulatory compliance. John retired from Kraft in 1987 and joined the Food Research Institute at the University of Wisconsin-Madison as research program manager. He retired from the University in 1993. In 1994, Nelson received the Laureate Award from the National Cheese Institute in recognition for his more than 30 years of service to the cheese industry.

John is survived by his wife, Marilyn; a son, John, of Rochester, NY; daughters, Janet (Libertyville, IL) and Margie (Chicago, IL) and two granddaughters. A memorial service for Dr. Nelson was held on November 7, 1997 at the First United Methodist Church in Madison.

C. ANTHON ERNSTROM, 1922-1998

Carl Anthon (Tony) Ernstrom was born on March 28, 1922 in Draper, Utah and died on January 13, 1998 in Logan, Utah from complications of leukemia. After completing work for B.S. and M.S. degrees at Utah State University, Ernstrom moved to the University of Wisconsin to earn the Ph.D. degree, which he received in 1956.

In 1953, while still doing graduate work, Ernstrom joined the faculty of the Department of Dairy and Food Industries (now Food Science) as an instructor to do extension work in dairy technology. In 1955 he moved to Milwaukee and the Chr. Hansen's Laboratory. Upon completion of work for the Ph.D. degree, Tony returned to UW-Madison as an assistant professor in the Department of Dairy and Food Industries. He worked in the area of dairy chemistry.

In 1965, Dr. Ernstrom left UW-Madison and moved back to Utah State University where he organized and became chairman of what is now the Department of Nutrition and Food Sciences. Upon retirement from Utah State University, Tony served as executive vice president of the National Dairy Promotion and Research Board until 1989. During his years with the NDPRB, Tony was instrumental in establishing its research program and also guided development of the six dairy research centers at various locations in the U.S. Upon leaving the NDPRB, Tony, always the entrepreneur, went into the dairy foods business with two of his sons.

Dr. Ernstrom served for 13 years as editor or associate editor of the *Journal of Dairy Science*. In 1984, he received the Kraft Teaching Award from the American Dairy Science Association and also the William V. Cruess Award (for excellence in teaching food science and technology) from the Institute of Food Technologists. The Governor's Medal for Science and Technology from the State of Utah was bestowed on Ernstrom in 1996. The building housing the Department of Nutrition and Food Sciences was built largely through Ernstrom's efforts in marshalling industrial and state support. In 1992, the building was named "The C. Anton Ernstrom Nutrition and Food Sciences Building."

Tony is survived by his wife, Maurine; four children, Brian, Reed, Jean and Maren; a sister, Helen Howell; a brother, Wayne; and several grandchildren.

BOOKS FOR YOUR LIBRARY

Applied Dairy Microbiology, edited by Elmer Marth and James Steele, was published earlier this year by Marcel Dekker, Inc., 270 Madison Ave., New York, NY 10016. This is the first book on dairy microbiology published in the U.S. in 40 years. UW-Madison authors who contributed chapters to the book include J. Russell Bishop (Food Science), Mark Johnson (Center for Dairy Research), James Steele (Food Science), Paul Weimer (U.S. Dairy Forage Center/Bacteriology), and William Wendorff (Food

Science). Food Science Alumni at other institutions also contributed chapters: Joseph Frank (University of Georgia), Jeffrey Kornacki (Silliker Laboratories of Wisconsin) and Elliot Ryser (University of Vermont - now at Michigan State University).

Contents of the book are: 1. Microbiology of the dairy animal, 2. Raw milk and fluid milk products, 3. Concentrated and dry milks and wheys, 4. Ice cream and frozen yogurt, 5. Butter and related products, 6. Starter cultures and their use, 7. Genetics and metabolism of starter cultures, 8. Fermented milks and probiotics, 9. Cheese products, 10. Fermented by-products, 11. Public health concerns, 12. Control of microorganisms in dairy processing, 13. Testing milk and milk products, and 14. Treatment of dairy wastes.

Dairy Foods Safety: 1995-1996 has been compiled and edited by Elmer Marth and published this year by Food and Nutrition Press, P.O.B. 374, Trumbull, CT 06611. The 710-page book contains edited summaries and complete literature citations of over 1300 articles gleaned from the world's scientific journals.

Contents of the book include: 1. Highlights of the summaries, 2. *Aeromonas hydrophila* (30 abstracts), 3. Aflatoxin / cyclopiazonic acid/fumonisin (73), 4. *Bacillus cereus* (34), 5. *Borrelia burgdorferi* (13), 6. Bovine spongiform encephalopathy and Creutzfeldt-Jakob disease (59), 7. (42), 8. *Campylobacter jejuni* (62), 9. *Clostridium botulinum* (29), 10. *Coxiella burnetii* and Q-fever (31), 11. *Escherichia coli* (210), 12. *Helicobacter pylori* (102), 13. *Listeria monocytogenes* (268), 14. *Mycobacterium paratuberculosis* (25), 15. *Mycobacterium/tuberculosis* (63), 16. Salmonellae (128), 17. *Staphylococcus aureus* (83), 18. Streptococci (39), and 19.

Yersinia enterocolitica (48).

The second edition of *Listeria, Listeriosis and Food Safety* is edited by Elliot Ryser and Elmer Marth and will be published in a few months by Marcel Dekker, Inc., 270 Madison Ave., New York, NY 10016. Food Science alumni who contributed chapters to this book include Elliot Ryser, Ahmed Yousef (Ohio State University) and Robert Brackett (University of Georgia).

Contents of the book include: 1. *Listeria monocytogenes*: Characteristics and classification, 2. Occurrence and survival of *Listeria monocytogenes* in natural environments, 3. Listeriosis in animals, 4. Listeriosis in humans, 5. Pathogenesis of *Listeria monocytogenes*, 6. Characteristics of *Listeria monocytogenes* important to food processors, 7. Conventional methods to detect and isolate *Listeria monocytogenes* in food and environmental samples, 9. Typing strains of *Listeria monocytogenes*, 10. Foodborne listeriosis, 11. Incidence and behavior of *Listeria monocytogenes* in unfermented dairy products, 12. Incidence and behavior of *Listeria monocytogenes* in cheese and other fermented dairy products, 13. Incidence and behavior of *Listeria monocytogenes* in meat products, 14. Incidence and behavior of *Listeria monocytogenes* in poultry and egg products, 15. Incidence and behavior of *Listeria monocytogenes* in fish and seafood, 16. Incidence and behavior of *Listeria monocytogenes* in products of plant origin, and 17. Incidence and control of *Listeria* in food-processing facilities.

NEWS FROM THE CENTER FOR DAIRY RESEARCH

Safety/Quality Program

Marianne Smukowski, Program Coordinator, was a presenter at the Milk Company and Regulatory Quality Assurance Assignment, March 14 - 27, 1998 in Vilnius, Lithuania. Background: Restoration of Lithuania independent farming has been accompanied by abrupt dissolution of the former Soviet-styled production structures. A restitution program combined with dispersal of collective and state dairy farm assets, including dairy cows, has created over 104,000 micro farms with an average of 8 to 10 hectares of land and 3 cows per farm.

The goal of this technical assistance assignment is to provide practical education to milk processing company personnel, inspection agency staff and food industry regulators in the procedures of developing and applying HACCP plans. Lithuania intends to modify its food processing regulatory requirements to achieve compatibility with international standards. This transformation will necessitate the application of HACCP plans in each plant that will be exporting to foreign customers. Ultimately, all plants producing for both domestic and international markets should be required to develop and comply with HACCP plans. Marianne's week long presentations included good manufacturing practices in addition to HACCP principles.

Kristin Houck and Marianne Smukowski worked with Steve Ingham in developing the "Introduction to Dairy Microbiology" short course. The course was offered April 8-9, 1998. A publication, "Potential Uses of Microbiological Testing in Cheese Plant HACCP and Quality Assurance Systems," by Steven Ingham, Ann Larson, Marianne Smukowski, Kristin Houck, Eric Johnson, Mark Johnson and Rusty Bishop was published in *Dairy, Food and Environmental Sanitation*, December 1997.

Whey Applications Program

Kimberlee J. Burrington, Program Coordinator, presented at the first Cal - Poly Whey Concentrate and Dry Milk Symposium in April, 1998. A publication, "More Than Just Milk," by . Burrington appeared in *Food Product Design*,

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January 1998. Assistant Researcher Karen Smith has joined CDR to work in the Whey Applications Program.

Cheese Program

Poster sessions presented at the American Dairy Science Association Meeting, Guelph, Ontario include: (a) "Influence of Methocel on the Physical Characteristics of Frozen-thawed Mozzarella," by Amy Dikkeboom, Carol Chen, Kristen Houck, John Jaeggi and Mark Johnson; (b) "Manufacturing Lower Fat Mozzarella Cheese by Adding Milk Coagulant at Different pH Values," by Carol Chen, John Jaeggi and Mark Johnson; (c) "Influence of Starter Cultures on Cheddar Cheese Flavor Development," by J.L. Steele and Mark Johnson with researchers from the Western Dairy Center, Utah State University, Logan; and (d) "Improving Cheddar Cheese Flavor with the Addition of Brevibacteria," by researchers from the Western Dairy Center, Utah State University, Logan, Mark Johnson and J. L. Steele.

Mark Johnson will present "Manufacture and Flavor Development of Gouda and Reduced-Fat Cheeses" at Cheese Science '98, an international conference on Cheese Science and Technology. The conference will be held at the University of Melbourne, Victoria, Australia, July 1 - 3, 1998.

Milkfat Program

Kerry Kaylegian, Program Coordinator, presented: (a) "The Use of Milkfat Fractions in Bakery Products," at IBC's Fat and Cholesterol Reduced Foods Conference, Orlando, FL; (b) "The Use of Milkfat Fractions in Chocolates," at the Pennsylvania Manufacturing Confectioner's Association Annual Meeting, Hershey, PA; (c) "Manufacture of Specialty Milkfat Ingredients," at the American Dairy Science Association meeting, Guelph, Ontario and Kansas State University, Manhattan, KS; (d) "Dairy Ingredients in Chocolate," at the Chocolate Confectionery Short Course, AIB/Leatherhead, Manhattan, KS; (e) "Milkfat and Milkfat Fractions in Chocolate," at the M&M/Mars Research Meeting, Chicago, IL; (f) "Milkfat Applications Laboratory," at the DMI National Milkfat Technology Forum, Rosemont, IL; and (g) at the UW "Milkfat as a Food Ingredient" short course.

A publication "Milkfat Fractions" appeared in *Chocolate, Manufacturing Confectioner*, May 1997 and the program was mentioned in *Food Technology*, February 1998, cover story on "Milkfat Fractionation" by B.G. German.

NEWS FROM THE AQUACULTURE PROGRAM

Yellow perch aquaculture, one of the Aquaculture Program's main research interests, has become a top priority among fish producers over the last few years as evidenced by the numerous state, national and international meetings that have centered on this popular Wisconsin fish. First, in May of 1997, Jeff Malison attended and moderated a yellow perch culture workshop in Martinique, West Indies; a meeting sponsored by the European Aquaculture Society. Then, in October, the Aquaculture Program sponsored a meeting for producers of yellow perch at our laboratory at the Lake Mills State Fish Hatchery. This meeting was attended by yellow perch growers from throughout the midwest. Next, in February a day-long yellow perch workshop was held at the 1998 Annual Meeting of the World Aquaculture Society in Las Vegas, NV. This 5-day meeting was attended by over 4,000 persons, and the perch workshop was one of the most popular sessions. Finally, this past March, yellow perch was the focus of several presentations and a 2-hour workshop held at the 1998 Wisconsin Aquaculture Conference in Eau Claire. Twenty-three producers and over 100 interested parties attended the perch workshop.

Speaking about the Wisconsin Aquaculture Conference, the 1998 meeting was Wisconsin's fifth consecutive annual state meeting and the most successful to date. The conference was cosponsored by the Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP), Wisconsin Aquaculture Association, Wisconsin Aquaculture Industry Advisory Council, and the University of Wisconsin Sea Grant Institute. Noted speakers included Governor Tommy Thompson, State Senator Dale Schultz, US Congressman David Obey, Department of Natural Resources (DNR) Secretary George Meyer, and DATCP Secretary Ben Brancel. In addition to yellow perch, conference topics included the recently passed Wisconsin aquaculture legislation that transferred some of the regulatory oversight of private fish hatcheries from DNR to DATCP, fish nutrition and health, pond design and management, walleye culture, animal damage control, bait culture, fee fishing and alternative production systems.

The construction of research ponds for our Program at the Lake Mills State Fish Hatchery, a project begun last autumn and being conducted by the US Army 961st Engineering (Heavy Combat) Battalion, has been progressing

Continued on Page 17

slower than expected primarily because of weather-related delays. We are still hopeful, however, that the project will be completed by this November.

Doctoral student Eric Vandeloise from the Freshwater Ecology program at Notre-Dame University in Namur, Belgium is visiting our program for one month. He is studying the effects of the gonadal steroid, 11-ketotestosterone, on the stress response in salmonids. Also, post-doctoral researcher Mary Ann Garcia-Abiado ended her tenure with our program in October 1997, and has assumed another post-doctoral position in Columbus, Ohio.

NEWS FROM FOOD RESEARCH INSTITUTE

FRI Annual Meeting

On May 13-14, 1997, scientists from FRI, the food industry, and government gathered at the Wisconsin Center to discuss issues of food safety. Among the hot topics were *Escherichia coli* O157:H7 and the present and potential uses of biotechnology. Risk assessment for food safety, government regulations, and current food safety concerns in Europe were also reviewed and updates on conjugated linoleic acid, biofilms, *Clostridium botulinum*, mycotoxin synthesis, and caloric restriction were presented. Topics related to food safety were discussed at a roundtable and other recent data were presented at a poster session.

Conjugated Linoleic Acid (CLA) Forum

On August 13-14, 1997, a scientific forum was convened in Madison to discuss the latest research on the physiological effects of CLA and its mechanisms of action. Evidence was presented for CLA's anticarcinogenic and antiatherogenic properties as well as for its positive effects on fat partitioning and bone metabolism. Experiments designed to increase the CLA content of foods and analytical methods were also described.

Bovine Spongiform Encephalopathy (BSE) Forum

On September 9, 1997, a forum was held to discuss the BSE epidemic and its implications for the U. S. UW researchers reviewed the BSE epidemic in the U. K. and the nature of the disease and described ongoing research on related diseases at the UW and repercussions for farmers. Important points related to effective risk communication were illustrated with reference to government responses to the crisis. Concerns of the dairy, beef, gelatin, and rendering industries were presented and USDA representatives discussed government plans to prevent or respond to a possible outbreak of BSE in the U.S.

Research

In addition to the research conducted by Profs. Chu and Luchansky (reported elsewhere in this newsletter), other areas of active research interest by FRI faculty include: (1) immunological methods to detect two peanut allergens (Dr. Bush); (2) botulinum toxins (Dr. DasGupta); (3) botulism and use of probiotics and phosphate salts to inhibit clostridia and acids from hops to limit growth of foodborne pathogens (Dr. Johnson); (4) *E. coli* O57:H7 - its dissemination in Wisconsin dairy herds and its tolerance to acids in foods; response to stress by *Campylobacter* (Dr. Kaspar); (5) anticarcinogens in foods (Dr. Pariza); and (6) biofilms and hemolysins (Dr. Wong).

Awards

Dr. Amy Wong was presented with the Pound Research Award for excellence in research. Dr. Eric Johnson assumed the chairmanship of the Division of Food Microbiology for the American Society for Microbiology in June, 1997.

J.H. von Elbe Recognition

Reception / Dinner

If you would like an invitation to the retirement festivities on July 24, please contact Barbara Kamp (608) 263-6388 or bakamp@facstaff.wisc.edu. or FAX (608) 262-6872

Endowment

In honor of Joe's retirement, the von Elbe Food Science Endowment has been established with the UW Foundation. This fund has been created to recognize Joe's decades of outstanding research, teaching and service to the faculty, staff and students within the department and also within the food industry throughout the country.

Earnings from the endowment will be used to support the most critical needs of the Department including student scholarships and study grants, high school teacher workshops, graduate student awards, faculty instructional awards, industry short courses and outreach activities for the department. Gifts to this fund in Joe's honor, regardless of size, send a clear message of the deep respect and friendship we have for Joe and will be deeply appreciated.

For more information regarding the fund, contact Marcy Heim at (608) 263-6669, or to make a contribution, fill out the form below and mail it directly to UWF-von Elbe Endowment, University of Wisconsin-Foundation, 1845 University Ave., PO Box 8860, Madison, WI 53708-8860.

I/We wish to join other faculty, students, alumni, staff, corporations and friends in recognizing the contributions of Joe von Elbe to the Department of Food Science

_____ I/We wish to make a single gift at this time. Enclosed is my/our contribution of \$ _____

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Name _____

Home Address _____

Employer and address _____

Degree(s) earned at U.W. and year(s) _____

Information for future Newsletter _____

Return questionnaire to:

Dr. Elmer H. Marth, Department of Food Science
University of Wisconsin, 1605 Linden Drive
Madison, WI 53706

MISSING

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Al-Shaikhli, Jawdat
Al-Rubaie, Nasir
Aschbacher, Thomas
Batz, John and Sandra
Bauman, David
Bennett, Miles
Black, Maureen
Buazzi, Mahmoud
Buyens, Harold
Chang, Pei Kung
Christianson, Bob
Christopherson, Tracy
Cushman, Robert
D'souza, Stanley
Fan, Warren
Ferrier, Les

Finol, Maria
Gruetzmacher, Jean
Hallstrom, Bengt
Hefty, Richard
Hekmati, Majid
Horn, Kathleen
Huh, Hyung Tack
Huth, Laura
Kielsmeier, Elwood
Kim, Myung Ki
Kinyungu, Matheka
Kloser, Paul
Lameka, Ann
Malik, Ashok
Muljadi, Anton
Nuss, Elsa
Payne, R. Edward

Redman, Herbert
Rehfeld, Betty
Reich, Margaret
Ruck, John
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