

MAG
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update

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AN AMERICAN FAMILY

presidential press coverage

do you know what's in the food you're eating? (do you care?)

is hollywood drying up?

PROTEINS *nobels*

crop dusters and horsepersons

basketballs WINKS

RESEARCH

sleeping sickness along the mississippi

APPLES airplanes

minnesota prairie chickens

crunch: the sound and the fury

the history of an american family

by Peggy Ness

"Haw, gee, come along," called Andrew Saglie, urging the weary oxen, Frank and Brown, forward. Straining, they moved the covered wagon ahead. It was the last leg of a long journey.

Fording a stream and plodding on, they came to rest on a hill overlooking a lake to the south. Overhead, the honking of geese and cranes circling high in the sky sounded like bugle calls. Swans glided on the lake below. To the east stretched verdant prairie with its luxurious red-tipped grasses, wild flowers, and abundant wildlife.

The year was 1868. Andrew and his wife Anne, her parents Kristian and Bergitte, and children Edward, Anna Margrethe, and Christian had reached their homestead a year after boarding ship in Trondheim, Norway, in search of a better life.

From the hilltop they saw the best of both countries. The land across the hills and valleys toward the water was not unlike the fjords of their native Norway, and to the east the fertile prairie offered promise of good farming.

Here, on 160 acres some seven miles west of Glenwood in Pope County, they would homestead. A statement of entry was made in Glenwood at a cost of \$2.50, and the homestead papers were filed for \$16. Government land was \$2.50 per acre.

In the hillside, near a spring-fed rivulet, the Saglie family made a



Andrew and Anne Saglie



The Jorgen Strandness Family

dugout that provided living quarters until 1869, when a more permanent dwelling was built.

With the help of a neighbor, Andrew turned three acres of virgin soil the first year, using a 14-inch plow pulled by oxen. The following year the land was seeded to wheat and an additional seven acres were turned. Harvesting was done by hand with a four-fingered grain cradle. The settlers tied the grain into bundles after cutting.

Thus began a farm that would remain the property of a single family for more than 100 years. Its story is a chapter in the history of the settlement of west-central Minnesota, drawn from the writings of members of the family who lived on it and clarified by the research of University of Minnesota-Morris (UMM) students Robert Leaverton and Rodney Munsterman for the UMM Historical Research course. It is preserved as part of the heritage of Minnesota through the archives of the West Central Minnesota Historical Research Center at UMM.

An area of the farm still known as Indian Hill was a campsite for Chippewa in the spring of 1869 and 1870. The Chippewa came from reservations in northern Minnesota to hunt and trap when the ice was breaking up in lakes and sloughs. Using their canoes tipped on the side for a windbreak, they camped on the side of the hill near a slough.

Christian Saglie, then a boy of 8, remembered the Chippewa braves coming to the dugout where the family lived in search of shelter from the cold. His mother offered fresh-baked

bread, as well as what comfort the dugout could provide.

The settlers suffered the cold of winter and mean conditions, but perhaps the strangest phenomenon confronting them occurred during 1876. One Sunday morning, grasshoppers came from the north like a snowstorm and stayed for three weeks, until the wind turned to the north. Then the insects disappeared in huge clouds as suddenly as they had arrived. The effect on crops was devastating both in 1876 and in 1877, for the 'hoppers had laid eggs and were even more numerous the second year.

In 1879, Anna Saglie married Jorgen Strandness, also a Norwegian immigrant, who had established himself as a builder and contractor in nearby Morris. Shortly after their marriage, the couple bought the family farm from Anna's parents.

As more acreage was tilled a greater variety of crops were grown. Over the years, oats, barley, corn, flax, soybeans, alfalfa, clover, timothy, and occasionally buckwheat, as well as vegetables, apples, grapes, and a trial run of compass cherries, have been grown on the farm.

In 1898, Jorgen Strandness purchased a tract of prairie land from William Carson for \$400. The land, which adjoined the farm on the east, would provide a source of hay for his horses and other livestock.

This virgin prairie land was a source of enjoyment for the family as well as a source of fodder for the animals. It was a prairie chicken booming ground (see p. 6) and the home of numerous other birds, including eagles, hummingbirds, bluebirds, king birds, partridges, pelicans, brants, bitterns, and loons. Among the other animals that inhabited it were elk, deer, bears, wolves, foxes, otters, lynx, chipmunks, and ground squirrels. Buffaloes that had roamed the area were gone before the white settlers arrived in Pope County.

morris

Wild violets, pink daisies, goldenrod, prairie lilies, roses, crocuses, and milkweed adorned the land. In addition, there was an abundance of fish and fowl in the waterways, including pickerel, bass, sunfish, and pike coming up "Trappers Run" from Lakes Pelican and Minnewaska.

Itinerant bands of gypsies liked the prairie, too, and a site near the west edge of the property was a favorite camping ground as they traveled throughout the country with horses and wagons around the turn of the century.

Farm life also had its hardships for the Strandness family, however. Anna brought 10 children into the world, but three died in infancy and a fourth died in her early teens.

Jorgen died in 1934, a year in which drought struck. The lake dried up completely. The leaves of the oaks on the homestead withered and the trees were feared dead. The hay on the prairie was shorter than usual, but it was not destroyed. Then on July 5, 1935, a deluge filled the lake overnight. With the moisture, the oaks revived and the prairie again flourished.

Anna died in 1945 after a lingering illness. Today, the Strandness farm is still owned by her son and daughter.

The prairie, which has remained essentially in a virgin state, was given to The Nature Conservancy in 1971 by Elisabeth Strandness, daughter of Jorgen and Anna and granddaughter of Andrew Saglie, on the condition that the land be forever held as a nature preserve. It remains a living museum, providing a sanctuary for plant and animal species unable to cope with man-made changes on the land.



Anna Margrethe Saglie Strandness

R. SCHOLES



do bad proteins cause schizophrenia?

An abnormal protein has been discovered in the brains of patients with schizophrenia and associated mental disorders by researchers at the University of Minnesota and the Medical College of Ohio.

The researchers—Gary D. Miner, Leonard Heston, and William Rush of Minneapolis and Stephen Mayor of Toledo—stress that further work is needed to determine whether the protein plays a role in causing schizophrenia or is caused by the disorder.



does education make our brains denser?

A physical evidence of the abstract process of learning has been tentatively identified by a graduate student in the Department of Anatomy at the University.

Richard Altschuler found that rats living in a stimulating environment in his laboratory showed almost a doubling in the density of the connections between neurons in an area of the brain (the hippocampus) associated with memory.

One group of rats was housed in a special "learning-enriched environment" — a large two-level cage

may we please have half your attention?

Thank you. Now, would you please glance at the front page? Does the label say "TO THE PARENTS OF _____"? If it doesn't, read no further. If it does, this message is for you alone.

First of all, we don't like sending you **Update** care of "TO THE PARENTS OF _____." We would prefer to address it directly to you, in your own name.

Secondly, if you are on the "parents" mailing list, we have no way of sending you **Update** after your son, daughter, or ward leaves the University. With our next issue, we will begin using a more "permanent" mailing list that includes only those parents who have requested to be on it.

So this is our offer: If you wish to receive future issues of **Update** (still free of charge, of course), please fill out this coupon. Mail it to **Update**, S-68 Morrill Hall, 100 Church St. S.E., University of Minnesota, Minneapolis, MN 55455.

I have been receiving **Update** as the parent of a student. I would like to continue receiving it, addressed as follows:

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"The term *schizophrenia*," their report states, "may actually be a 'catch-all' for several disorders having distinctly different causes but similar clinical symptoms—just as a fever can be due to many causes."

If there is a direct relationship and if the protein can be detected more readily through such measures as blood or urine tests, the potential exists for early diagnosis, treatment, or prevention of schizophrenia.

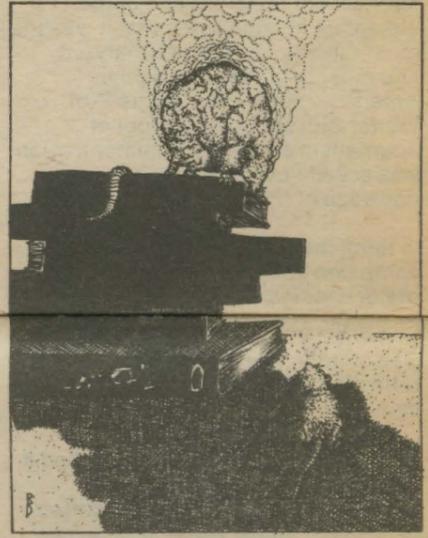
former faculty members visit stockholm

Two former Minnesota faculty members received Nobel Prizes last fall. If the University were keeping score, these two would bring the total University-associated Nobel Prizes to 11.

This year's chemistry prize went to William Nunn Lipscomb, now of Harvard University, for his research into substances called boranes. Boranes, or boron hydrides, are compounds of the element boron with hydrogen. His discovery of the peculiar way in which borane molecules hold together has led to an understanding of how brand new chemicals may be built.

The literature prize, of course, went to Saul Bellow, novelist. Some of his best-selling titles: *The Adventures of Augie March*, *Herzog*, and *Mr. Sammler's Planet*.

Lipscomb was a member of the University's chemistry department from 1946 to 1959. Bellow taught at the University for several years in the 1940s and '50s.



containing a maze, a swing, mirrors with bells, an exercise wheel, and other devices. A second group of rats was kept in a normal laboratory cage without extra learning opportunities.

After 80 days, brain tissue from both groups was examined. High magnification indicated that the "increased-learning" group had a synaptic density of 1.97 percent compared to the 1.04 percent for the control group.

who is this man? (the answer is blowing in . . .)



R. ZIMMERMAN

mystery alum #2

As we have tried to make clear before in these pages, the University is faced with the problem of locating its former students. Many thousands, like the anonymous ex-student above, attended for a quarter or so and then went on to other things. Many thousands more went on to graduate from the University.

The problem is that we don't know what happened to everybody. The University has about 140,000 names and addresses of its alumni, but there are a half million or so others who have vanished into thin air. Either that or they moved without telling us where to.

If you can identify the alumnus above, or better yet, if you have any alumni friends who have wandered from the fold, please tell us their names and new addresses. When we're all together again, we'll look back at this and laugh.

Missing alumnus or alumna:

Name

Street or Box

Community and Zip

Years Attended

election recollections

lousy campaign reporting? blame it on the lousy campaign . . .

text by Michael Finley

As Jimmy Carter takes office this month, memories of the election itself are getting fewer and vaguer.

Members of the press and of the electorate at large agree that it was the most talked-about, most analyzed, and most debated campaign in American history. Associate Prof. Walter Brovald of the School of Journalism and Mass Communication was asked how he sized up press coverage of the campaign.

"I think the press covered the campaign about as well as the two major candidates permitted it to be covered," Brovald said. "To the extent that press coverage of the campaign was of poor quality, it was only a reflection of the poor quality of the campaign itself."

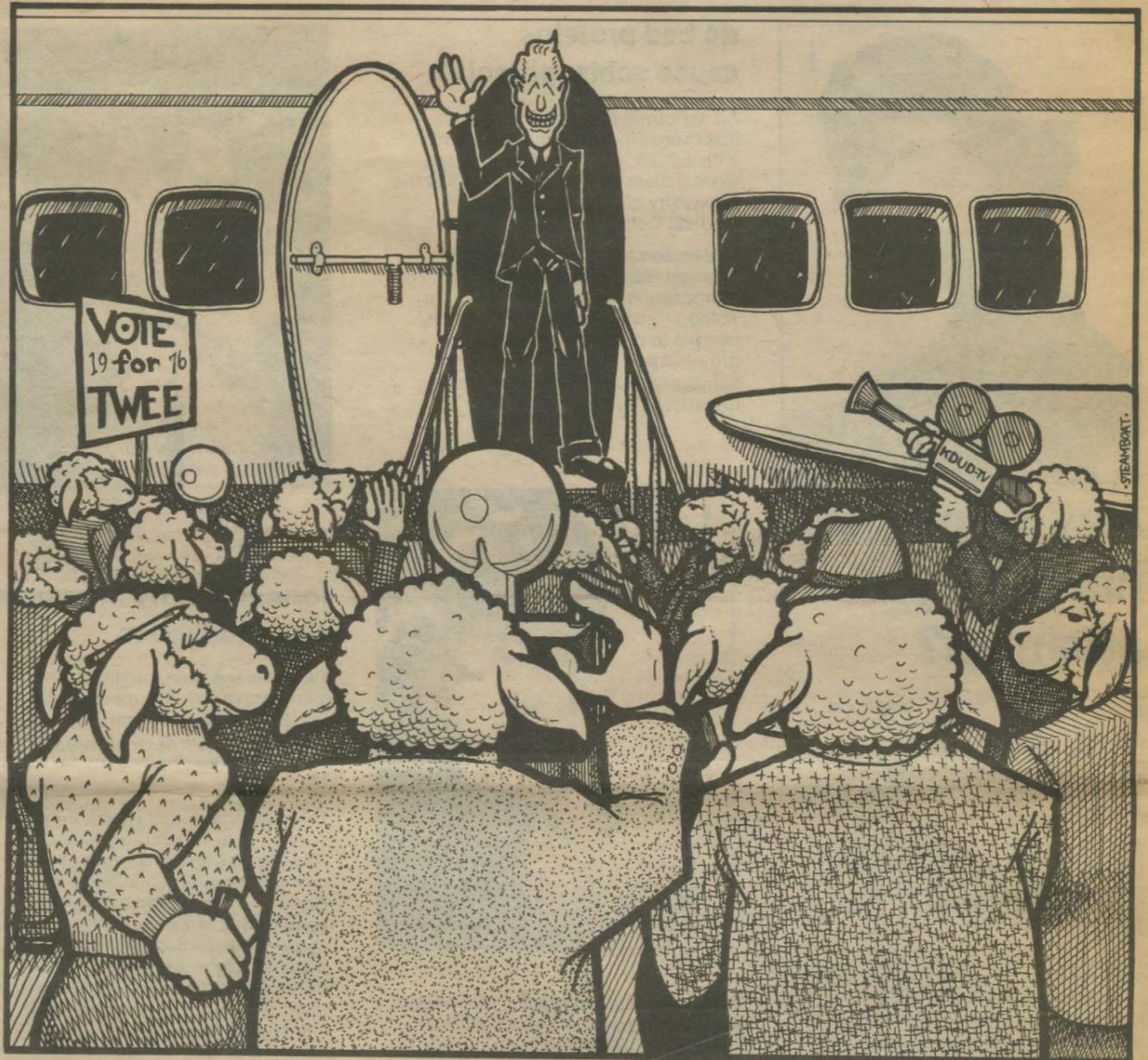
According to Brovald, the press had a tendency to "magnify small, nit-picking errors, faults, and gaffes" of the candidates, a phenomenon he attributed to "pack" journalism. "When you're a reporter and you hear the same clichés at every campaign stop, after a while all you think you can do is wait for a misstatement of some sort."

Brovald remembers traveling with the Nixon campaign in 1960 through Wisconsin. Even at that point, he recalls, the press was antagonistic toward Nixon, and Nixon toward the press. In the midst of all that dislike, human nature prevailed from time to time over news judgment, and the reporters' feelings showed up in print.

Brovald noted that after the most recent election, Ford visited with reporters, while Carter people listed their complaints about press coverage of their candidate. As with Nixon, reporters following Carter had developed a dislike for the man.

How much do such factors affect campaign reporting? "It's a matter of professionalism," Brovald said. "I wish it were something that was teachable, but it isn't. You can teach somebody to be a good adversary reporter, but it's harder to teach somebody to cope with routine stresses."

"It lasts long after elections, too. Reporters have to watch what they do. They run the risk of getting too confrontive with a candidate and getting shut off, or of getting too cozy with a candidate and thus becoming unreliable. The line you walk between your sources is a narrow one."



STEAMBOAT

What about Watergate? Did the involvement of the press in at first ignoring an election scandal and later uncovering it play a major part in coverage of this election?

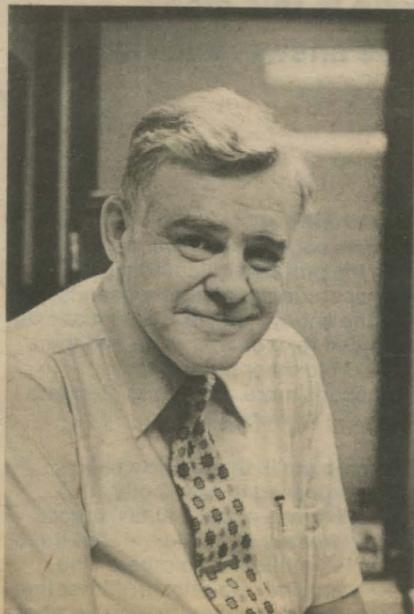
"No, I didn't detect any particular tendency on the part of reporters to view the campaign with a Watergate eye," Brovald said. "Ford tried to run a Nixon-like campaign from the Rose

Garden, so the issue of accessibility was raised. One thing the press did like about Carter was his accessibility. Only later did Carter—wisely, I think—pull back from that to avoid errors.

"Woodward and Bernstein were right. There's not a big change of attitudes in the press. When Bernstein was in town recently, in fact, he said that the

journalistic enterprise doesn't function a bit better today than it did before Watergate."

Brovald wishes that a way could be found to give the Eugene McCarthys of American politics a bigger role in elections. He wishes that the idea of a campaign being a marketplace for discussion of ideas could take hold and that the debates could have been



Walt Brovald



Arnold Ismach



Phillip Tichenor

TOM FOLEY

kept more under control by the questioners.

But not all of his criticisms are negative: "Television and the papers did a great job in getting the basic facts of the primary and final campaigns to the people. No one has the right to feel short-changed by the media in the area of basic coverage. It was a long campaign, but we heard all about it."

maybe the boys on the bus should stay home?

Many people have complained in recent months about press coverage of presidential elections, but University journalism instructor Arnold Ismach has ideas about how to improve it. He thinks reporters should stop following the major candidates around the country.

"The problem with campaign coverage is that reporters get into a very reactive frame of mind" he said. "If the candidates do or say something, you report it. If they don't do anything, you don't think you have anything to report. I think there are other ways to do it."

For instance, Ismach said, this time an issue raised by both candidates was trust, yet relatively few attempts were made over the long period of coverage to report on the actual characters of the two men. "There were exceptions, of course. The news magazines did pretty well in this regard, as did the major dailies in Washington, New York, and a few other cities."

Ismach thinks reporters should not follow the candidates around on their campaign travels. "The only reason the candidates do it is for media coverage, and the only reason reporters go along is because that's where the candidates are," he said.

"The coverage that comes out of this, especially television coverage, is shallow, without substance, canned, and contrived: the candidate waiting by the plant gates, the candidate going down to the local polluted water and kneeling by the bank. Speech coverage is probably the worst way you can possibly get information to the public. Press conferences are the next worst."

Local reporters can handle visits by candidates, Ismach said, leaving wire service, television, and radio newspeople free to do more issue-oriented coverage.

Ismach added that he wasn't surprised that so many people in the country waited until the last hours of the two-year campaign to make up their minds. He thinks it's because in all that time, people didn't think they got the information they needed to make an intelligent decision.

People living in small towns, he said, often don't get a lot of national coverage in their newspapers. What coverage they did see this year was bogged down with distractions about ethnic slurs, opinions on immorality, and emotional secondary issues.

"One healthy sign I noticed," Ismach said, "is that journalism is taking a long, hard look at itself. Charles Seib, a columnist for the *Washington Post*, wrote 'Gee, we did a lousy job this year,' and the next day James Reston of the *New York Times* responded with 'No, that's not true; we did a great job.'"

For years, Ismach said, journalists sneered at their critics, with the attitude of "Hell, they don't have to meet deadlines." Now, he said, "we're better educated, and not so resentful of intellectual endeavor."

If Ismach feels any disappointment about the campaign, however, it's that the press didn't quite fulfill its post-Watergate promises. "After 1972, the press beat its breast, saying 'Well, we sure booted it this time.' We all read Timothy Crouse's *The Boys on the Bus* and made up our minds that we'd not get into trivia the next time around, that we'd not be manipulated by media events, that we'd not make the election of our leaders into a kind of horse race. We see now what came of all that."

is balanced press coverage really balanced?

To Phillip Tichenor, the most striking thing about press coverage of the 1976 presidential election was the question of balance.

"All through the campaign," said Tichenor, professor of journalism at the University, "editors were very scrupulous about seeing to it that the two candidates were treated equally. The problem was that their idea of balanced coverage was a balance of column inches, not of substance. I think this decision to give the two candidates the exact same amount of coverage had something to do with Carter's lead dissolving the way it did in late summer."

Not that Tichenor believes in a conspiracy on the part of the press. "It's just that the press has a habit of giving tit for tat. If Carter gets himself in trouble over the tax issue with his misstatements, then there is the increasing likelihood that the press will make something out of Ford's remarks on Eastern Europe."

According to Tichenor, the press uses identical reportorial criteria for both major candidates in "balanced" coverage. If Candidate A is judged by the press according to a certain set of criteria, then if Candidate B gets into an even remotely similar situation, he will find those same criteria applied to him.

The concept of balance reached surrealistic extremes during the debate negotiations, when Carter's advance person asked that Ford's lectern be recessed so that Ford's height would not give him an unfair advantage over Carter. Ford's advance person asked in turn that the water glasses be placed in recessed areas to compensate for any possible coordination advantage Carter might have.

"A lot has been said about those debates," Tichenor said, and because they involved press participation, he has his own theory about their importance.

"The debates did a lot to make clear certain of the candidates' personal qualities as well as their stands on the issues. And while Ford didn't emerge as the winner of the three debates, I think he profited the most from them."

"Before the debates, he was widely perceived to be the inferior candidate—bumbling, nonverbal, and slow to react. Compared to the brighter, wittier, and more verbal Carter, Ford was expected to fare badly. But he didn't. He proved that he could hold his own with Carter, and Carter's lead shrank accordingly."

Tichenor is still puzzled by certain aspects of the relationship between politicians, the press, and the general public. He cited a study conducted in Charleston, S.C., in which researchers combed the daily papers, ranking the 10 issues receiving the most coverage. Then the researchers polled people in Charleston on the issues that mattered most to them. The correlation was almost perfect.

It's understandable to Tichenor why the public regards what the press prints as important. But how does the press decide what's important in the first place?

Another question Tichenor is concerned about is election and pre-election analysis. "I'm sure if we did a poll on it, we'd find that, yes, nearly everyone thinks it was overdone. On the other hand, though, nobody has accused any of the election analysts or pollsters of outright fraud. In 1968, George Wallace made quite a stir when he called polls the tools of the establishment."

What we ought to bear in mind, Tichenor said, is that polls, like reporters, have to be pretty accurate in order to stay in the game. No one wants to look ridiculous tomorrow for what is printed or said today. This time, there were no excruciating retractions like Jack Anderson's apology to vice presidential nominee Thomas Eagleton in 1972.

j-school receives \$2 million cowles gift

Speaking of journalism, it was that University school that was the recipient last October of one of the largest gifts by an individual in the history of the University of Minnesota.

A \$2 million gift from John Cowles, retired chairman of the Minneapolis Star and Tribune Company, was earmarked to go toward strengthening the University's role in journalism and journalism education.

While the Cowles gift has lifted spirits throughout Murphy Hall, the school of journalism has already had an embarrassment of other kinds of riches. Eric Sevareid of CBS is a J-School graduate, as are Harry Reasoner of ABC, Harrison Salisbury of the *New York Times*, and newspaper columnist Carl Rowan.

The School of Journalism and Mass Communication is consistently ranked among the top journalism programs in the United States.

update

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students take light horsemanship seriously

by Michael Finley

Although they may have been given silly names—names like Postcard, Beans, or Tomaine—they themselves are not silly. And when the students lead them from their stalls into the practice ring, they do so with the deference befitting these strange, aristocratic creatures.

Most of the students in the Light Horse Management program at the University of Minnesota Technical College in Crookston are women. Why this is, instructor Gary Mullen is loath to guess. Perhaps because men traditionally maintain engines, leaving the job of caring for living things to the women.

In this tense day and age, such guesswork can get one into trouble. What Mullen does know is that the handful of men who have been through the program have been some of the best equestrians of the lot. Strength and leg-length come in handy when working horses.

Mullen said that the "light" in the Light Horse Management program describes the horses, not the management. Light horses are just that—light horses—as opposed to the heavier draft horses, usually depicted as pulling plows or beer wagons.

Light horses include thoroughbreds, saddlebreds, Morgans, Arabians, quarter horses, and Tennessee walking horses. Each of these horses has been bred over the centuries to bring out favorable gaits, strengths, and other idiosyncrasies. The light horsemanship program instructs its students in the properties of each breed.

"It's a two-year major in agriculture," Mullen said. "In that time we teach the different styles of riding, horse anatomy and physiology, diseases, hoof care, nutrition, the history of horses, and also the financial aspects of keeping horses."

Instruction occurs in all its guises, from atop a saddle, to the latest ideas in horse management, to rear guard duty at the end of a shovel. Before students earn their certificates, they are as familiar with charts and graphs as they are with the ammonia-rich air of the stable.

What is perhaps most striking about the program, Mullen said, is that the students have to learn things that can't, in the usual sense, be taught. Coordination is integral to working horses, he said, and plays a big part in winnowing out the curious from the serious. Beyond mere coordination is

an even more important intangible—the intuitive feeling the individual has for the animal, and vice versa.

That's an area that Mullen is well equipped to deal with. His master's thesis at Colorado State University was on the topic of horse psychology. While people may think there are few things simpler than horse sense, Mullen believes differently.

"For one thing," he said, "practically all of the horse's learning is based on avoidance, and most of its reinforcements are negative ones. The entire horse-rider relationship turns on the horse's desire to avoid the mild kicks it receives from the rider."

The students in the ring with their practice horses, however, put the lie to Mullen's thesis, and he freely admits it. The soothing pats the animals receive on their necks and on their flanks, and the obvious care the students have for their horses, are evidence of a much more positively reinforced relationship.

And when they canter through the arena, their differences seem to dissolve altogether, as horse and rider move up and down as one.

crookston



TOM FOLEY

prairie chickens make whoopee on the booming grounds

by Michael Finley

In March the females start making their first brief visits to the "booming grounds." The males are already there. They have been there through the winter, and they will be around until June or so.

By April, the males and females are in the heat of their negotiations. The male dances rapidly about, lowering his head as he struts. Like a monster from the *Arabian Nights*, he inflates

the two bright orange sacs beneath his cheeks. He fans his tail feathers as wide as they will go and then shuts them with a sharp click. Then he booms.

He hums into the inflated orange sacs, which amplify the sound into a sharp, intense hum, not unlike the sound produced by spinning the frequency knob on a ham radio. The female is suitably impressed.

The males and females are prairie chickens. The booming grounds are sparse clearings within the unused prairie lands between Crookston and Moorhead. Booming is a part of mating, and mating is all that stands between the Minnesota prairie chicken—one of the more distinctive, not to say peculiar, local creatures—and its extinction within the next few years.

Ask Dan Svedarsky about prairie chickens. The assistant professor of agriculture at the University's Technical College in Crookston will lay it on the line:

"The prairie chicken is hanging on by the skin of its teeth," he says. The only thing that has kept farmers from plowing under the last of the prairie chicken habitats has been the lack of incentive to farm the gravelly land. With wheat and sugar beet prices rising as they have in recent years, that incentive may already be there.

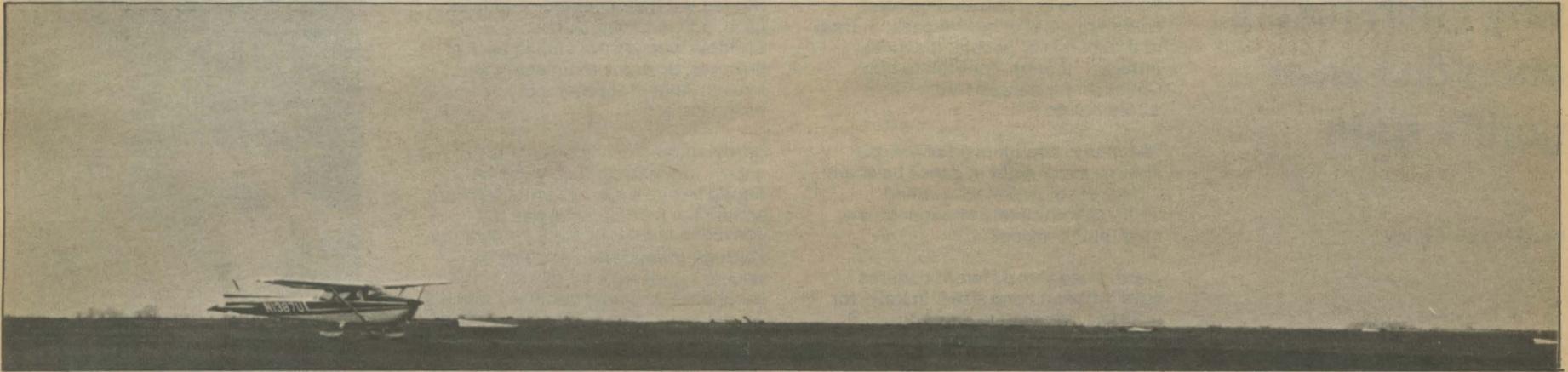
That is why Svedarsky helped organize the Minnesota Prairie Chicken

Society: to do a yearly census on the dwindling population, and to find ways to keep the species in the black.

"What we are is a sort of public relations agency for the prairie chickens," Svedarsky says. "We work with groups like the Nature Conservancy to remind people of the value of our clients."

Svedarsky's prognosis for the independent survival of the prairie chickens, with booming and nesting grounds intact, is bleak. He figures that the desirability of feeding people will probably win out over the desirability of not destroying the last of these odd, harmless creatures. What he's hoping for is that enough private support can be enlisted so that a museum-type prairie range habitat can be set aside and maintained for the species through future centuries.

In the meantime, he and other chicken-watchers clock the birds' movements with a telemetric system of radio observation. Every time a fox kills a bird, or a skunk steals one's eggs, Svedarsky knows. He is a kind of guardian angel for the prairie chickens. All he wants is for the chickens to have room to boom on.



crop dusting not a fun job

There isn't much to distinguish the Crookston airport from the terrain surrounding it. The same flat land stretches out here that stretches across the rest of northwestern Minnesota. The same sharp winds gust in across the plowed dark fields. The same long columns of clouds churn ceaselessly overhead.

The only real difference is the occasional small aircraft touching down on the runway. As often as not, it's the classroom plane for the crop dusting program at the University campus in Crookston.

no, definitely not fun

"Actually, 'crop dusting' has gotten to be a pretty outmoded term," said Tom Hruby of the program. "Nowadays, it goes by the name of 'aerial application.' It's a year-round technology, involving distribution of pesticides, fungicides, and fertilizers."

by Michael Finley

If there's one image that Hruby and colleague Larry Leake would like to correct, it's the notion that the life of a crop duster—or better yet, an "agricultural aviator"—is somehow a romantic one. They are constantly running into the stereotype people have of the freewheeling, barnstorming flyer with dust-bleared goggles and good-luck scarf flagging in the breeze.

"I think it seems a lot more glamorous to the outsider than it is to someone who's actually involved in it," says Hruby. "It's mostly a lot of tedious, hard work."

Crop dusters, for that matter, are not even a vanishing breed. About 30 freshmen and sophomores at Crookston are currently enrolled in the instructional program—one of two in the United States—hoping to earn the FAA Commercial Pilot certification.

Hruby said that agricultural aviation is coming more and more into use as large corporate farms take advantage of the speed and thoroughness of farming with airplanes.

Of the 30 students enrolled in the program, Hruby expects a certain percentage to drop out. Some of them have never been in a plane before. Some may be more than a little daunted by the prospect of taking off in subzero cold. And Hruby figures there are some people who still see crop dusting through rose-colored goggles.

Although Hruby says to ignore the romanticized notion of the lone crop duster for the pie in the sky it is, still one wonders.

Especially in Crookston, where people live sandwiched between the flat farmlands and the low-lying northern clouds, the sight of a plane lifting off, breaking free from the earth-sky sandwich, stirs the callous breast. One wonders if it isn't just a little bit fun.



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Waseca

why hitch-hikers shouldn't wear gorilla suits

by Michael Finley

"When I first came to Waseca from Duluth," Allan Ward said, "I had an interesting experience. I was just standing there and this farmer was staring at me, looking me up and looking me down. Finally, he said 'Howdy' and went his way.

"I was a bit upset at the way he looked at me and figured something must be wrong. Maybe there was food on my clothes or my zipper wasn't up or something. Finally, it dawned on me that the farmer was just being friendly. It was just a misunderstanding caused by me and my urban rules of nonverbal behavior coming up against him and his rural nonverbal behavior."

Nonverbal behavior is Al Ward's hobby, but it also fits right in with his work as director of counseling at the University of Minnesota Technical College at Waseca (UMW). Out of the piles of formal and informal research done in this new field of psychology, he finds several groups of situational behaviors particularly interesting.

One of these areas is the difference between urban and rural nonverbal behaviors. Being from Duluth, living in Waseca, and visiting the Twin Cities from time to time, he often finds himself caught in the crossfire.

"One thing people in cities do is try not to look at things for very long. If you try to make eye contact with everybody you pass on the Nicollet Mall, you'll probably go crazy. There's just too many people to see.

"Elevators are a fruitful place to observe nonverbal behavior. I was in an elevator downtown not long ago, and I thought I was doing everything right. After all, I'm from Duluth, right? I stared at the front of the elevator like I'm supposed to, with my hands folded in front of me. I thought I was doing great, but a fellow turned to me and said, 'Say, you're not from Minneapolis, are you? Have a nice day!' and left me there, wondering how I'd tipped him off."

Basically, Ward said, many nonverbal behaviors are related to self-preservation. Not looking at people on the street is a way of not getting involved with them.

Some nonverbal-behavior watchers have postulated the existence of egg-shaped comfort zones that we all have about us. Determining how close we get to other people, and how close we let them get to us, these distances denote differences in status, differences in the kinds of relationships we have, and other, cultural kinds of differences.

"For instance," Ward said, "it's one thing for Fran Tarkenton and Chuck

Foreman to hug one another after completing a touchdown pass, in front of thousands of people. It's quite different, though, for Fran to hug Chuck on the Nicollet Mall. They would not do it.

"Similarly, strangers embrace one another every night in dance halls and think little of it. But who would embrace a complete stranger in any other public place?"

Ward noted that different cultures have different zone sizes. In Italy, for instance, the people stand close to one another and gesture broadly in conversation. In Sweden, the distance is greater between acquaintances and

"I thought I was doing everything right. I stared at the front of the elevator like I'm supposed to—I thought I was doing great."

figured out that smiling is innate at birth, and not a learned behavior. Children who are not smiled back at, however, do come to unlearn their smiles. Angry foot-stamping seems to be innate, too."

Studying nonverbal behavior is not merely interesting. It can also be turned to one's own advantage. Ward abhors the manipulative use of nonverbals in books such as *Winning Through Intimidation and Power: What It Is and How To Get It*. At the same time, knowing about nonverbals does help in ordinary communication, and the behaviors can be fun to watch.



Allan Ward

TOM FOLEY

TOM FOLEY



the gestures more restricted, which strikes Ward as ironic. Sweden's colder climate would seem to require more huddling and arm-waving.

Women have greater sensitivity to these zones of spatial comfort than do men, especially when signals are negative, as when a stranger seems to come too near. This suggests to Ward that at the root of a lot of nonverbal behavior is the threat of rape or other violence, perhaps even a subliminal memory of interpersonal cave-era savageries.

Then there is that most pleasant of nonverbal signals, the smile. "German researchers, who are in the forefront of a lot of nonverbal study, have

Traffic is a good place to watch how people react to nonverbals. "Go stand at any corner. When a car pulls up to the light, stare at the driver. Just look at him blankly. He—if it is a man driving—will usually step on the gas and race away as soon as the light is his.

"Taxi drivers are experts at nonverbals. Ask cabbies how to get their attention and they won't tell you to whistle. Whistling is nonverbal, but it is also, by and large, inaudible. The best thing is to stick your arm in the air. People don't do that in crowds very often, so it stands out loud and clear.

"Also ask cabbies about how people

look. A driver may pretend to ignore an elderly woman with an armload of purchases, but pick up a conservatively dressed young businessman with a briefcase. They are usually big tipplers."

Hitchhiking is one form of communication that is entirely nonverbal. Whether you as the driver pick the hitchhiker up and whether you as the hitchhiker get picked up depends completely on the momentary sizing-up of the hitchhiker by the driver. One study was conducted by a man who had long hair and a beard and wore blue jeans, beads, and leather. He counted the cars until one picked him up. He then shaved, changed clothes, and returned to the same place at the same time the next day, again counting the cars that passed before he was picked up. Finally he was the quintessential conservatively dressed young businessman with briefcase. Not only did the number of cars change radically from guise to guise, but so did the kinds of people who stopped.

Again, Ward notices an irony. "While hippies—I don't like the word but I'll use it this once—were kind of an individualistic group, they had to dress very similarly in order to be recognizable. Nobody would ever pick up a pure individualist who was hitchhiking. He would look too strange."

The eyes are probably the most potent sender of nonverbal messages, said Ward. An experiment was once conducted in which subjects were shown two photographs. The only difference between the two was that the character's eyes were open in one and closed in the other. With the open-eye picture, the subjects looked at it briefly and from a distance. With the closed-eye picture, however, the subjects pored over it for long periods of time. People are afraid of eyes.

"A German scientist named Eckart Hess developed something called pupilometrics, which is all about the meaning of changes in the size of the pupil in the iris. Hess once showed friends a family album in which he'd interspersed photographs of nudes from a magazine. Whenever the friends came upon a nude, their pupils got big. Big pupils seem to be a sign of interest, at the very least. I always tell my male students that if their dates' pupils are little when the men

RESEARCH

A Special Report for Friends
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Winter 1977



researchers may hold key to survival

by Maureen Smith

Keith Huston likes to get in his car and go for a drive. "Whether it's out in the country or in the city, I can look to the left and the right and somewhere I will see something that was developed at the University of Minnesota," says Huston, director of the Agricultural Experiment Station.

Everyone has a favorite example of a discovery by University investigators that has changed people's lives or boosted the economy of the state: Taconite. Open-heart surgery. Era wheat.

But some faculty members fear that public support for research may be waning. "In a very real sense, people don't realize that it's through research that we provide new jobs, new opportunities, new economic freedoms," said Bruce Overmier, professor of psychology and chairman of the University Senate Committee on Research. Too often, he said, research is viewed as a drain on the nation's resources instead of as an investment.

"Whenever there is competition for resources, whether it's within the University, within the state, or within the society at large, there is a tendency to cut those things we decide are frills," Overmier said. His concern is that research may be wrongly perceived as a frill.

The trouble with research is that it can't offer solutions to problems by tomorrow morning. "If the initial discovery hasn't been made yet, you can't plan it," said Henry Koffler, vice president for academic affairs. "You can plan research, but you can't plan discovery."

Even when a breakthrough is made, Koffler said, there is typically a 30-year lag between the initial discovery and the final development of a useful product—from the discovery of hormones, for example, to the development of cortisone.

As the problems become more complicated, Overmier said, the search for solutions becomes that much more expensive and time-consuming. "In most areas of science we've skimmed off the things you can see with your eyes or measure with your hands," Huston said.

Impatience with delayed results may lead some people to a general disillusionment with research, Overmier said. "Why don't all you fancy researchers give us an answer? they want to know. 'That's what we're paying you for.'"

Another problem with the deferred results, Overmier said, is that people may think it won't hurt to wait a year. "That year has great costs. A research enterprise isn't an assembly line that

you can shut down and then start up again. People go away. It takes several years to train people again."

Koffler remembers the days when federal dollars for research were pouring in. "I was a recipient of all the goodies as they came along." Today, he said, "it's a different world." But Koffler understands the limitations on resources. "People get spoiled in a sense. We should be doing more, but I can't shed crocodile tears and say we've been treated harshly. We haven't."

expansion of knowledge

Universities are the one institution in society with a responsibility for the expansion of knowledge, said Dean Frank Sorauf of the College of Liberal Arts (CLA). "Our collective curiosity and our need and desire to know are justification enough."

"There are also practical applications," Sorauf said, "but it isn't always clear at the time one does the research what the application is."

Even if a discovery has no practical application, it may be valuable for the understanding it adds. And the work of creative artists, which is considered equivalent to research in a university setting, has its own value. Prof. Robert Holt, research officer in CLA, cited Dominick Argento's operas, Paul Fetter's compositions, Charles Nolte's plays. "They certainly enrich the quality of life in the area," he said.

Important discoveries would be lost if researchers were always expected to produce immediate results, said Alfred O. Nier, Regents' professor of physics who is heading the entry team for the Viking Mars probe. "Where can scientists conduct long-range investigations if not at a university?" Nier asked.

Nier and Prof. William G. Shepherd both like to tell the story of the discovery of transistors. Although the work was not done at Minnesota, one of the three men who won the Nobel Prize for it was a Minnesota alumnus and another was a former faculty member.

The discovery was an accidental one, said Shepherd, director of the Space Science Center and research officer for the Institute of Technology. "The people who won the Nobel Prize were conducting some fairly basic experiments aimed at understanding the surface states of solids."

The multitude of transistor radios and computers and pocket calculators that resulted was beyond the wildest dreams of the investigators.

The enormous economic potential of transistors convinced private laboratories that basic research pays off, Shepherd said, and for a few years companies made room in their budgets for basic research.

"But then the management discovered that the payoff was so far down the road that they were having a hard time justifying it to stockholders. They withdrew and said they would leave the basic research to the universities. It was appropriate because the mission of a university is not just disseminating what is known, but expanding knowledge," Shepherd said.

"If someone isn't going to do that, we're going to have a stagnant society, a stagnant economy, and a stagnant intellectual community."

happy surprises

A theme that is repeated again and again by researchers is that they never know themselves where their investigations will lead or what the payoffs might be. The story of the transistor is not an isolated example.

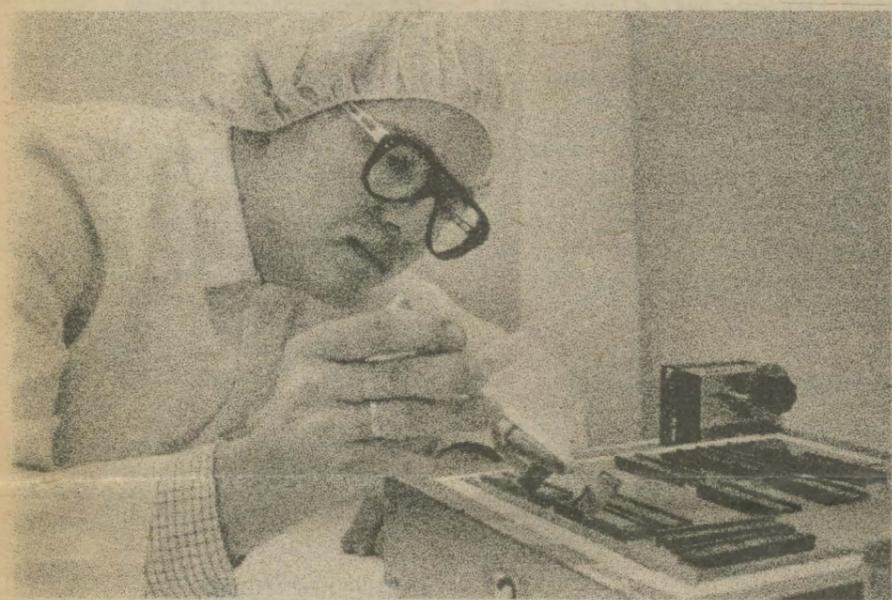
As a young political scientist in Pennsylvania in the 1950s and early 1960s, Sorauf did some research on patronage systems. "I found myself living in the center of one of the last great strongholds of patronage, and I wanted to understand that aspect of politics."

Sorauf's research interests led him into other areas, and he left the study of patronage behind him. "I discovered that the United States Supreme Court drew on my writings last June in a decision the court made. One doesn't necessarily foresee the usefulness of what one does."

Similarly, Reuben Hill, Regents' professor of family sociology, published a study in 1949 on the effects of war separation and reunion during World War II. "We went all the way through the Korean War with no reference to it whatsoever," he said. But his study was used as the war in Vietnam was ending, and it is being cited in 1976 books.

Huston cited some research at the University that was intended to help hail-damage appraisers be more uniform in estimating damages. Corn plants were cut off in an attempt to mimic the effects of hail.

What the investigators learned, to their surprise, was that cutting off corn at a certain maturity date leads the plant to produce more than if it had never been cut.



"Who'd have thought that?" Huston asked. "Anyone would have said that was just plain nutty."

Probably the most famous example of serendipity in research is Sir Alexander Fleming's discovery of penicillin, which began with a dropped culture dish. Some people are troubled by the accidental nature of such discoveries, Overmier said. "But had he not been working on that class of problems, Fleming wouldn't have seen the value in that accident. It takes a special mind to recognize what the value of that accident is."

who cares?

Even a well trained scientist in one area cannot always see the value of investigations in another area, Overmier said. "I can't see the long-term benefits in high-energy physics, but I am convinced that they're there. Historical precedent tells me that they are."

"Who cares whether the sun has some spots on it or not—unless it turns out that knowing something about the sunspots can tell you something about the weather and when there's going to be bad radio transmission."

"What's the value in measuring how long it takes someone to press a button when you flash a funny-looking letter on the screen? It sounds silly. But such research can tell us a great deal about how people learn to read. Jay Samuels and David LaBerge have a project that grew out of just that."

Sometimes the benefits of research are obvious. Huston talks about the development of new varieties of oats, barley, wheat, corn, pasture grasses,

shade trees. "Year after year they get a little better," he said.

Similarly, the payoffs are obvious in health research. Lyle French, vice president for health sciences, talks about the early work in open-heart surgery, George Moore's work on isotope scanning, the late Arnold Lazarow's work in diabetes, Alma Sparrow's research on an expanded role for nurses.

Dean N. L. Gault of the Medical School talks about Edmund Yunis's work on the typing of organs (important for transplants), Robert Good's work on bone marrow transplants, Owen Wangenstein's work on gastrointestinal surgery, Elwin Fraley's work on the possibility that a virus causes cancer of the bladder, B. J. Kennedy's work with chemotherapy.

Sometimes the full value of a research project isn't recognized at the time. Shepherd talks about Richard Jordan's work a quarter of a century ago on solar collectors. "Suddenly, there is an enormous interest," he said.

Perhaps the most important research project at the University of Minnesota right now isn't recognized for its great potential. Even the investigators themselves may not suspect it. "You don't know what you're going to find, whether it's out in space, under a microscope, or in the mind of man," Overmier said.

scholar-teachers

Teaching is the other primary mission of a university. Almost everyone who was interviewed said it is a myth that, as Sorauf put it, "scholarship and teaching are somehow divided." To the contrary, they said, teaching is

strengthened by scholarship and is in fact dependent on it.

For one thing, a thriving research enterprise attracts top scholar-teachers to a university. "If this were not an active research community, the leading lights of the faculty would not be here," said Sandra Scarr, who chaired the Senate Committee on Research last year and is on leave this year.

"I don't think I could stay here just teaching," Overmier said. "The excitement would go out of it in a big hurry." At the same time, he said, "I don't think I could do all the research without the opportunity to tell people about it. The two are intertwined as part of my life."

A university faculty is "a different kind of faculty" than is found at a college, Sorauf said. "That's one of the big pluses we can offer able and highly motivated undergraduates. We can't offer them everything—alas, we can't offer them the same degree of personal attention—but we can offer them exciting contact with faculty who are national and international experts."

Gault said the vitality of the Medical School faculty pervades the halls and is noticed by visitors. "It's contagious, it's inspirational to students, and it keeps people on their toes," he said.

Gordon Bopp, academic dean at the University of Minnesota-Morris (UMM), said it has been his observation that "our more outstanding faculty members in general are outstanding in research or scholarship. We do have a few people who commit themselves almost entirely to teaching and who do a very good job, but that's more the exception than the rule. In the eyes of students and colleagues alike, the individual who is advancing knowledge is usually the more exciting individual."

Koffler said he has seen "institutions become better teaching institutions as the scholarship improved. I'm talking about the quality of teaching as perceived by students, not just as perceived by me."

Allen Simpson, chairman of the Scandinavian department, said there are apparent exceptions, such as "superior scholars who hate teaching and leave bad memories in the minds of students they are inflicted upon and 'actor-teachers' who have not read in their subject for many years, but who, like actors giving new life to lines written long ago, can repeat the same things to new classes year after year and leave the impression that they are outstanding teachers."

"The actor-teachers serve a purpose: they often fire students with enthusiasm. But if the students are to advance in their field beyond the introductory level, they must seek not actor-teachers but scholar-teachers."

Edward Foster, professor of economics and associate dean of the Graduate School, said there is "very little that I teach in my courses that I knew when I came here. Not everything I teach is something I've done personal research on. It's a combination of the things I've done research on and the things other people have done research on that have been published in the last ten years. I doubt that there is any field of knowledge so static that you can have courses of good quality without that renewal."

"All knowledge that is taught is the result of someone's research," Shepherd said.

Teaching students how to learn is more important than teaching information, Holt said, because the information will soon be out of date. "The best person to teach students how to learn is a professor who's doing research, one who is learning."

apprentice scholars

Even if it were possible for a nonscholar to teach undergraduates successfully, the educators agreed, it would be impossible to teach graduate students.

"It is inconceivable that people who aren't engaged in research themselves can teach other people how to do it," Foster said.

Overmier likes to compare the training of graduate students with an apprenticeship in the skilled trades. "Some things are best learned as an apprentice. You can write books about it until you're blue in the face, but all the book learning in the world will not teach you to be a steamfitter. Research is the same: there is no substitute for learning the skills."

"If one is going to supervise graduate students—especially for the Ph.D., which is a research degree—one really has to be a research scholar oneself," Sorauf said. A scholar-teacher can "help a student define a problem, bringing the best standards to bear, and can also serve as a role model," he said.

A distinguished scholar-teacher is helpful to graduate students in another important way, Simpson said. When it comes time to look for jobs, "candidates for positions in institutions of higher learning are selected, in part, according to whom they studied with." The competitive chances of someone who has studied under an outstanding scholar are "vastly better than the chances of the student of an unknown or indifferent scholar."

In a research laboratory where faculty member and graduate students work side by side, Overmier said, it isn't even possible to sort out what is research and what is teaching. "If you're not doing that research, you can't be doing that teaching. I think they're tightly intertwined."

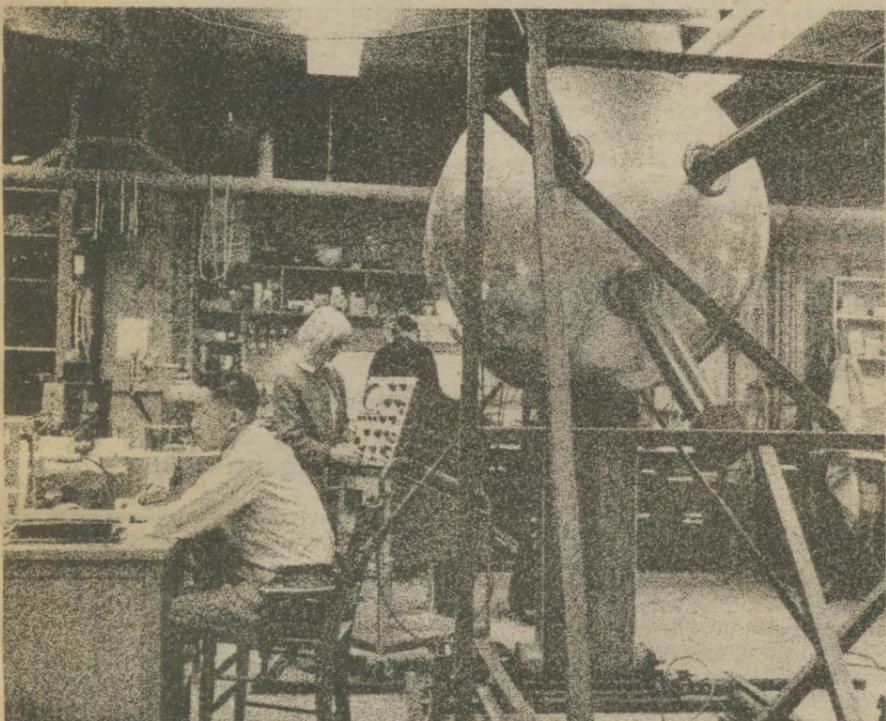
shifting balance

The balance between teaching and research at the University varies from campus to campus and from department to department. Teaching loads are somewhat heavier and research expectations lighter at UMM and at the University of Minnesota-Duluth (UMD), for example, than on the Twin Cities campus.

In recent years the balance at Duluth and Morris has been shifting. While research still is not given the same weight it is given on the Twin Cities campus, faculty up for promotion or tenure are expected to present some evidence of research activity.

At a recent meeting of the University Senate Consultative Committee, UMD English professor Wendell Glick said he thought the expectations were unrealistic.

Because of the heavy teaching load, he said, "in my department there is almost no research done except on leave or sabbatical. There's a kind of allocation of function. All of us can't



go researching; some have to mind the store." When sabbaticals are given only to a favored few, he said, the issue becomes a moral one. "You don't want departments to give tenure because someone is liked and mixes good martinis," he said, but departments should be able to argue that "individuals who are carrying their part of the burden are worthy of promotion even if they haven't written a line."

"I think there's an element of truth to that, but I think he somewhat overstated the real situation," said David Vose, vice provost for academic administration at UMD. (Vose was responding to an abbreviated version of Glick's remarks in which the statement appeared to apply to the UMD campus as a whole.)

"My contention is that most faculty members who are strongly committed to research are doing research," Vose said. "That's the kind of commitment we want to see from a faculty member at the University. I don't think one can show a significant difference in the amount of teaching."

Gordon Bopp of UMM said that a faculty member "who has an exciting,

inquiring mind and who needs food for that proclivity" will find it by conducting research and involving students in it.

Morris has no graduate students—"no paid slaves," as Bopp put it—so by necessity UMM faculty members have turned to undergraduates for help. As a result, students have been given "an opportunity to learn about research and about scholarship."

UMM students have even been published in national journals, as coauthors with faculty members. Ernest Kemble, Eric Klinger, and Peter French have all included their students to this extent. "That's pretty darn good, when undergraduates are published in refereed journals," Bopp said.

too much research?

As research requirements spread to smaller campuses and competition for academic positions becomes keener, more and more faculty members across the nation are feeling the pressure to "publish or perish." Does society need all of these scholarly articles? Do the journals even have space to publish all the worthy ones?

"It's nightmarish for someone starting out to get into print," said Paul Alkon, professor of English on the Twin Cities campus. "My impression is that people as bright as I am are being shunted out of the academic career"

for lack of publishing opportunities. But Alkon added that "if an article is extraordinarily good, I don't think there's a major problem."

"I know in my own field there is increasing pressure on existing journals," Sorauf said, "but I don't have the feeling that there are good pieces of work going without a publisher." He said he has heard that the problem is more severe in the languages and literature, but he doesn't know how to evaluate such claims.

In the aggregate, Sorauf said, there has been "a real proliferation of scholarly journals. The cost of periodicals and serials is just eating into the acquisition budgets of libraries."

Although the proliferation of journals may mean increased opportunities for publication, it underlines the other question of how much is too much.

Koffler said he sees the problem not as one of too much scholarship but as one of information transfer. "Civilization has never had to publish that volume of knowledge before, but there is no question in my mind that the problem will be solved."

One proposal, he said, is that papers in highly specialized fields continue to be read and refereed but that, instead of being published in a journal, they be placed in a national depository. An abstract would be published, requiring much less space, and those wanting to read the paper would get it from the depository.

"I'm a traditional scholar," Koffler said. "I like to see publications in journals." But he said some change is needed. "What we have is a bottleneck in publishing information and disseminating it."

The larger question of how much research is too much is one that concerns Koffler. "What worries me is this: We educate a lot of scholars and scientists. There is no sense in training them unless they can be creatively productive.

"Can you ever have enough creative effort? Probably not—but there's only so much that society can do." The rate of increase in support of research couldn't possibly have been continued, he said. "It was going to eat up the whole national budget."

The question, Koffler said, is "what is the right amount of research for a rich country to be engaged in? When you start turning down research applications that are good, then you're in trouble."

Overmier said that among the industrialized nations in the world, the United States spends one of the lowest percentages of its resources on basic research. "Only England spends less, and you can see what's happening to it."

a matter of survival

Overmier knows the costs of conducting research are high, and he doesn't advocate giving up everything else in order to support the research enterprise. But he hopes people think about the costs of not conducting research.

"I think the survival of our way of life—indeed, our absolute survival—is dependent on research solving some problems in the not very distant future.

"I really believe if you took all the research out of this world and just

used the technology we have, Western society as we know it would collapse some time in the 21st century. The fabric of society would be gone.

"I also believe that I don't know—that nobody knows—where the critical answers lie. Do they lie in the mind? In biology? We may be dependent on the survival of the honeybee, and honeybees are threatened, you know. Or do the answers lie in technological breakthroughs?

"I'm sufficiently unsure that I'm not willing to place all my bets on just one."

research brings dollars into state

by Maureen Smith

Last year the University of Minnesota received \$57 million from external sources for research.

In the same year, hundreds of millions of dollars were added to the Minnesota economy as a result of the past research at the University. Thousands of Minnesotans were employed in jobs that would not have existed without the research.

Much of the \$57 million itself went straight into the economy of the state. Equipment and supplies were purchased from Minnesota businesses. Researchers' salaries went to buy groceries and gasoline and winter coats.

"Every dollar that comes into the economy has a multiplier effect," said Bruce Overmier, chairman of the University Senate Committee on Research. "In real dollars and cents, research is making a multimillion-dollar contribution to the economy of the state."

Vice President James Brinkerhoff cited the taconite industry as "a billion-dollar enterprise that is there today because of the fruitful research of a University of Minnesota professor."

Keith Huston, director of the Agricultural Experiment Station, said that agricultural research adds more than \$250 million a year to the economy of the state.

As important as agriculture is to Minnesota, technology has an even greater impact in terms of income and employment, Prof. Hendrik Oskam said.

Regents' Prof. Alfred O. Nier cited half a dozen small companies that have sprung up as a direct spin-off from advanced work in technology at the University. Among them: Rosemount Engineering and Physical Electronics. "We do play an important part in the life around here," Nier said.

"When one thinks of Minnesota's economy, it is not at all difficult to pinpoint two of its main sources of strength: agriculture and its related industries, and a constellation of vital enterprises known as high-technology



industries," University President C. Peter Magrath said at a recent meeting of the Institute of Technology Alumni Association.

"Both these activities are securely grounded in a common endeavor," Magrath said. "That common endeavor is research."

top 10

The University has consistently ranked in the top 10 institutions nationally in outside support received for research and development. In fiscal 1975, the most recent year for which figures are available, the University ranked fifth.

"We're ranked right up there with the best in the country," said A. R. Potami, director of the Office of Research Administration. The ability to attract federal funds and other outside support is a tribute to the quality of the faculty, he said.

Another reason for the high national ranking is the "almost unique diversity" of the University of Minnesota, Brinkerhoff said in an interview before he left to take a post at the University of Michigan. It is unusual for the same university to have programs in medicine, agriculture, technology, and all the other fields in which programs are offered at Minnesota. Researchers in all of these areas bring in grants.

"We're doing pretty well in capturing the research dollars that are available," Brinkerhoff said.

The University received \$98.5 million for externally sponsored programs in fiscal 1975. Of this total, \$57 million, or 58 percent, was for research and the rest was for training and public service programs.

Two thirds of all the outside funding came from the federal government. By far the biggest chunk—half of all outside support—came from the Department of Health, Education, and Welfare (HEW). Most of the HEW funds were from the National Institutes of Health (37 percent of the total outside support).

The National Science Foundation (NSF) was a distant second to HEW as a source of federal funds. NSF funds were 4 percent of the total. Then came the Department of Agriculture, the National Aeronautics and Space Administration (NASA), and the Energy Research and Development Administration (ERDA).

An agency-by-agency comparison shows some areas of competitive strength and other areas that have been disappointing, Potami said. Minnesota faculty members have done well in attracting HEW funds, especially in the health areas. Probably the biggest disappointment has been the level of NSF funding. "In total dollars for research, we're right up there with Wisconsin and Michigan," Potami said, but Minnesota receives something like \$4 million a year from NSF while Wisconsin and Michigan each receive \$6 or \$8 million.

"I'm not sure what our problem is," Potami said. "We submit applications—maybe we don't submit enough. We do well in math and some other areas. I don't think we've been as aggressive as we could be."

In technological research the University can't compete with a school like the Massachusetts Institute of Technology, Potami said. "They're just a heck of a lot bigger. For our size, we're doing some nice work with NASA and ERDA." He pointed to

ERDA as a source from which increased support can be anticipated.

Within the University, the Medical School is the largest recipient of outside support. Forty percent of all external funding in 1975 went to the Medical School. Twelve percent went for other research in the health sciences.

The Institute of Agriculture, Forestry, and Home Economics received 10.3 percent, the Institute of Technology 9.7 percent, the College of Education 4.1 percent, and the College of Liberal Arts 3.8 percent.

who pays?

Traditionally, the states have assumed an obligation for undergraduate education and the federal government an obligation for graduate education and research, Vice President Henry Koffler said. States have supported research in agriculture but not, for example, in technology.

Koffler said there is no intrinsic reason for this division of support. "It's just something that has arisen historically. Federal funds allow things to be done that have to be done at a university in the first place."

Some state money for research is distributed in small grants by the Graduate School. Almost \$900,000 was awarded last year.

Associate Dean Edward Foster said that much of this money, although not all of it, is intended as seed money—money given to young faculty members while they are establishing a track record for research, with the hope that they will later be able to attract federal funds.

Some of the most important research at the University has been supported in the beginning with modest grants, Nier said. "A small state investment can bring a big return."

supporting students

Brinkerhoff said that half of the equipment on the Twin Cities campus was purchased under research grants. As research projects are completed, most of the equipment becomes the property of the University. The equipment is used for educational purposes as well as for further research.

In other ways, too, research money helps to support education, Brinkerhoff said. "Our computer availability is there only because of our research program," he said. "Now we have a computer center that is larger than we would have had if it were just for research, but that was the seed corn." Libraries also benefit from research money, he said.

A faculty member who receives a research grant may be helping to support several graduate students, Brinkerhoff said—research assistants who work on the project and teaching assistants (TAs) who replace the faculty member in the classroom. The students gain valuable experience as well as income.

Here's how it works: A faculty member with a nine-month salary of \$21,000 may be able to give only \$15,000 worth of teaching time because of time devoted to a research project. The research contract will be charged for \$6,000 of the faculty member's time, and that amount will go into a pot that is used to hire

teaching assistants. If the faculty member works full time on research in the summer, he or she will be paid \$7,000 for the summer.

In a labor-intensive enterprise like the University, more than half of all research money goes for salaries. As a result, Brinkerhoff said, "we have a larger body of trained, educated, professional staff" than would have been possible without the research funds. And the salary money is "just pumped into the economy of Minnesota," Brinkerhoff said. "Those people pay taxes and buy homes and cars and groceries."

repaying the state

Sponsored research brings money into the University. At the same time, research adds substantially to the costs of running the University. Researchers use space, electricity, heat, computer time, libraries, janitorial services, clerical support. Research places unusual demands on the purchasing, accounting, personnel, and payroll departments, partly because of government accounting procedures.

In recognition of these costs, Brinkerhoff said, agreements have been negotiated nationally requiring that research grants not only pay the direct costs of salaries and equipment but include some reimbursement for the indirect costs.

How is the indirect-cost money used? In one sense, it is money that the University never sees. An estimate of indirect-cost recovery is included each biennium in the University's legislative request, and the appropriation is reduced by that amount. In effect, the state is being reimbursed for the indirect costs of sponsored research. "The federal government or sponsoring agency is repaying the state," Potami said.

As the indirect-cost payments are received, Brinkerhoff said, they are allocated according to this formula: 75 percent to the regular operating budget and the rest in nonrecurring appropriations to areas of the University on which research places special demands. The largest nonrecurring award goes to University Libraries, with plant services second.

Indirect-cost money isn't discretionary, Brinkerhoff said. "It's required in order to keep the doors open." To illustrate, he drew a picture of "what would happen if we had a complete disaster and there was no sponsored research. The institution in a short period of time would be faced with layoffs and terminations, total retrenchment. There would be a need for fewer people, for less space. We'd just be a smaller institution. On the Twin Cities campus, why, we'd be faced with the closing up of whole buildings."

Research costs money, and it brings in money. Is it a good investment? At the University, the answer to that one is easy.

"Two marvelous products" come from research, Koffler said—"educated, talented people and new knowledge or insights. You can't lose. It's the best investment you can make in the long run."

"If we accept the notion that research and innovation—far more than oil or coal or any other quickly expendable material—is the real fuel that powers our nation, then I think we must agree that support for research must remain strong and uncompromised," said President Magrath.

look into their eyes, they might as well forget it."

Nonverbals, Ward said, probably constitute 90 percent of all human communication, and much of that 90 percent is vital data. A man may stand accused of horrible failings if he crosses his legs in an inappropriate way. The same goes for women. Voice inflections can alter the meaning of a spoken sentence so that it means the exact opposite of what the words by themselves mean. An acknowledging lift of the eyebrows is expected by a friend but resented by a stranger. Put your feet on your boss's desk some time and find out what that means.

letters

keeping it going

"Cancerophobia" is genuinely touching. Factual and myth-destroying, yet full of the humanity of Richard Todd, Amy Travis, Mary Ferlic, Edith Johnson, B. J. Kennedy, and Charles McKhann. You make me inordinately proud to have graduated from that school. **Update** ought to be printed and distributed nation-wide, so that everyone can be reassured that this frail flesh we walk around in has some remarkable people working and caring enough to keep it going.

Bill Aull
Champaign, IL

treatments not treats

I wonder what portion of the millions of dollars spent on cancer research is set aside for cancer prevention. So far, all I have read is that more sophisticated and expensive treatments are being devised to "cut, burn, and poison the patient."

Leon J. Berman, '33
Culver City, CA

exclamation point

In my opinion every word in that issue should have been capitalized and underlined. It was magnificent.

Marilyn A. Spears
Aberdeen, WA

blind lab mice

Perhaps if medical researchers would investigate unorthodox cures for cancer, they would find the wonderful breakthrough we all await. There is none so blind as he who will not see.

Dorothy E. Petry
St. Paul

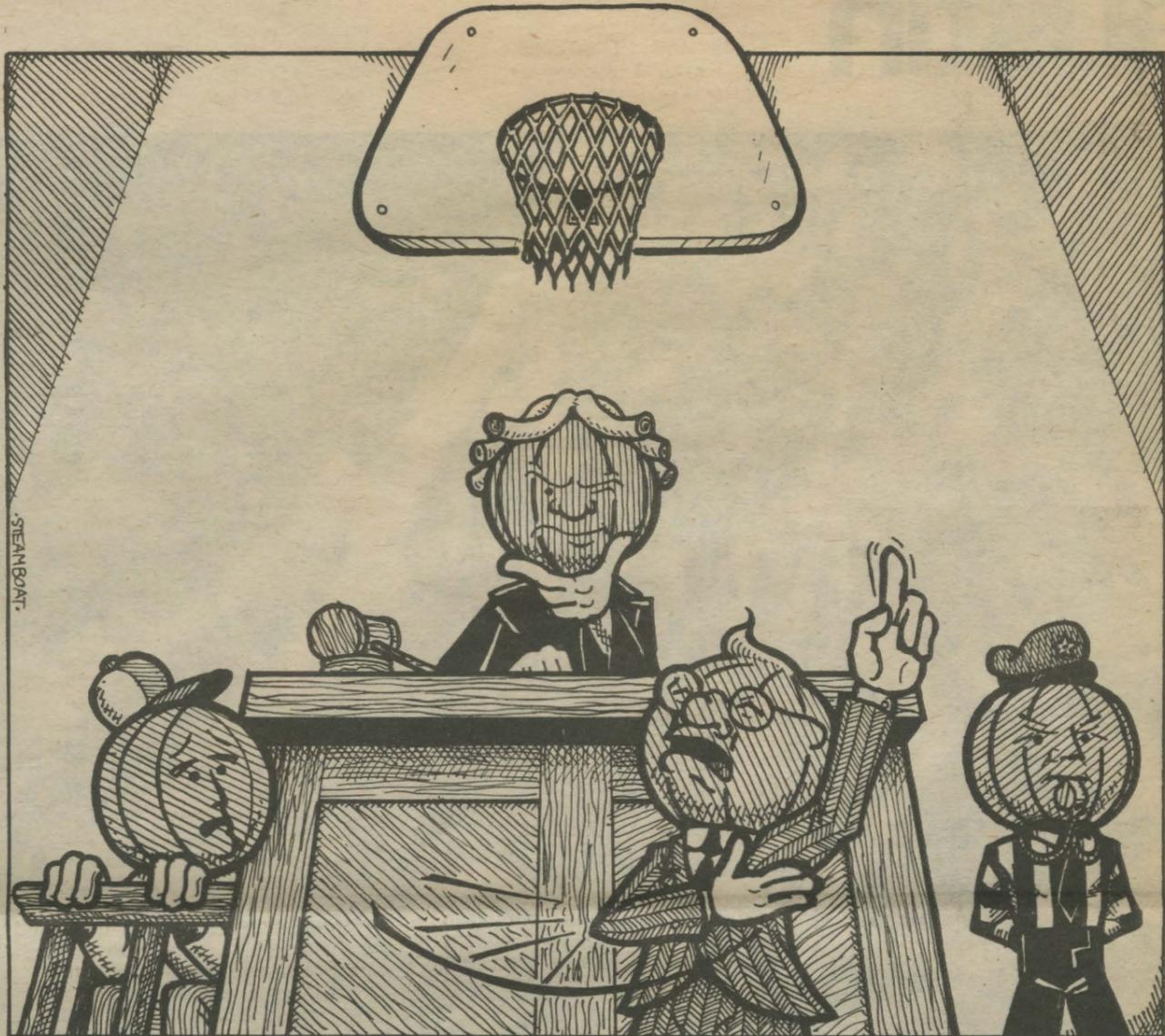
big smile

You've got to be kidding! Don't you watch the 6 o'clock news? In case you still don't know who he is: go to Washington, D.C., on Jan. 21, 1977. He'll be the one standing next to a fella with a top hat and a big smile.



mystery alum

John Shelburne
Long Beach, CA



STEAMBOAT

STEAMBOAT

university loyalties stirred in ncaa dispute



C. Peter Magrath

It's called the Fairness Fund, and it has more people thinking about the University of Minnesota than has any student demonstration, faculty controversy, or unpopular administrative decision in the past 20 years.

The final proof that the Fairness Fund has Minnesotans excited is the financial one: Gopher fans from all around are putting their money where their mouths formerly were, cheering on the Minnesota eleven, five, six, and nine.

It has to do with sports, of course. Specifically, it has to do with the continuing and increasingly bitter dispute between the University and the National Collegiate Athletic Association. The NCAA has insisted that the University declare three of its basketball team members ineligible because of violations allegedly committed a couple of seasons ago, although University hearings had found the players to be eligible.

For the University's part, it feels that it has already gone the limit in showing good faith, complying with every point in the NCAA decisions regarding the basketball program except this last one.

"I am convinced," said President C. Peter Magrath at an October press

conference, "that the rights of Mike Thompson, Dave Winey, and Flip Saunders are fundamental. They must be defended, regardless of the economic and other sanctions the NCAA is attempting to impose on us."

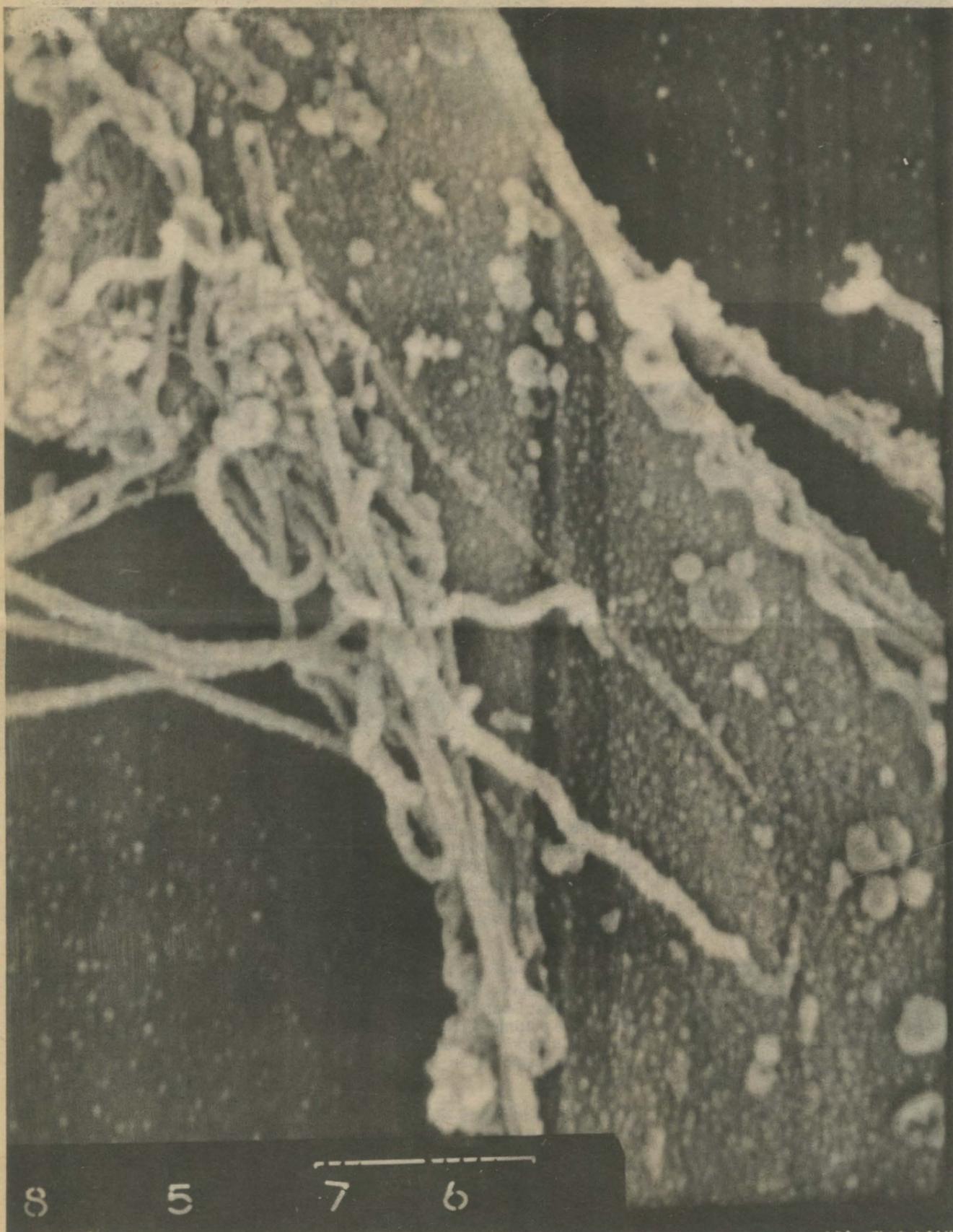
The sanctions Magrath referred to do seem severe: indefinite probation has been imposed on the entire men's intercollegiate sports program. The University has taken the NCAA ruling to court and has gained a temporary injunction against it, but it has also taken its case to the public. Thus, the Fairness Fund.

Buckets have been passed at football games, student and alumni organizations have chipped in, and individuals have contributed. The outpouring of support in this alleged "age of apathy" has been impressive.

At this point, the University has collected almost the entire \$75,000 that was set as the original goal. But it has now become clear that that will not be enough.

Those who are interested in lending a hand to the University's appeal may send contributions to Fairness Fund, Morrill Hall, 100 Church St. S.E., University of Minnesota, Minneapolis, MN 55455.

austin



syphilis,
vegetable oil,
roses,
legionnaires'
disease,
cryonics,
cancer,
sleeping
sickness,
cataracts,
cholesterol,
and other
concerns of
the hormel
institute

by Michael Finley

Syphilis spirochetes

support from the Hormel Foundation made possible the founding of the Hormel Institute within the University, devoted to lipid research."

Although they are proud of their name, it sometimes causes confusion. Perhaps because both the Hormel Institute and the George A. Hormel meat packing plant are in Austin. Or maybe it's because the Hormel Institute does basic research on fats, and the Hormel plant is also in the "fat" business.

No, Hormel Institute people say, they're not the same thing at all. The institute is an academic place, a far-flung unit of the Graduate School back on the Twin Cities campus of the University. And people at the institute rarely use the word *fats*. The big word there is *lipids*.

jack spratt could eat no lipid

Now, lipids are fats. But while we think of fat as being useless rolls of flesh hanging from our otherwise perfect bodies—just as biochemistry for years thought of fats as simple, slippery, and functionless organic compounds—Hormel Institute researchers know better. Lipids, about which little was known a scant 50 years ago, are finally assuming their proper importance in the biological sphere.

Lipids owe some of their sudden prestige in this sphere to former University professor George Burr, who, with the help of his wife, published the discovery of essential fatty acids. The work was done in the attic of Jackson Hall in Minneapolis in 1928. What the Burrs found was that fats were important for something beyond their simple caloric value. They are as necessary for life as amino acids, vitamins, and minerals.

"I was one of George Burr's last grad students," said Ralph Holman, professor of biochemistry and director of the Hormel Institute. "When he left the University in 1946, there was suddenly a gap in an area that had been pioneered at Minnesota. J. C. Hormel's gift of a site and basic

i-v beleaguered

For anyone who doubts the importance of lipids in diet, Holman describes a disease known as essential fatty acid deficiency. Essential fatty acid deficiency is not something that happens to people stranded on desert islands far from the nearest nutritionist, doctor, or cafeteria. This nutritional disease occurs most often at the heart of civilization's health institutions, in the wards of many hospitals in the world.

"Essential fatty acid deficiency is induced by prolonged intravenous



TOM FOLEY

Howard Jenkin

feeding," Holman said. "The idea of intravenous care originated years ago when doctors first grappled with the problem of how to keep seriously ill people from dehydrating." Intravenous salt solutions prevented the dehydration. Then glucose was added to provide energy, and amino acids were added to that to replace protein. But still patients weren't getting everything. The body needs essential fatty acids to keep intact the membranes within and around cells. Without the necessary fatty acids, the cells die.

"Now, there's a soybean emulsion containing essential fatty acids that can be used in intravenous feeding, and the problem of essential fatty acids can be brought under control," Holman said.

winona's sleeping sickness

It isn't an epidemic, but it is serious. Over the past dozen or so years, some people living in the Mississippi River area stretching from Winona through LaCrosse have contracted a mysterious sleeping sickness. Symptoms of the disease are severe: uncontrollable body movement, damage to the central nervous system, and, finally, death.

Work on this disease has been done by Wayne Thompson of the University of Wisconsin-Madison and Henry Balfour of the Minnesota Twin Cities campus. Howard Jenkin of the Hormel Institute also has his finger in the pie, however obliquely. It seems that the sleeping sickness virus bears a striking resemblance to viruses he's studied before, such as Japanese encephalitis virus and dengue fever viruses found mainly in Asia.

The vector, or carrier, of the Japanese encephalitis virus is, as one might almost expect, one of the more common varieties of mosquitoes found along the river banks, *Culex* by name. The reservoir of the virus is the body of a pig. Only incidentally do people play a part in the life cycle of the virus, when they are infected by a mosquito that has already bitten an infected pig. Unhappily, people are the only ones who show signs of the infection.

Again, lipids may play a part in solving a real problem, because certain lipids appear to be required for the virus to grow. Institute researchers are toying with the idea of somehow fooling the virus with fraudulent lipids, thereby killing it. Scientists elsewhere are working on other angles.

spirochetes are hard to train

There is another disease in Minnesota and in other parts of the world, especially the large cities, that is working an even more cruel hardship on people—syphilis.

Syphilis, by all accounts, shouldn't be as hard to treat as it is. Vaccines for dozens of similar bacterial invasions have been devised and put into use. But syphilis germs—*Treponema pallidum*—present immunologists with one seemingly insurmountable problem: they refuse to grow in laboratories. Give them a human body and they'll gradually destroy it, but show them a test tube and they won't bat a spiral. And if you can't cultivate the germs, you can't make a vaccine. It's as simple, and as complicated, as that.

"Syphilis goes through three stages," said Howard Jenkin. "The primary stage can happen after sexual contact and spontaneously disappear. The second occurs a while later, taking the form of skin lesions over the body that also go away. It may take as many as 20 or 30 years before the third, irreversible, stage takes place. The most prevalent symptoms are severe neural damage and mental disease. Many of the people in mental institutions today are people who went untreated or were improperly treated for syphilis in its earlier stages."

We tend to think we have the syphilis problem solved because of penicillin and tetracycline treatment, Jenkin said, but how do we know for sure? It takes a waiting period of 20 or 30 years to tell the full story, and by then it is too late to try the "wonder drugs" again. Researchers are also baffled by the fact that permanent immunity to the disease does not develop after the infection.



TOM FOLEY

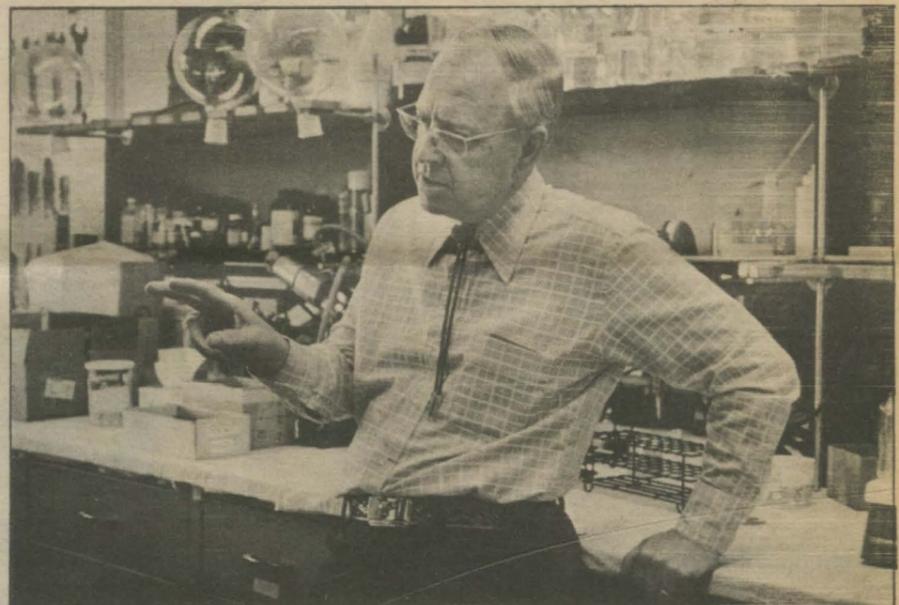
Jacques Chipault

No breakthrough yet, Hormel Institute researchers report. But they are proud to be among the three or four institutions currently awarded grants to try to grow the stubborn spirochete. Last reports have spirochetes alive and spiraling happily after nine days. The previous record was 48 hours.

an aside about legionnaires' disease

"You know," Howard Jenkin speculated, "in all the reports coming from all those studies conducted on the disease that hit the American Legion people in Philadelphia, I haven't heard anyone make much of the fact that the roof of that old hotel is pretty thick with fecal materials from local pigeons."

"There is a disease called psittacosis. It starts as a disease among birds, and



TOM FOLEY

Ralph Holman

sometimes it is transmitted to people. Symptoms are headache, nausea, chills—all leading to bronchial pneumonia. The intake ventilation shafts on the hotel roof were coated with the ideal substance for contagion."

braving the cataracts

Prof. Jacques Chipault explains what cataracts are: "When water and certain metal ions accumulate in the lens of the eye, the lens is made to swell and optical properties are impaired. Light stops going through the lens to the retina and is instead refracted. It is the refraction of light back through the lens that gives the lens its milky white appearance. The whiteness is an optical illusion, but the cataract itself is very real."

Chipault doesn't know what defect in the lens causes the water and sodium ions to suddenly build up and turn back light. The lens grows like an onion, layer after layer, but it is isolated from the circulatory system and receives no nourishment, except by diffusion through its cell membranes. And when we talk about membranes we are also talking about lipids.

Twenty years ago, a drug was developed that promised to reduce cholesterol concentrations in the body. This it did, but it also caused cataracts. When the drug was withdrawn, the cataracts disappeared. Chipault doesn't know yet what the solution will be. The light of discovery, so to speak, is still refracted by the cloud of disorderly data. But that's the way it usually is with basic research. Sooner or later, things clear up.

smelling the roses

Research at the Hormel Institute is diverse. It ranges from animal to vegetable to human, from agriculture to medicine, from molecules to Sunday dinners, from what we are to what we eat.

Lipids are part of many things. Hormel Institute people feel that advances in dealing with such diseases as arthritis, brucellosis, herpes, and cancer will be possible only so far as researchers accumulate basic information on all biochemical fronts, including lipids.

The air we breathe gets in on the action at the institute in ongoing work on how ozone and atmospheric pollutants affect lipid-proteins in people's lungs. Institute researchers also study fish—your aquarium gourami, to be exact—to learn about wax esters.

Hydrogenated fat—the shortening we use in our kitchens—is a matter of considerable debate among scientists: are its artificial lipids safe or not? Lipid researchers have even used their gas chromatographs for analysis of the chemicals that make up various fragrances of flowers.

The Hormel Institute's efforts have not gone unnoted in the scientific community worldwide, even if most Minnesotans continue to associate the name Hormel with Spam.

ginger snaps
and
carrot bites
and things
that go
CRUNCH
in
the night . . .

Newton provided physics with laws of motion. Lister turned medicine on its head with the discovery of germs. Now comes Vickers and her criterion for crunchiness.

The great thing about Zata Vickers' formula—which is certainly celery-snapping, if not earth-shaking—is that it is easy to understand, a far cry from the more cryptic Einsteinian $E = Mc^2$. To quote her formula in its entirety:

Crispness is an uneven, irregular sound produced when you bite food.

What sorts of things pass the crispness test? Ginger snaps, soda

crackers, peanut brittle, and carrots. What sorts of things fail? Chocolate pudding, for one.

"I did most of my crispness research as part of my Ph.D. thesis last year," said Vickers, assistant professor in the Department of Food Science and Nutrition. "My speciality is the properties of food—how we perceive it through taste, odor, appearance, feel, and sound. Sound, especially, has been interesting to me. What kinds of information do people get when they bite into food? What do the noises foods make mean?"

"Take lettuce, for example. Most people like crisp lettuce better than wilted lettuce. A crisp saltine is preferable to a wet saltine. Crispness

is a quality that is never spoken of in a derogatory sense—it is always pleasant. And everyone knows what he or she means when the word 'crisp' is used. It means that the food breaks easily, or that it breaks cleanly, or something like that. I asked several people what they meant by crisp and could come up with no clear conclusion.

"I prepared a tray of foods, including butter cookies, ginger snaps, peanut brittle, carrots, celery, and apples, and had people test the foods, using several tests. The first is a hand test, in which the subjects tap the food on the plate or break it in their fingers. In the second, the subjects bite it

by Michael Finley



TOM FOLEY

regent rings
bell,
applophiles
salivate

First of all, it isn't red. At least, not all red. If you gaze deeply into it for a few seconds, other colors show themselves. Its north pole is green, the color of the first buds of spring. The red part is a series of stripes extending longitudinally upward from its south pole. Interrupting these stripes is a galaxy of small yellow stars—semidwarfs probably—each clump forming a constellation on the apple's skin: The Orchardman, The Cider Press, The Pie.

Apples have been around so long that it is difficult to think of them in a new way. They are the first things to come to mind that start with the letter A. William Tell took aim at one, to the tune of "the Lone Ranger theme." Eve's and Adam's apple was the beginning of all knowledge.

But this apple, easily as tempting as its ancestor, is different. It's new. With it, a team of plant breeders and testers at the University have given new meaning to the assertion that God doesn't make those little green, red, and yellow apples all by himself.

"This is the Minnesota Regent apple," says Shirley Munson, assistant professor of horticultural science and landscape architecture. "It's our favorite creation, a cross between Daniel's Red Duchess and Red Delicious. It has the crunchy texture people like in the Delicious, but it has a much better taste. Here, have a slice."

If Adam's apple imparted the knowledge of good and evil, and Isaac Newton's, gravity, the Minnesota Regent imparts far subtler intuitions.

It is simultaneously sweet and tart, is satisfyingly crunchy, and has snow-white flesh and taut, dappled skin. For a moment, time is suspended, gravity is held in abeyance, even good and evil wait in the wings, while incisors and tongue go to work on the apple.

"At first we wanted to call it the Minnesota Regal," Munson said. "But when we applied to the American Pomological Society for the name, we learned that 'Regal' was already taken. That was when we thought of 'Regent.' We like it much better. It has a classy ring to it, don't you think?"

Apples are famous for the ideas they give people. Munson and her colleagues have ideas, in turn, for the Regent and other recent fruit inventions.

using their front teeth. In the third test, they bite it using their molars.

"What I found out was that the front-teeth biting test was the best test for detecting crispness. I varied the crispness of the foods. A good ginger snap is very crisp, but even a little moisture in the air will make it hard and rubbery. With the carrots and celery sticks, I used both fresh and blanched, or slightly cooked, vegetables. The apple I used was a year old and very mushy.

"In the end, the ginger snap was found to be crisper than the butter cookie, followed by the peanut brittle—which some people thought was brittle, all right, but not exactly crisp—then the carrots, celery, and mushy apple.

"But the problem was that I still had no working definition of crispness, just the consensus of the subjects. For instance, if a ginger snap breaks in two easily, it's a sign of crispness. But a crisp carrot bends almost as much as a limp carrot before breaking. I couldn't find a definition that applied to all foods."

Vickers went so far as to cook several carrots for different periods of time—for five minutes, for ten minutes, and so on. With each sample, the subject was asked whether the carrot was crisp or not. If she could find agreement on when the carrot ceased to be crisp, she would have a crispness threshold. But every subject had a different idea of where the crispness threshold fell.

Finding no textural standard for the concept of crispness, it occurred to Vickers that she'd been approaching the problem from the wrong angle. Crispness may not be an expression of texture at all, she decided. Crispness and crunchiness might be expressions of sound.

Sure enough, tests with sound-measuring equipment demonstrated what tapping and breaking between the fingers could not: that "crispness is an uneven, irregular sound produced when you bite food."

Advancing quickly where no scientist had ever been before, Vickers found that there are two basic kinds of crisp foods: wet crisp foods and dry crisp foods. A strip of green pepper—one of the loudest of all foods—belongs in the first category. A chow mein noodle belongs in the second.

What causes the crunch when you bite the green pepper slice? Vickers said that it is the explosion of pressurized cells within the living pepper tissue. Biting into it is like popping a balloon. The crunch of the chow mein noodle has a different origin entirely: it is simply the shattering of rigid, dead tissue, more like the explosion of a grenade.

Interestingly enough, the wet and dry types of crisp foods enjoy opposite properties. If you soak a carrot in water, it becomes even crisper. If you soak a saltine in water, it becomes very un-crisp. This Vickers had known earlier.

TOM FOLEY



Zata Vickers

The reason potato chips are curved, Vickers said, is because that way, when we bite them, we break them at many points, causing maximum crunch. If potato chips were flat, their crunch potential would be greatly inhibited.

Crunch, she said, is a component of crispness. Specifically, it is the low-pitched sound that we hear vibrating through our jawbones, as opposed to the high-pitched, crisp tones that pass from the potato chip

out of our mouths, into the air, and around our heads to our ears.

"The snack-food industry has gone pretty crazy about crunchy food in the past few years," Vickers said. The first food with a name advertising its sound was the candy bar Krackel. Since then, advertisements for extra-crispy chicken, tortilla chips, kids' breakfast cereals, and TV snacks have addressed themselves almost exclusively to the sound effects of the products.

"It's really understandable, from a marketing point of view," Vickers said. "How, for instance, can you convey the taste of a product, or the way it smells? You just can't do that on television. But crunch is easy to do. You just have someone crunch the product."

Beyond her research on food sonics, Vickers has other thoughts about crunchiness. "It's somehow pleasant, reassuring. When company comes, you don't offer them something quiet, like chocolate pudding. Carrot sticks and corn chips are much more comforting in a social situation."

How does Vickers feel to be the Einstein, Edison, and Galileo of her chosen specialty, all rolled into one?

"Well, I think the fact that no one's studied it up to now gives you an idea of how important it is."

"In 1977 we'll be introducing three new apples and two new grape varieties," she said.

Before these new creations make their debut, she said, rigorous tests must be performed on them. As a professional apple (and grape and berry and potato, etc.) evaluator, Munson tests the fruit with impartial, paid panelists. In these tests, she learns what different palates make of

the fruit's texture, color, size, shape, aroma, and taste.

"It isn't easy to train a panel in a short time," she said. "People are different and react differently to things. Some people, myself included, cannot tolerate slimy textures, or 'mouth-feels' as I like to call them. Some people's complexions break out at the mention of strawberries. Lots of people simply aren't consistent from one test to the next."

Munson's testing room includes lighting apparatus that disguises the color of food being tested. If an apple with a gorgeous complexion, like the Regent, is to compete in a taste test with an uglier apple, the difference in appearance can be neutralized by turning them both blue, or orange, or green.

Foremost among the other new apples is the Prairie Spy. Taste-wise, it compares agreeably with the sainted Regent. Color-wise, however, it compares to lichen on a table-top. This russet appearance may turn some people off to using it in centerpieces, Munson said, but its taste blinds one to its imperfections.

Minnesota is not a major apple-producing state, she said. Washington is the main apple state, the source of most supermarket apples. But local apples, such as the Beacon—or "State Fair"—apple, do have a cult following that will probably intensify in future years.

The unveiling of the Minnesota Regent should set the world of apples rocking. It is that kind of apple. The kind you want to worship.

If that isn't sacrilege enough, fruit breeders on the project—including Cecil Stushnoff, Harold Pellet, Emil Anderson, and pioneer plant breeder William Alderman—are hard at work

shaking new apples down from their sleeves.

Promises of new apples are more than just pie in the sky. Plant breeders expect major turnovers in the apple field. So be prepared to fritter away your time with sauces, strudels, cider, and other applications.



Shirley Munson

TOM FOLEY

p-o-i-s-o-n spelled out in #2 red dye

by Sunita K. Yawalker

Food colors and preservatives seem to be making headlines with alarming regularity these days. The coal-tar derivative Red No. 2 was banned not long ago. More recently, the coloring agent used on maraschino cherries, Red No. 4, has been banned.

"A stage has come," said Vernal S. Packard, Jr., professor of food science and nutrition, "when in the mind of the consumer, the word additive is spelled p-o-i-s-o-n."

First cyclamate, the artificial sweetener, was banned. Then questions were raised about the safety of BHT, a flavor protector. After that came concern over monosodium glutamate (MSG), a flavor enhancer, and sodium nitrite, the preservative used in cured meat products.

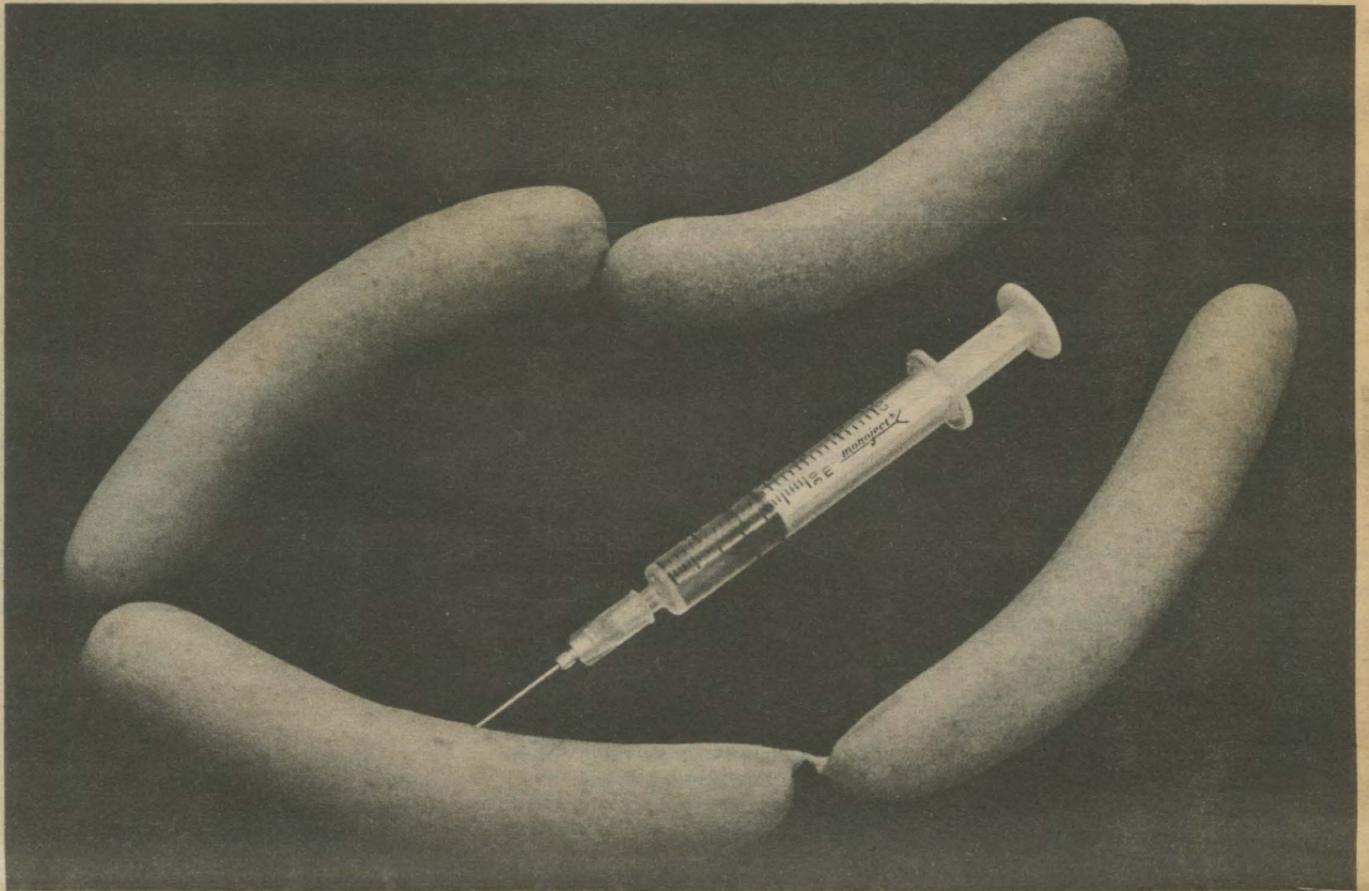
"Such announcements can cause real consumer concern," Packard says in his recently published book, *Processed Foods and the Consumer: Additives, Labeling Standards, and Nutrition* (University of Minnesota Press).

In his book, he said, he has tried to place the use and nature of food additives in the proper perspective. According to Packard, additives can be divided into three general classes: intentional additives, which would be better understood simply as food ingredients; incidental additives, or contaminants of "known origin"; and chance contaminants, the dirt and dust and pieces of miscellany that happen to be in food by chance alone.

TOM FOLEY



Vernal S. Packard



TOM FOLEY

Sodium bicarbonate (baking soda) is an example of an intentional additive. In the home, it is added to bread dough to make it rise. When the commercial baker uses sodium bicarbonate, it is considered an additive.

After one has finished washing and drying dishes at home, some detergent might still remain on the dishes. When a food processor cleans the processing equipment, a similar detergent remaining afterwards (in the same minute amounts) becomes an incidental additive to the next batch of food processed.

Chemical names associated with additives are often the cause of fear and hesitancy, but chemicals are literally the stuff of life, Packard said. "All things, living and unliving, can be broken down into a baker's variety of chemical compounds." As the book states, Aceton-3-hydroxy-2-butanone may sound dangerous to those unschooled in chemistry, but it is one of the characterizing flavors found naturally in butter.

Not many people would knowingly drink wood alcohol, a well known poison, yet wood alcohol (methanol) is a natural ingredient of coffee. So is caffeine, which is three times as toxic as the dandelion spray 2,4,D, according to Packard.

Salt, the universal consumer product used every day, also is a toxic compound, comparatively speaking. It is more toxic than piperonyl butoxide, a compound used in household insect sprays. "There's no such thing as absolute safety in any food," Packard said.

Then how is it that we manage to survive? Packard explained that it is a simple, yet unimaginably complicated question involving the amount consumed and the relative toxicity of

the individual chemicals. Anything consumed in overdose is lethal, and there are real dangers in our passion to eat mountains of commonplace foods such as sugar and meat, he says in the book.

Use of additives is often hard to avoid, and for a food processor the alternatives are often limited: risk the growth of toxic agents or add a preservative, Packard said. A number of poisons that can be produced by bacteria, molds, and fungi have the ability to grow on a variety of foods. Certain *salmonellae* (bacteria) can cause flu-like symptoms, while some toxins produced by molds and fungi can cause illness as slight as mild nausea or as complex as cancer. Another bacterium, *C. botulinum*, produces a toxin that can cause death in a matter of days.

The question is which preservatives and other additives, in what amounts, might do more harm than good. Suspected of causing cancer, the sweetener cyclamate was banned in 1969. However, with cyclamate levels at one fourth gram to one gram per 12-ounce bottle, a person would have to consume 138 to 552 bottles of diet soft drinks per day to equal the toxic dosage consumed by the test animals in early experiments. And as Packard points out, scientists have not yet been able to prove that cyclamates cause cancer.

An ad hoc committee of the National Cancer Institute recently questioned whether or not any substance, once banned with widespread notoriety, could be expected to regain acceptability if it were to be reinstated. "And whether or not it serves a useful purpose," Packard adds. "That's where perspective is badly needed."

Color additives are a case in point. Recently banned Red No. 2 and Red

No. 4 are both synthetic coloring additives. Naturally occurring coloring agents such as riboflavin (vitamin B²) and turmeric (a spice) are also used to color food. Acceptable daily intake levels for these natural coloring agents are no higher—in fact, they average lower—than levels for the coal-tar synthetics, Packard writes.

"I do not want to remove concern about additives in food, but I would like to see it tempered with realism and fact," Packard said. "Clearly, the best way to avoid food intoxication is to eat moderately a wide variety of foods, except where allergies dictate exclusion of certain food items."



Greta Garbo

Extravaganzas such as *Earthquake* and *Midway*, which attract large audiences and require a big screen to compete with television, have been promoted more in recent years. And there is less comedy, Davidson said, adding that the popularity of comedy has risen and fallen periodically. "Some production companies are not going to take the chances that a studio would with a comedy," he said.

According to Deutsch, women's roles have evaporated. *Jaws*, *The Godfather*, and *All the President's Men* are a few examples of recent successes that have no women in major roles, he said.

"The roles of women are in flux in our society, and Hollywood is not going to take chances on anything but the old formulas," Davidson said.

As a result, Deutsch said, there are no female stars today with the consistent popularity that women such as Marlene Dietrich, Katharine Hepburn, and Vivien Leigh have had in Hollywood's history.

Faye Dunaway is the only female actress who seems to get consistently good roles, Davidson and Deutsch

holdings," Deutsch said. Most people consider the directors and stars, he said, but overlook the importance of the studios in the movie industry.

"The current state of the art is very disturbing," he said. "By studying it, I'm not trying to perpetuate it—I'm trying to reform it. One of the ways to do this is to look at the past and educate consumers about what is being sold to them, to be aware of the values the movies are perpetuating."

Davidson and Deutsch believe it is important to study popular culture such as movies. "I see our course as something that may add to people's understanding," Davidson said. "The more one understands something, the more one can enjoy it. It's like becoming a better reader."

Davidson thinks movies provide varied experiences. "People who wouldn't think of lumping all novels together and criticizing them do that with movies. But there are all types—good and bad," he said.

"Movies are an important index or indication of the culture we're trying to study," Deutsch said. "They reinforce or promote certain values."



PHOTOPLAY

Marlene Dietrich

movies: they don't make them like they used to

by Bill Huntzicker

Are you seeing more movies these days but enjoying them less? So are a couple of University people who are teaching an extension course called Movies and the American Experience. They are Jim Deutsch and Jim Davidson, both of the American Studies program on the Twin Cities campus.

"The economic imperatives of the motion picture have changed drastically," Davidson said. "The bottom has dropped out of the market for new movies."

"The studios used to produce a large number of pictures that grossed roughly the same amount. Since 1970, a handful of movies like *Jaws* and *The Godfather* have made over \$100 million, and the producers are playing roulette to get a blockbuster," he said.

Deutsch said that under the old studio system, directors would spend only about 20 percent of their effort on economic problems and about 80 percent making the movie. "Today, the percentages are reversed. In that sense, there is less freedom," he said.

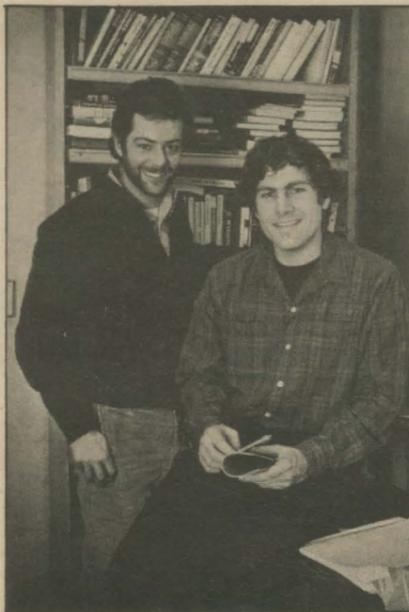
The large studios that owned their own distributors and theaters were assured that theaters would show their movies, and they were in a better position to take chances and to experiment, Deutsch said. Today, there are hundreds of independent producers creating packages for the studios, which have mostly become mere financial institutions to buy, promote, and distribute films.

The content of the movies has changed as a result. "The movies have put a cheap premium on romance and life, creating a casualness toward sex and violence," Deutsch said.

said. Liza Minnelli has made six or seven films, Ali Magraw has made only three, and Jane Fonda has made a number of good movies but has not had any major roles in the last few years.

According to the two men, most recent women's roles portray either prostitutes, as in *Klute*, or demonic, malicious people, as in *The Exorcist* and *One Flew Over the Cuckoo's Nest*.

"The new Hollywood has emerged since 1970, about the time MGM and Fox auctioned off many of their



Jim Davidson and Jim Deutsch

"They are, to some extent, documents of certain times and places," Davidson said. "Movies take you to exotic places in other societies and to places within our society, such as inside rich people's homes."

Davidson had just come from watching a 1913 French movie, which, he said, took him to places that he had

never seen and that no longer exist. "Just the street scenes give you some indication of what life was like," he said.

American movies gained much of their early popularity among immigrant groups who lived in poverty and did not understand the English language, Deutsch said. "They had no trouble understanding a silent movie," he said, "and the movies lifted them out of their New York City squalor to see the American dream. Movies pacified the masses."

Westerns were introduced at the turn of the century, Deutsch said, when Butch Cassidy was still alive and Jesse James and Billy the Kid had been dead only 20 years. "*The Great Train Robbery* was filmed in New Jersey in 1903 when train robberies were still occurring," he said, adding that the western was a defense reaction by white males who saw the frontier disappearing.

Deutsch, who recently completed his master of arts degree in American studies at Minnesota, plans to leave for Mississippi when the course is finished. Davidson, who teaches in the English department, has a master of arts degree in American studies from Boston College and is working on his doctorate at the University of Minnesota.

Twin Cities campus

St. Paul Student Center Films (North Star ballroom)

Jan. 21—*The Sailor Who Fell From Grace With the Sea*, 7:30 p.m.
 Jan. 22—*The Sailor . . .*, 7:30 & 9:30 p.m.
 Feb. 4—*The Night Porter*, 7:30 p.m.
 Feb. 5—*The Night Porter*, 7:30 & 9:30 p.m.
 Feb. 18—*Funny Girl*, 7:30 p.m.
 Feb. 19—*Funny Girl*, 7:30 & 9:30 p.m.
 Mar. 4—*Shampoo*, 7:30 p.m.
 Mar. 5—*Shampoo*, 7:30 & 9:30 p.m.

St. Paul Student Center Jazz (Rouser room, 7 p.m.)

Feb. 23, Mar. 2, 9

Scandinavian Days (North Star ballroom, noon)

Jan. 12—Norway
 Jan. 19—Denmark
 Jan. 26—Sweden
 Feb. 2—Finland

St. Paul Student Center Dances (North Star ballroom, 8 p.m.)

Jan. 14—Square Dance
 Feb. 3—Rock Dance
 Feb. 11—Square Dance

St. Paul Student Center Drama

Feb. 9—Guthrie Theater: "A Party for Two," 8 p.m.

St. Paul Student Center Galleries

Through Jan. 28—Watercolors by Marian Cooper, Mixed Media by Del Chamblee, Handcrafted Glassware by John Dingley
 Jan. 31-Feb. 25—Montage by Mary Ellen Horty, Photographs by Joe Gerber
 Feb. 28-Apr. 1—Japanese Sumie Paintings by Mitsuko Evans; "Our American Heritage," photographs by Del Cass

Concerts and Lectures (Northrop Auditorium, 8 p.m.; tickets: 373-2345)

Jan. 11—Royal Winnipeg Ballet
 Feb. 17—Inbal Dance Theatre of Israel
 Feb. 19—Paul Taylor Dance Company
 Mar. 5—San Francisco Ballet
 Mar. 6—San Francisco Ballet, 3 p.m.
 Mar. 3—Bayanihan Philippine Dance Company
 Mar. 13—Osipov Balalaika Orchestra

Candlelight Concerts (St. Paul Student Center, 8 p.m.; tickets: 373-1051)

Jan. 18—The Viennese Violins (dinner, 6:15 p.m.)
 Jan. 25—St. Paul Chamber Orchestra String Quartet
 Feb. 8—Macalester Trio
 Feb. 15—Jeffrey Van, guitar, & Adele Zeitlin, flute (dinner, 6:15 p.m.)
 Mar. 8—Renaissance Chamber Consort

Punchinello Players (North Hall, 8 p.m.; tickets: 373-1570)

Feb. 18-19, 25-26, Mar. 4-5—*The Effect of Gamma Rays on Man-in-the-Moon Marigolds*

The Whole Coffeehouse (Coffman, doors open 8:30 p.m.)

Jan. 14-15—Mighty Joe Young
 Jan. 21-22—Josh White, Jr.
 Feb. 4-5—Lonnie Knight & Barb With
 Feb. 11-12—Luther Allison
 Feb. 18-19—James Lee Stanley
 Feb. 25-26—Reginald Buckner
 Mar. 4-6—Ben Sidran

Music Department Events (Scott Hall, 8 p.m.)

Jan. 13—Tokyo String Quartet, 3:15 p.m.
 Jan. 14—Tokyo String Quartet, 10:15 a.m.
 Feb. 4—University Symphony Band, Northrop
 Feb. 6—University Wind Ensemble and Brass Choir; Northrop, 3 p.m.
 Feb. 7—Raphael Hillyer, viola
 Feb. 10—University Symphonic Chorus and Symphony Orchestra, Northrop
 Feb. 13—University Jazz Ensembles; Coffman, 4 p.m.

More Music Department Events (Scott Hall, 8 p.m.)

Feb. 25-26—Opera Workshop
 Feb. 27—University Symphony Bands II & III; Northrop, 2 p.m.
 Mar. 2—Concert Choir, Chamber Singers, & Orchestra; Northrop, 7:30 p.m.
 Mar. 3—Ruben Haugen, saxophone, & Charles Forsberg, piano
 Mar. 6—University Wind Ensemble; Northrop, 3 p.m.
 Mar. 9—University Men's Chorus & Brass Choir
 Mar. 10—University Symphony Orchestra, Northrop

Coffman Union Popular Films (Theater-Lecture Hall)

Jan. 14-15—*All the President's Men*, 7:30 & 10 p.m.
 Jan. 20-21—*Swept Away*, 7:30 & 9:45 p.m.
 Jan. 27-28—*Seven Beauties*, 7:30 & 9:45 p.m.
 Feb. 4-5—*Amarcord*, 7:30 & 9:45 p.m.
 Feb. 11-12—*The Godfather*; West Bank Auditorium, 7 & 10:15 p.m.
 Feb. 24-25—*Last Tango in Paris*, 7:30 & 10 p.m.
 Mar. 4-5—*Face to Face*, 7:30 & 10 p.m.

American Film Theater (Coffman Theater-Lecture Hall, 7:30 p.m.)

Jan. 12—*The Man in the Glass Booth*
 Jan. 19—*The Maids*
 Jan. 26—*Galileo*
 Feb. 2—*Jacques Brel Is Alive and Well and Living in Paris*
 Feb. 9—*In Celebration*

More At Coffman Union

Feb. 11-12, 18-19—Drama: *First Breeze of Summer*, 8 p.m.
 Wednesdays—Lecture Series: "Literature and Other Arts"
 Thursdays—Performing Arts Series

University Theatre (Rarig Center; tickets: 373-2337)

Jan 28-Feb. 13—*Happy End*
 Feb. 18-Mar. 6—*The Prime of Miss Jean Brodie*
 Feb. 26—*Johnny Moonbean and the Silver Arrow*
 Feb. 8-9—Theatre of the Word (Brecht)
 Mar. 1-3, 8-10—Winter Workshop

University Gallery (Northrop Auditorium)

Through Feb. 17—"Purcell & Elmslie, Architects"
 Jan. 14-Feb. 20—"Perspectives on Dane Rudhyar as Creative Artist"
 Feb. 15-Mar. 15—"Classical Narratives in Master Drawings"
 Mar. 3-17—Lorna Ritz, faculty artist

Coffman Galleries

Jan. 5-29—Sculpture by Robert Saxon, Undergraduate Printmaking Exhibit, Posters from Amnesty International
 Jan. 31-Feb. 24—Photography of Rebert Sengstack and Lawrence Sykes

Art in Tribal Culture Film Series (Coffman Gallery, noon)

Feb. 3—*The Crooked Beak of Heaven & Behind the Mask*
 Feb. 10—*Man Blong Custom & The Sweat of the Sun*
 Feb. 17—*Woven Gardens & Kingdom of Bronze*
 Feb. 25—*Across the Frontiers*

Natural History Film Series (Bell Museum, 12:15 p.m. Fri., 2:30 p.m. Sun.)

Jan. 14-16—*Giants in the Sky, The Red Fox, & Private Life of the Mute Swan*
 Jan. 21-23—*This Land*
 Jan. 28-30—*The Early Americans*
 Feb. 4-6—*Kodiak Island, How To Build an Igloo, & Birch Canoe Builder*
 Feb. 11-13—*Lower Than the Angels*
 Feb. 18-20—*Moonwalk*
 Feb. 25-27—*Not So Solid Earth, Volcanoes: Exploring the Restless Earth, & Succession on Lava*
 Mar. 4-6—*In Search of a Mate & Life in a Tropical Forest*

F. L. Jaques Natural History Art Gallery (Bell Museum)

Through Jan. 18—Alfred Martin: Watercolors, Drawings, & Prints
 Jan. 22-Feb. 20—"The Tallgrass Prairie"
 Feb. 23-Apr. 10—Watercolors and Scratchboards by Dana Gardner

Duluth campus

Theater (Marshall Performing Arts Center)

Jan. 11—Dudley Riggs' Brave New Workshop
 Jan. 19—Guthrie Theater: "A Party for Two"
 Feb. 17-19—UMD Theatre: *Oh Dad, Dear Dad, Mama's Hung You in the Closet and I'm Feeling So Sad*

Dance (Marshall Center, 8:15 p.m.)

Jan. 25-Mar. 8—Duluth Ballet

Music (Marshall Center, 8:15 p.m.)

Jan. 14—Patricia Laliberte, piano, & Rosalind Laskin, mezzo-soprano
 Jan. 26—Larry Coryell, guitar
 Jan. 27—Jazz Ensemble I
 Feb. 22—UMD Concert & Honor Bands, 7:30 p.m.
 Feb. 24—Thad Jones-Mel Lewis Orchestra
 Feb. 25—Leo Kottke
 Feb. 27—University Singers
 Mar. 1—UMD-Community Orchestra
 Mar. 3—Jazz Lab & Varsity Bands
 Mar. 4—Harp Trio
 Mar. 10—Donna Pegors, soprano, and Patricia Laliberte, piano

Films (Bohannon Hall, 8 p.m.)

Jan. 12—*The Passenger*
 Jan. 19—*Fellini Satyricon*
 Jan. 26—*Siegfried*
 Jan. 27—*Kriemhild's Revenge*
 Feb. 2—*Dodes Ka-Den*
 Feb. 9—*The Seduction of Mimi*
 Feb. 16—*Savage Messiah*
 Feb. 23—*Weekend*
 Mar. 2—*Simon of the Desert*

Tweed Museum of Art

Through Feb. 2—"Turn of a Leaf," photographs by Michael Catlin; Color Nature Photographs by Dan Litchfield
 Through Feb. 13—From the Permanent Collection
 Feb. 6-Mar. 2—Faculty Invitational Exhibition
 Feb. 15-Mar. 2—Paintings and Prints by Brian Swingler
 Mar. 6—Art from Duluth Elementaries
 Mar. 4-27—From the Permanent Collection
 Apr. 2-May 8—International Crafts

Morris campus

Films (Edson auditorium)

Jan. 13—*Verdiani*, 8:15 p.m.
 Jan. 15—*The Learning Tree*, 2 p.m.
 Jan. 20—*Catch-22*, 7 & 10 p.m.
 Jan. 26—*Straw Dogs*, 7 & 10 p.m.
 Jan. 29—*The Scarlet Claw*, 2 p.m.
 Feb. 5—*Chamber of Horrors*, 2 p.m.
 Feb. 10—*Lady Sings the Blues*, 7 & 10 p.m.
 Feb. 12—*The Producers*, 2 p.m.
 Feb. 25—*Blow-Up*, 8:15 p.m.
 Mar. 10—*Black Girl*, 8:15 p.m.
 Mar. 12—*His Girl Friday*, 2 p.m.

Theater (8:15 p.m.)

Jan. 19-22—*Tiny Alice*, Black Box Theatre
 Mar. 2-5—*South Pacific*, Proscenium Theatre

Performing Arts Series

Jan. 23—Alice Parker: "Songs of Eve," Recital Hall, 3:30 p.m.
 Jan. 25—The Guthrie Theater: "A Party for Two," Edson, 8:15 p.m.
 Feb. 3—Concentus Musicus, Recital Hall, 8:15 p.m.
 Feb. 14—Jazz Opera: *Solomon and Sheba*, Harlem Opera Society; Edson, 8:15 p.m.

Concert and Coffeehouse (Edson, 8:15 p.m.)

Jan. 19—Lamont Cranston, 9:15 p.m.
 Jan. 21—Chamber Choir, Alice Parker conducting; Recital Hall
 Jan. 28—Michael Johnson
 Feb. 11—Comfort Station
 Feb. 22-23—Dakota Dave Hull & Sean Blackburn
 Mar. 6—Choral-Orchestral Concert, 3 p.m.
 Mar. 8—UMM Band, Recital Hall

Crookston campus

Films (Kiehle, 8 p.m.)

Jan. 17—*Tora! Tora! Tora!*
 Jan. 31—*M*A*S*H*
 Feb. 14—*Dirty Harry*
 Mar. 7—*Walking Tall*
 Mar. 21—*Dr. Zhivago*
 Apr. 4—*The Dove*

Music (Trojan Inn, 8 p.m.)

Jan. 25—Frank Hall, guitarist
 Jan. 28—Dance: Transit, Eagles Hall, 9 p.m.
 Feb. 7—Dakota Dave Hull & Sean Blackburn
 Feb. 15—Missouri Woodland Duo

Miscellaneous

Jan. 28—Ag-Arama, all day
 Feb. 19—Talent Festival, Kiehle

Waseca campus

Jan. 12—Dance: Toys, 9 p.m.
 Jan. 25—Michael Johnson, 8 p.m.
 Feb. 1—Film: *The Sailor Who Fell From Grace With the Sea*, 8 p.m.
 Feb. 9—Dance: Headstone, 9 p.m.
 Feb. 12—Sleigh & Cutter Parade, 1:30 p.m.
 Feb. 15—Dudley Riggs' Brave New Workshop, 10 a.m.
 Feb. 22—UMW Chorus, 10 a.m.
 Feb. 22—Film: *The Hindenburg*, 8 p.m.
 Mar. 2—Dance: Melisma, 6 p.m.

update

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BACK TO THE CITIES!

seen one city,
you've seen
'em all,
right?
look again...

by Maureen Smith

Nobody would mistake Baltimore for Cleveland or Boston for Houston. Even Minnesota's "twin cities" of Minneapolis and St. Paul are two distinct cities. Yet a mythology of urban life and urban problems persists as if all cities were alike.

Government planners, caught in the mythology, create programs that work in one city but not in another.

John S. Adams, professor of geography and public affairs at the University of Minnesota, and his colleague Ronald Abler at Pennsylvania State University have just completed a

six-year, multivolume project intended to show the nation's 20 largest metropolitan areas in their true texture and diversity.

The final volume, drawing together information from separate studies of each city and of several policy issues, is *A Comparative Atlas of America's Great Cities*, published by the University of Minnesota Press. Even at \$95 a copy, Adams said, "the Press is selling them like hotcakes."

In an interview, Adams talked about some of the difficulties that arise when people hold a monolithic view of cities.

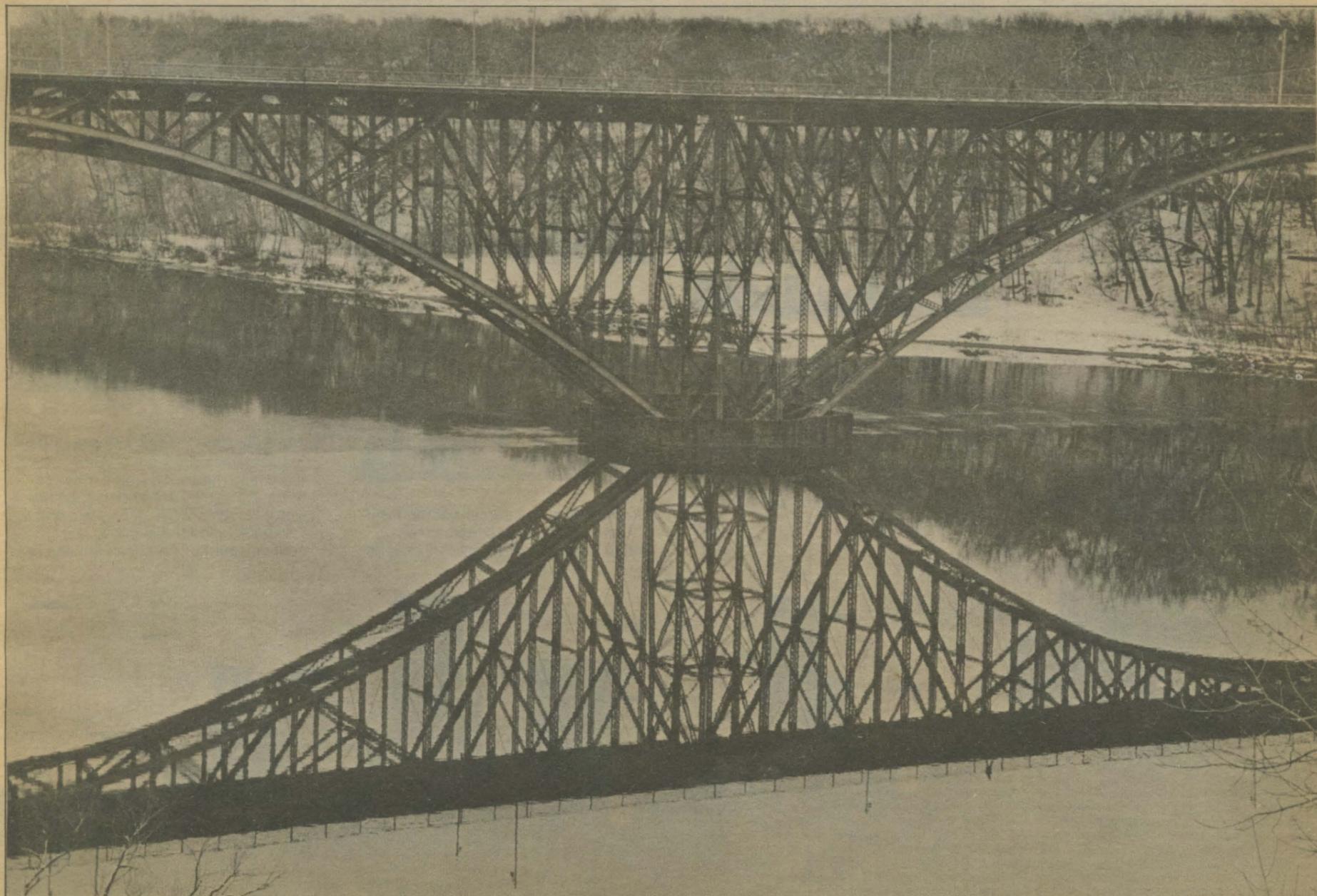
Suppose that a city's public school officials want to build a program for

Spanish-speaking children in the elementary grades. It makes a difference whether those children are from middle- and upper-class Cuban families in Miami, families of new Mexican immigrants in Dallas-Fort Worth, established Mexican-American families in Los Angeles, or Puerto Rican families in New York City.

Even when decisions are made locally, Adams said, planners may be guided by what they have heard through the national media.

Adams drew another example of diversity from the schools. Discussions of city schools usually focus on

This bridge on the Mississippi does more than span the bluffs. It also connects two unique American cities. St. Paul has been called the last eastern city, Minneapolis the first western one. Tumbleweed is sometimes sighted gusting down the streets of Minneapolis, but it never crosses into St. Paul.



TOM FOLEY

In the 1950s, it was very unfashionable to live in areas near downtown. Everyone was in a hurry to move to Roseville or Golden Valley. Twenty years later, the fashions have changed.

footnotes to an atlas, or, tail-ends of two cities

by Elizabeth Petrangelo

The rest of the world thinks the Twin Cities are one city—Minneapolis. *Fortune*, *Time*, and *National Geographic* magazines have told their readers that Minneapolis is a great place to live. St. Paul? Well, St. Paul residents have a chamber orchestra and the State Capitol, and they are all jealous of Minneapolis.

A completely different view is given in *A Comparative Atlas of America's Great Cities: Twenty Metropolitan Regions*, by Ronald Abler and John S. Adams. The atlas tells its readers that Minneapolis and St. Paul are two very distinct cities, despite their proximity. And they are both great places to live.

To use the atlas, you have to understand a key abbreviation. SMSA stands for Standard Metropolitan Statistical Area, which means a central population cluster and a surrounding area closely linked to that cluster, with a combined population of at least 50,000 people.

The Twin Cities SMSA—Hennepin, Ramsey, Anoka, Dakota, and Washington counties—is the 15th most populous in the nation with 1.8 million people.



Although the Twin Cities area has a reputation of being strongly Scandinavian, the immigrant groups are disappearing rapidly. Swedish foreign stock is the largest ethnic group in the SMSA, but it barely exceeds 3 percent of the population. (Someone who was born in Sweden, or with one or both parents born in Sweden, is of Swedish foreign stock.)

public schools. "Most people are astonished when you tell them that until recently well over a third, or close to 50 percent, of the elementary school children in some cities were in nonpublic schools," he said.

Although the percentages of elementary school children in parochial schools are dropping, they are still significant in such cities as Pittsburgh (33.9 percent), Philadelphia (33.7 percent), and St. Paul (33.6 percent). By contrast, only 1.9 percent of the school children in Atlanta attend parochial schools.

What parochial schools mean in the life of a city becomes even more apparent when the percentages are mapped by neighborhood. The percentage of children in parochial schools is about 60 percent in western St. Paul and well below 20 percent on the east side of the city. In many neighborhoods in the southwestern

(to column 8)



Minneapolis and St. Paul are almost equal in area, but the population density is 7,900 people per square mile in Minneapolis and 5,900 people per square mile in St. Paul. Overall, the Twin Cities' population density is 6,900 people per square mile—more like that of Los Angeles (5,100) than that of Chicago (15,000).



"The median age in the Twin Cities SMSA is 26 years," the atlas states. "The median ages of the Minneapolis and St. Paul populations are 29 and 28, respectively." Nine percent of the people in the Twin Cities SMSA are over 64 years of age.



For each male in the Twin Cities SMSA, there are 1.07 females, an imbalance caused largely by young women from other parts of the state moving to the two cities to find jobs.



Blacks make up 4 percent of the Twin Cities population and are concentrated mostly in three neighborhoods

in the two cities. "The Twin Cities' early black community was small (4,500 in 1940) and primarily an offshoot of the railroad industry," the atlas states. It is still small: the Twin Cities SMSA has the lowest proportion (1.8 percent) of blacks of any of the SMSAs in the atlas.



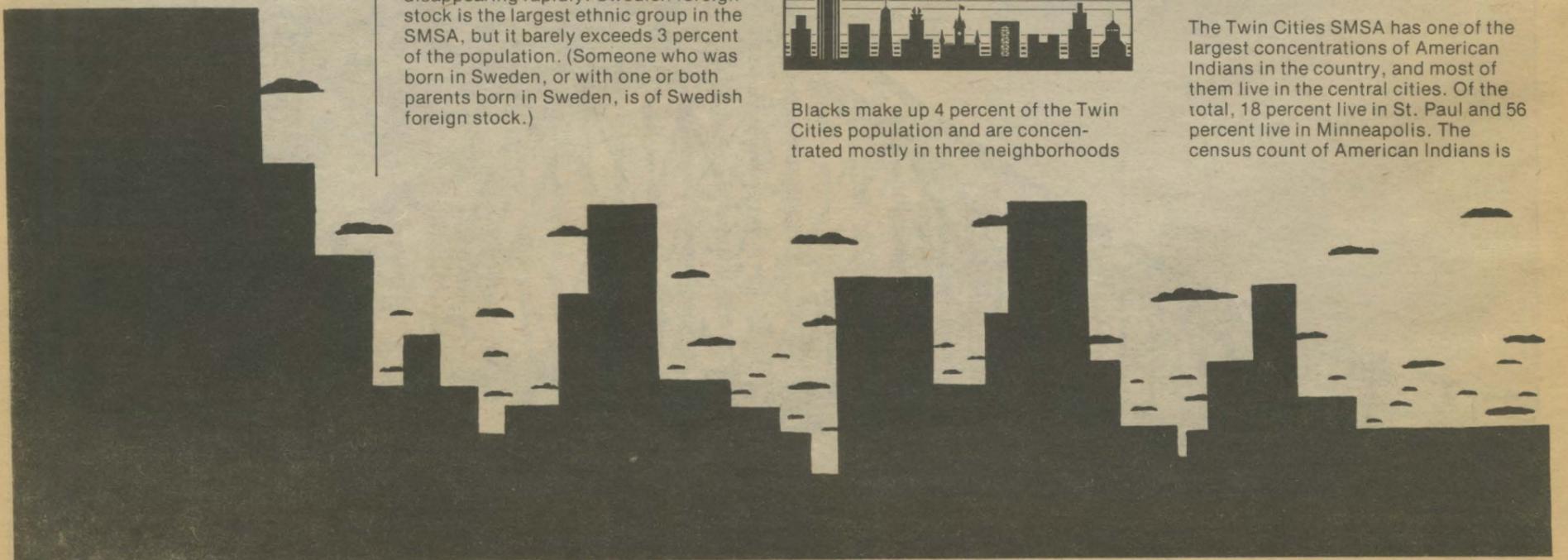
An unhappy note: While not many blacks work for the railroad any more, they still have not moved into well-paid jobs to any great degree, and the median family income for Twin Cities blacks falls \$4,000 short of that for whites.



Of the 16,700 Spanish-Americans living in the Twin Cities SMSA, 23.6 percent live in Minneapolis and 39 percent live in St. Paul. Most are of Central and South American stock or are indigenous Mexican-Americans who came to Minnesota originally in the early days of the sugar beet industry in the Red River Valley.



The Twin Cities SMSA has one of the largest concentrations of American Indians in the country, and most of them live in the central cities. Of the total, 18 percent live in St. Paul and 56 percent live in Minneapolis. The census count of American Indians is

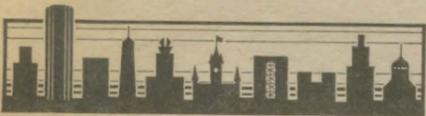




Two neighborhoods, one in St. Paul, the other in Minneapolis. Can you tell which is which? (The Minneapolis houses are on the left.)

Surprise, surprise: not only is St. Paul younger than its sister, Minneapolis, but it makes more money, too!

probably low, because there is free movement between the cities and the Indian reservations in north-central Minnesota.



On the average, there are 2.6 people in Minneapolis households and 2.9 in St. Paul, with the largest households located in the suburbs and the smallest in the central business districts of both cities. Blacks have larger households than whites, with the average for Minneapolis at 3.1 people and for St. Paul 3.2 people.



Thirty-three percent of the people in the Twin Cities SMSA work force are in service occupations; 29 percent are clerical workers; 25 percent are engineers, managers, proprietors, teachers, and administrators; and 13 percent are blue-collar workers. Exec-

utives are most likely to live west of Minneapolis toward Lake Minnetonka, in the newer areas of northern Dakota County, and in the northern suburbs of St. Paul, where people have bought old farmsteads and built expensive homes.



Between 1965 and 1970, 41 percent of the population 5 years old and older moved into a different residence. Statistics in the atlas show that the moving around occurred all over the SMSA, not just in high-turnover tracts.



People in the Twin Cities SMSA are highly dependent on the automobile. Only 14 percent of the households in the SMSA are without a car. Eighty-five percent of those households are in Minneapolis and St. Paul.



If you are a member of the right 7.2 percent of Minneapolis households or 5.5 percent of St. Paul households, you aren't bothered by telephone sales people because you don't have a phone. But the Twin Cities SMSA has the lowest proportion of households without telephones of all the SMSAs included in the atlas.

More students are enrolled in parochial schools in St. Paul than in Minneapolis, despite St. Paul's smaller population. "Enrollments are not as clearly inverse to black population concentration as they are in other cities," the atlas states.



The Twin Cities SMSA "has the smallest proportion of its population below the poverty threshold of the metropolitan areas mapped here, and St. Paul (9.5 percent) has the smallest percentage among central cities," according to the atlas. In Minneapolis, 12 percent of the people are classified as at or below poverty level.



The authors of the atlas have this to say about the Twin Cities: "The Twin Cities SMSA has remarkably few problems compared with most metropolitan regions of its size. This happy situation is largely a function of the social and economic homogeneity of the metropolitan area's population.



"Most Twin Cities residents are well educated and well off financially. The sharp social and economic gradients common in many metropolitan areas are absent in the Twin Cities.



"The Twin Cities have been national pioneers in the realm of metropolitan government, which suggests that any problems that do arise in the future will be dealt with forthrightly and effectively."

(from column 1)

corner of Chicago, Adams said, 80 to 85 percent of the elementary school children are in parochial schools.

"Parochial schools provide an alternative to the integrated, troubled public schools and keep white ethnics in central city neighborhoods from which they might otherwise flee," Adams and Abler say in the Philadelphia chapter of the atlas. "But the schools do so at the cost of perpetuating racial segregation." Parochial school children are mostly Catholic and mostly white.

As misleading as it is to say that all cities are alike, it would be equally false to say that cities have nothing in common. Adams and Abler have grouped the 20 cities in the atlas into four classes.

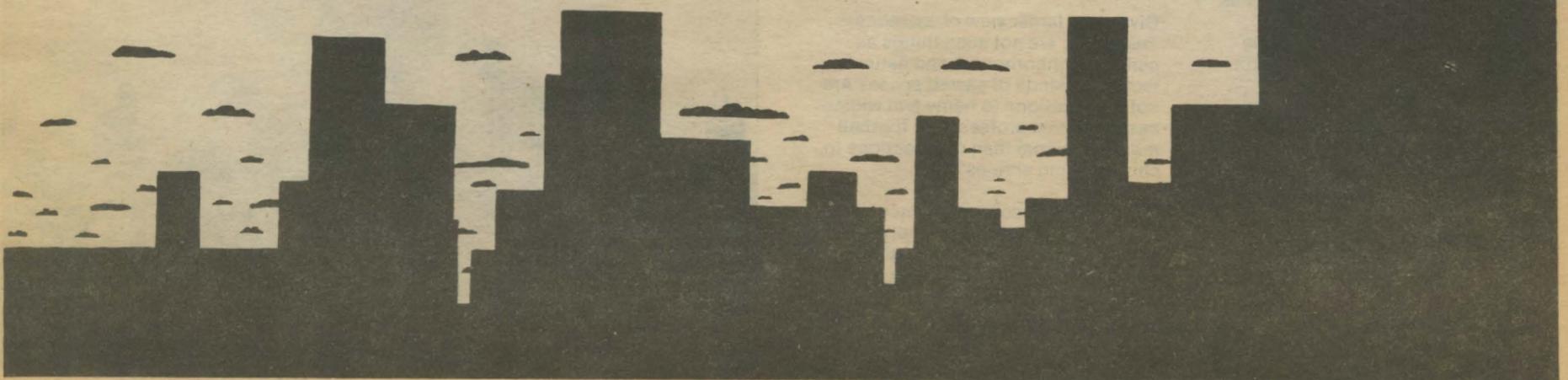
The first group are the "cities of the nation's historic metropolitan core"—Boston, New York-Northern New Jersey, Philadelphia, and Hartford-Connecticut Valley. All were built for easy access to waterborne transportation.

The nation's oldest cities are high-density cities. In the early years, people lived close to their jobs. Without cars, the streets were narrow. Without telephones, communication was by messenger. "What was an advantage in the 18th century creates problems in the 20th century."

These high-density cities of the East Coast are ideal for mass transit systems, Adams said. "It's absurd to think that a low-density area such as the Twin Cities could supply patronage" for such a system, he said.

In the chapter on Boston, Adams and Abler say that the city's age is "at once the source of some of its problems and a valuable asset. Age bequeaths the city an antiquated housing stock and narrow streets—often arranged almost randomly—that bedevil newcomers and visitors accustomed to more orderly vistas. But these same features produce a sense of closeness

cities, p. 14



unmarked temples: thoughts on the nature of sacred space

by Elizabeth Petrangelo



Consider these pictures, a modern photograph of a redwood forest and an antique reproduction of a detail from the great cathedral of Chartres, in France. Both act upon us in a similar manner. In each, profane commerce is forbidden.

It's quiet at the shrine. You approach it slowly, on foot, without the usual accoutrements of modern life—with no beer, and no television.

At the gate you submit to inspection by the shrine's guardians. You perform the appropriate rituals before entering. You are examined and finally found pure enough to set foot in the sacred place.

The "sacred place" is a national forest.

In a world grown small through technological advances and high-speed communication, it seems that sacredness has disappeared. There is little real awe any more, and any 8-year-old knows there are no demons living in caves, no nymphs guarding streams, and no wrathful gods of the forest.

In the cities, the football stadium has often replaced the church as the center of the city, and there is little ritual attached to the modern church service.

But sacredness has not disappeared, says Yi-Fu Tuan, professor of geography at the University. Its focus has merely moved.

Tuan's specialty is "humanistic" geography—geography studied from the

perspective of experience. He attempts to "put humanistic insights into a scientific framework." As part of his work, he studies the concepts of sacred place and space.

To most people, the word *sacred* calls up images of temples, druids, shrines, and church services. But these images are culture-bound, Tuan said. At the level of raw experience, "sacred phenomena are those that stand out from the commonplace and interrupt routine. The word *sacred* signifies apartness and definition. It also suggests order, wholeness, and numinous power," he said.

Given this larger view of sacredness, Tuan asks, are not such things as parks, neighborhoods, and national territories kinds of sacred space? Are not our reactions to home and wilderness and even professional football more emotional than our reactions to churches and shrines?

The traditional concept of sacred space has changed over time. Take the city as an example. In the beginning, all was confusion and the city symbolized heavenly order, Tuan said.

Scholars believe that city walls were seen as a magical defense against demons long before they took on a military-defense function. During an attack or an epidemic, the whole population used to march around the walls to reinforce their magical strength.

to ancient people. They lacked border and distinction and felt incomplete. The first things to be built in the ancient city were the walls and the shrines. Then came the streets and the homes."

Scholars believe that city walls were seen as a magical defense against demons long before they took on a military-defense function. When under attack or during an epidemic, the whole population of a city might march around the city walls to rein-

"Within its walls, one found just rules and discriminations. Beyond them lay chaos and arbitrariness.

"Terrestrial nature lacked order. The desert, the steppes, and the sea all symbolized chaos and a status of flux



Yi-Fu Tuan



force their religious and magical strength.

But somewhere between ancient times and the 20th century, things changed. The city now stands for "chaos and oppression," Tuan said. "The modern metropolis is perceived to be shapeless, polluted, disorderly, and dangerous. It is a sprawl with no recognizable edge. In religious language, the city is profane—a wilderness."

At the same time, he said, what was once considered profane wilderness has "acquired the aura and esteem of sacred space. Nature areas are set aside. They have well-defined boundaries. Profane commerce is forbidden. Motorized humanity must be unshod, abandon its wheels at the gate. Order remains a characteristic of sacred space, but the environments in which we discern order are reversed."

In the modern world, the neighborhood also has taken on an air of sacredness, using Tuan's definition. Clearly defined neighborhoods that welcome certain groups of people and carefully exclude others—usually the poor—are a fairly recent development, Tuan said.

As late as the 17th century in England, people of all classes lived in the same neighborhood, mixed in with both clean and polluting businesses. On one street, you would be likely to find stables, mansions, slums, small

businesses, inns, and market stalls. "People of rank could and did spend the greater part of their waking lives in the presence of people of all conditions," Tuan said. They were confident of their status in society. Personal emblems such as clothes, rank, and occupation, rather than residential address, proclaimed their social standing, he said.

But by the middle of the 19th century, the size of that group of people called "middle class" had grown considerably. Rank distinctions were muddled, and no one was really sure of the social status of those newly rich.

"To a person rising in the ranks of the middle class, it was a risk to be seen with workmen and laborers. Safety lay in geographical segregation, in having the right kind of house in the right area," Tuan said.

As city neighborhoods became "impure," people moved to the suburbs—"a modest Eden to be protected from pollution by factories and 'the great unwashed.' It was a type of sacred space in which only women and children were refined or innocent enough to dwell."

Since World War II the suburbs have lost a great deal of their purity, largely because of the incursion of shopping centers, unrestricted construction of cheap, uniform houses, and entry of so-called clean industries into neighborhoods looking for someone to share the tax burden.

The civil rights movement of the '60s also dealt a blow to the purity of the suburb. Suburban homeowners can no longer "exclude other human beings with an air of virtue," Tuan said.

"In protecting nature, however, well-educated members of the middle class remain free to articulate their indignation," he said.

The modern nation-state has acquired an air of sacredness over time, Tuan said. "Order is an attribute of the sacred, and the state imposes and maintains order. Power is an attribute of the sacred, and the state has great power over its people. We even personalize modern nations and call them 'sovereign powers,' as though they constitute an order of angels."

When the call to war, usually "Our sacred motherland (or fatherland) has been violated!" is sounded, people give their lives in their nation's defense. "The ultimate sacrifice is appropriate to the defense of the sacred," Tuan said.

Boundary or limit is another characteristic of sacredness, he said. "The modern nation-state, unlike an ancient empire or a medieval fief, has well-defined boundaries. People who cross them are required to perform the appropriate rites, which can be stringent or lax, depending on the traveler's degree of purity."

Theologian Michael Novak has pointed out that the modern stadium also has become a sort of sacred place, Tuan said. "If we define a sacred place as one evoking great emotion and surrounded by complex ritual, then a sports arena certainly fits," he said.

The modern sports contest is surrounded by ritual: patriotic songs are sung, certain rituals are performed at each contest, maidens dance. And each home has its own local shrine of sorts—its television set—before which worshippers of the sport may sit enthralled.

"Traditionally, the church was the focus of the city skyline, the most dominating structure of the city," Tuan said. "More and more often now, it could be the stadium. Minneapolis talks about building one downtown. It could end up being a lot more dominating than any of the churches in the city."

Actually, the "sacredness" of sport has historical ties—the Olympic games had religious connotations. "Supreme excellence is one component of sacredness and is also a component of sports," Tuan said. Athletic competition is one of the few places where excellence can be proclaimed publicly without the individual having to demur, "Shucks, it ain't me."

The church, that most obvious of sacred symbols, actually is becoming a secular place, Tuan said. "A medieval church, however much it catered to secular activities, was primarily sacred space. It radiated power. A modern church, notwithstanding its remaining religious functions, is increasingly a social and service center."

Sacred space is just one of the topics covered by Tuan in his new book, *Space and Place: The Perspective of Experience*, scheduled to be published by the University Press later this year.

Despite his belief that sacredness has not disappeared but has simply been rearranged, Tuan does feel that the sense of awe is one thing that is largely absent from the modern world.

"Today the gods no longer dwell in forests and streams," he said. "If we abuse nature, we shall pay for our wantonness in the long run, and ecologists can tell us just how this will happen with the help of systems analysis and computers."

But somehow, no rational explanations warning about the effect of pollution on the life of a stream can grab us quite as much as would the belief that if we pollute that sacred stream, our arms and legs will fall off.

update

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stadium to reroll tartanturf

The TartanTurf in Memorial Stadium on the University's Twin Cities campus will be torn up and replaced with grass before the next football season begins.

"At the end of the 1976 playing season, routine testing showed that the artificial turf would not stand another season," Walter Bruning, vice president for administrative operations, said in February. "The material is no longer resilient enough to be a safe playing field," he said.

The turf consists of a carpet and pad on top of an asphalt surface. "The turf has gotten soft as a result of the disintegration of the urethane underlayment absorption pad from moisture and sunlight," Jerome Nelson, assistant supervising engineer, said. To prevent injuries, the pad must absorb enough energy and shock to break an athlete's fall, he said.

Paul Giel, director of men's intercollegiate athletics, said he expects the natural turf to be a safer playing field. "I'll feel much better from a safety standpoint as far as the players are concerned," he said.

The cost of the TartanTurf and the asphalt underlay was \$360,000 when it was installed in 1970. The turf, manufactured by Minnesota Mining and Manufacturing Company, carried a five-year warranty, which has expired.

Bruning said the turf would have to be replaced with grass—at a cost of about \$110,000—because that is all the University's men's intercollegiate athletics program can afford.

Gov. Rudy Perpich, who gave a short message of thanks, noted that his father served in the army of Austria-Hungary from 1916 to 1918. Magrath said his grandmother was born in Vienna.

"Although Austria may be small in size, the Austrians are a people large in spirit, with a rich culture and history," Magrath said.

846 legs

Legs, legs, legs. It's Campus Carnival time again, and this year Carni organizers expect to front almost a thousand individual legs in the traditional dancelines.

Campus Carni is the oldest and biggest student-run fund-raiser of its

defending the request for more faculty

A spokesman for the University faculty took issue in February with charges that the University is overstaffed because enrollment has not increased as much as had been predicted.

"We are simply forced to hire people who are not related to the student-faculty ratio," said Ken Keller, chairman of the seven-member University Senate Consultative Committee, to the education division of the House Appropriations Committee.

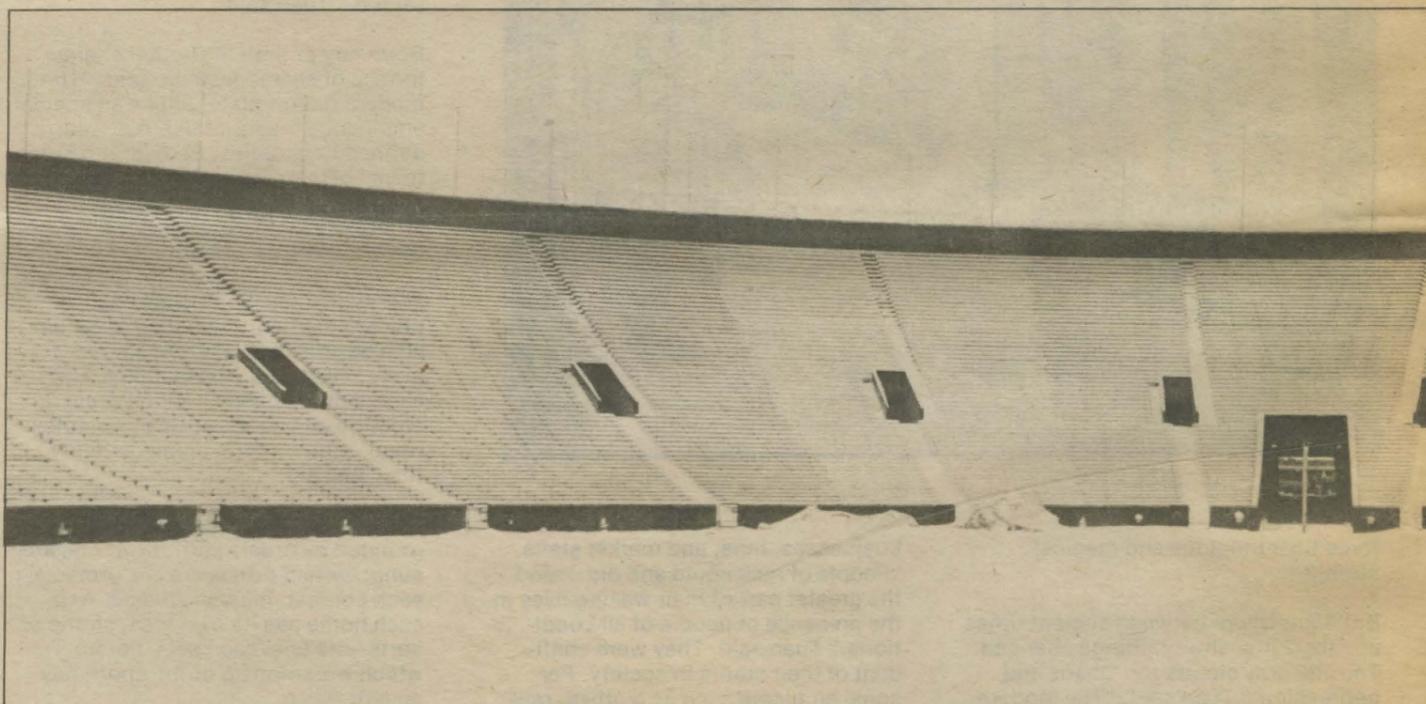
The House committee was meeting on the St. Paul campus for the last of its

classicist who goes to the archaeology site," he said.

Failure to fund enrollment-related requests places an additional burden on faculty members who would otherwise be doing research, Keller said. The University's request had anticipated an enrollment bulge between now and 1981, with an enrollment decline after that time.

University President C. Peter Magrath said the University is requesting 205 new, permanent faculty positions on the assumption that about 660 faculty members will reach retirement age during the 1980s.

Keller expressed reservations about a proposed alternative of hiring temporary faculty during the period of enrollment growth. "You can't really get the best people for one year," he said. "You get those people who have to take a job."



where are they now? dept.

Several jillion March snowflakes crowd Memorial Stadium.

type in the world. Last year it raised \$12,000 supporting Camp Superkids, a summer camp for young people with asthma.

This year it hopes to top last year's figure. Included in the festivities: live bands, skits, foods of many types, Disney-style two-story sets, tests of strength, and the ever-popular celebrity-dunking machines.

Not to mention the legs. Carni runs from April 14 through 16 at the U Fieldhouse at 18th and University Avenues S.E. Doors open at 6 p.m. Thursday and close at 11. On the weekend, festivities go on into the wee hours.

hearings on the University's \$366.6 million biennial request to the 1977 Legislature. In earlier hearings, several committee members had said that the University is overstaffed because it prepared for more students than actually enrolled last fall.

Keller, a professor of chemical engineering, said the University must add expertise to improve its teaching offerings without cutting back in other areas.

"There is, for example, a request for a sculptor at the Morris campus," Keller said. "That program can't exist as a major without the teaching position. This request would not only improve the student-faculty ratio, but would also improve the program."

"The fact that we are interested in solar energy and add a faculty member with that expertise doesn't mean that we can remove that money from the study of coal-gasification or other alternative energy sources. The hiring of someone who can do carbon-dating doesn't reduce the need for the

a gift from austria

Chancellor Bruno Kreisky of Austria presented the University of Minnesota with a \$1 million check last month for the establishment of a center for Austrian studies.

Kreisky said the gift, which he described as the largest Austria has given to a foreign country, would be used for a center to help Americans understand Austria and to provide opportunities for Austrian students and scientists to study in the United States.

University of Minnesota President C. Peter Magrath accepted the gift in a modest ceremony. He presented Kreisky with a peace pipe made by Wiyohpeyata Hoksina ("Western Boy"), a Dakota pipe maker from the Sisseton-Wahpeton Sioux band.

guinea persons wanted

Volunteers needed. An experimental project at University Hospitals needs volunteers from around the Twin Cities area to test a new drug. The drug, a vasodilator called butallamine, is thought to have beneficial effects on people's learning and memory. Side effects are said to be minimal.

If you are interested in helping with the project, are between 55 and 80 years of age, are in good physical shape, and can make four short visits to campus over a three-month test period, contact Julie Will, Box 393 Mayo, 420 Delaware St. S.E., University of Minnesota, Minneapolis, MN 55455; or call her at (612) 373-9138. There's a free physical in it for all volunteers, whether accepted for the project or not.

ideas proliferate on athletic budget

University officials revealed in February how they would spend the more than \$2.5 million that Gov. Rudy Perpich has recommended for intercollegiate athletics at the University if it were appropriated by the 1977 Legislature.

Walter H. Bruning, vice president for administrative operations, defended the \$1.25 million requested for women's athletics for the next two years as necessary to bring the University into compliance with federal law requiring similar opportunities for both men and women in sports. In his biennial budget mes-

pharmacy, nursing top legislative requests

University President C. Peter Magrath Feb. 11 listed his priorities for the University's legislative request and the Board of Regents said they will continue to seek a new building for pharmacy and nursing.

Magrath said his top priorities for the 1977 legislative request are faculty salary increases, new academic positions, special appropriations including research and graduate fellowship funds, and student financial aid.

"The governor's net recommendation for the biennium is about \$358 million

money allotted for child care centers

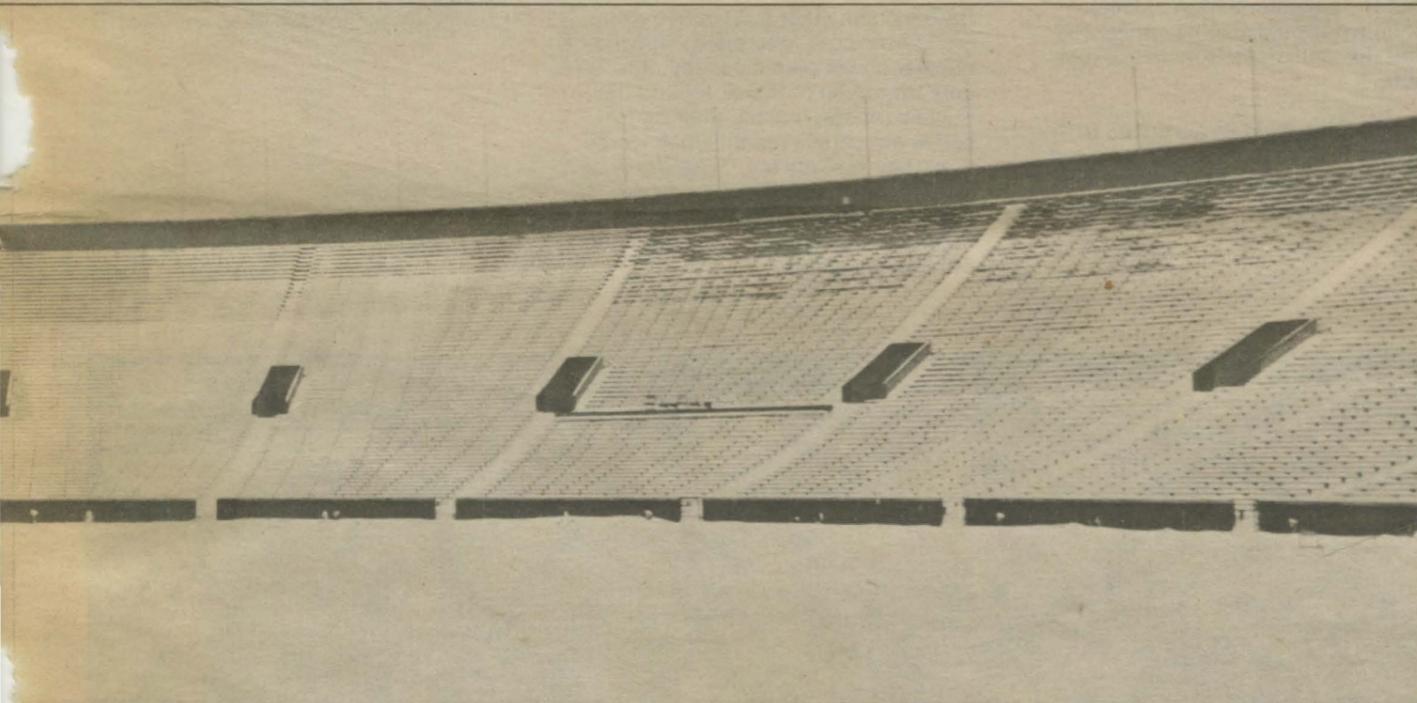
A bill that would establish evening child-care centers at the University of Minnesota and up to four other educational institutions in the state was passed with high priority from the social service subcommittee to the full Health and Welfare Committee of the Minnesota House of Representatives in March.

The bill would provide \$80,000, from the Commissioner of Public Welfare, to state colleges and universities for establishment and licensing of night-care programs for children whose parents attend evening classes.

concern about the role of American Indians in the University as a whole.

Magrath charged the task force to "look into how we can better meet the needs of American Indian students." They should, he said, try to answer these questions:

- How many potential American Indian students might be interested in attending the University of Minnesota?
- How can we better reach and recruit these students?
- Once these students are enrolled in the University, how can we better help assure their academic progress and graduation?
- How can we better recruit American Indian faculty and staff?



TOM FOLEY

sage, Gov. Perpich recommended an equal amount for men's intercollegiate athletics, which the University had not requested.

Bruning said he believes that no program in women's intercollegiate athletics is directly comparable to the men's football program, so the University doesn't plan to provide a budget comparable to that of the Gopher football program to any single women's program.

But women's intercollegiate sports would be made equitable with the men's programs in the areas of coaching, travel, meals and lodging, and equipment, Bruning said. "We think it's only fair that women have the same opportunities to travel to out-of-town activities as the men have."

and the University's net request is about \$368 million, exclusive of the request for faculty salary increases," Magrath said.

The "major discrepancy" between the University's request and Gov. Rudy Perpich's recommendations is in the area of new positions, he said. Perpich recommended none of the University's requested 205 new academic positions.

The regents also voted without dissent to reaffirm their previous position to seek funding for a new nursing and pharmacy building in the health sciences complex on the Twin Cities campus.

Another \$20,000 would go to the United Evening Educational Enhancement Program (UEEEP) already in existence at the University of Minnesota.

magrath names indian task force

A task force on American Indian concerns has been named by University of Minnesota President C. Peter Magrath.

Appointment of the 18-member group was a result of expressed concern by students and faculty over conflict within the University American Indian Studies Department and

update

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nuclear power versus coal: more scary information

by Brian Lowey

Few people would like to have a power plant built in their back yard. Power plants block views, and some are downright unhealthy.

The search for a healthy power plant has occupied the imaginations of engineers and environmentalists for over a generation. And now that people are finally taking a dim view of damming up rivers for hydroelectric power, the engineers have mostly produced two basic kinds of power generating plants—fossil-fuel and nuclear.

But which is safer? And which do you want in your back yard?

Donald Barber, a professor of environmental health at the University and a consultant on power plant emissions, would opt for a nuclear plant in his back yard, especially if the alternative were a coal-fired plant. In fact, he

says, "the nuclear power plant is one of the safest means of producing power ever devised."

With supplies of oil becoming increasingly scarce, it appears that coal is the most likely fuel for future fossil-fuel plants. But coal is basically a dirty fuel, Barber said.

Barber has studied the airborne emission problems presented by coal-fired generators, and he hasn't liked what he's seen.

"My fears of coal-burning plants are primarily associated with the relatively unknown toxicity of the oxides of sulfur and nitrogen," he said. These oxides pour abundantly out of the smokestacks of coal-fired plants, even those with pollution-control equipment, and they have been associated with respiratory disease.

"Right now, we know more about the nuclear risks of power plants than we know about the chemical risks," he said, "and if we are truly concerned about the emissions from nuclear plants, we should also be concerned about the emissions from fossil-fuel plants."

Most people would be surprised to discover that, along with sulfuric and nitrous oxides, coal-fired plants also release radioactive isotopes into the

atmosphere—in some cases, depending partly on the type of coal burned, in greater concentrations than do nuclear power plants.

The National Council on Radiation Protection and Measurement has set standards regulating the release of these isotopes into the atmosphere. However, there is some uncertainty in the council about whether to lower the standards to take into consideration some of the "daughter" products to which radioactive uranium and thorium ultimately decay. In the coal industry, these isotopes appear not only in smokestack emissions but also throughout the coal processing cycle.

"If government radiation standards go down, we will have a problem with coal—no question about it," Barber said. "It doesn't make any sense to me to restrict a nuclear plant to a certain level of radiation and then let a fossil-fuel plant belch out 10 times that amount."

Barber claims that radioactive emissions from coal-fired plants upwind of nuclear power plants can result in contamination of the air around the nuclear plants, making their radioactive-emissions records look worse than they actually are. "There may be an interference problem," he said. "If our monitoring equipment were sophisticated enough, we could find out how great it is."

"There is also the danger of toxic drainage from coal or ash stockpiles," he said. "This drainage could not only leach out radioactive materials, but it could also alter the pH of ground water."

There are other uses for coal. It can be processed into a variety of petrochemicals that can be used in the manufacture of plastics, fertilizer, and even food. If we burn up all of our oil, and then burn up our coal reserves, these petrochemicals will become increasingly scarce. "And here we are shoveling our coal into boilers and watching all those oxides pour out of the stack," Barber said.

An alternative, at least for the time being, is to use nuclear reactors to produce power. "I don't look at reactors as a long-term solution to our energy problems," Barber said. "We need to pursue solar power vigorously. But I don't worry so much about the accident situation as far as reactors are concerned. The only thing I would worry about if I lived nearby would be being alerted in case of an accident."



R. SCHOLES

TOM FOLEY

So you think nuclear power is the only energy source that poses dangers? Wait till you hear about good old ordinary, dependable coal!

MISSING ????

WHAT CAN YOU DO FOR MINNESOTA?

Your friends or relatives could be among those listed below who have been lost in the University of Minnesota's official alumni records. They are individuals who have been unable to maintain those special contacts with classmates and collegiate faculty who have touched their lives and careers.

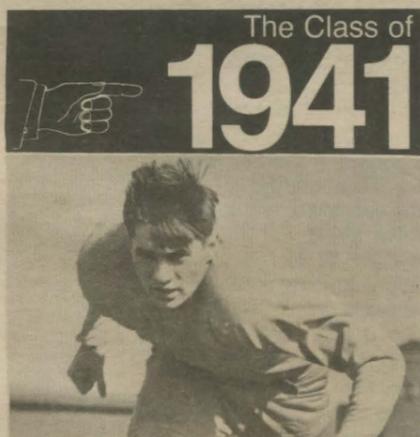
If you can help us find them, both your friends and the University of Minnesota will benefit. And you will have the satisfaction of knowing that you have helped the University of Minnesota expand its outreach to maintain that margin of excellence that enables the University to stand tall today.

Please fill in the coupon accompanying these listings if you can help. Our lost alumni and our University thank you.



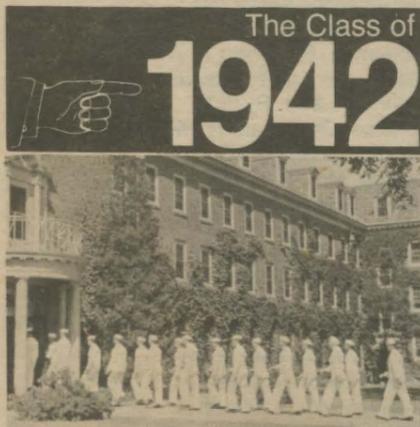
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 Collins, George C. (IT)
 Daby, Miss F. (Ed)
 Dobbin, John E. (Ed)
 Dunn, E. C. (CLA)
 Dunsworth, William L. (Ed)
 Flancher, Dr. Leon H. (Nur)
 Fox, Burton S. (CLA)
 Giebink, Dr. Robert R. (Med)
 Grimm, Miss D. E. (Ed)
 Gunderson, Miss Ellene M. (HEC)
 Gustafson, Roy A. (Law)
 Hewes, Miss Helen I. (Ed)
 Huseby, Dr. Robert A. (Med)
 Jensen, Mrs. Audrey P. (HEC)
 Johnson, Donald W. (hm)
 Koto, Mrs. D. P. (CLA)
 Krantz, Miss Katherine L. (CLA)
 Lecht, Donald E. (CLA)
 Lindberg, Robert D. (IT)
 Lundman, Donald G. (Ed)
 Lyon, Dr. E. D. (Dent)
 Malloy, Roland P. (Ag)
 Matterson, Lloyd D. (Ag)
 McLish, Mrs. D. A. (Nur)
 McNown, John S. (IT)
 Miller, Jr., John A. (IT)
 Mitchell, Dr. Thomas J. (Med)
 Nachtigal, Dr. Beatrice K. (Med)
 Newcomb, Mrs. Carl E. (CLA)
 Northrup, Miss C. M. (Grad)
 Pelstring, Miss Isabelle F. (Nur)
 Petri, Burton I. (IT)
 Pihlstrom, C. Dale (IT)
 Randall, Dean B. (Bus)
 Rasmussen, H. A. (IT)
 Riley, Ms. Sarah R. (CLA)
 Ross, G. W. (CLA)
 Samdahl, Roger D. (IT)
 Sartori, Dr. Michele (Dent)
 Schnell, Robert L. (Law)
 School, Mrs. W. E. (Ed)
 Schottland, Edward M. (CLA)
 Scobie, Mrs. G. W. (Bus)
 Shannon, Miss K. H. (UMD)
 Shaughnessy, Mrs. R. H. (Nur)
 Sheldon, Howard W. (IT)
 Simmonds, Mrs. Frank L. (Nur)
 Simon, Mrs. J. E. (HEC)
 Skoog-Smith, Dr. Anton H. (Med)
 Spillane, Leo J. (IT)
 Stevens, Charles M. (CLA)
 Swan, Mrs. B. R. (CLA)
 Thearle, Dr. William P. (Med)
 Thouin, Dr. Lawrence G. (Med)
 Todd, James H. (IT)
 Tyler, Edwin R. (IT)
 Wappes, Sister Noella (UMD)
 Webster, John M. (Law)
 Whittaker, Dr. Francis M. (Med)
 Wilhelm, John W. (CLA)
 Wilkins, Wendell C. (IT)
 Wilson, Miss Alice M. (CLA)
 Young, Dr. C. M. (Nur)



Alcott, Miss Rachel A. (Ed)
 Anderson, Miss E. M. (UMD)
 Anderson, Mrs. W. W. (CLA)
 Baer, Donald F.
 Baldrice, James C. (Ed)

MISSING ????

Barrett, Robert Leo (Law)
 Bostrom, Miss Dorothy (CLA)
 Buchanan, Mrs. Betty (CLA)
 Buhler, Rolf Dietrich (IT)
 Busyn, Edward S. (CLA)
 Caldis, George (Bus)
 Campbell, Gordon A. (IT)
 Campbell, Miss Helen K. (MortSci)
 Carlson, Mrs. Maurine M. (Ed)
 Christensen, Dr. May H. P. (Med)
 Christensen, Mrs. Orville C. (IT)
 Cohen, Dr. Ellis N. (Med)
 Corcoran, James M. (IT)
 Dahl, Henry A. (CLA)
 Dennis, Mrs. Lawrence E. (Ed)
 Doonan, S. Pershing (Law)
 Dugan, Jr., Eugene J. (IT)
 Durkee, Philander A. (IT)
 Einan, Dr. Henry O. (Dent)
 England, Mrs. James R. (CLA)
 Erickson, Miss Elaine E. (Ed)
 Ewert, Dr. Roger A. (Dent)
 Fehn, Mrs. Lorraine B. (HEC)
 Fett, Miss Elsie G. (CLA)
 Fish, Mrs. Virginia T. (CLA)
 Fortunescu, Mrs. R. C. (DentHyg)
 Fox, Robert B. (IT)
 Grubb, Mrs. Phyllis June (CLA)
 Hackett, Donald George (Ed)
 Hanson, Miss Margie R. (Ed)
 Hanson, Dr. Robert (Med)
 Harris, Mrs. Marion E. (HEC)
 Hayes, Mrs. Clo Mary (CLA)
 Hendrix, Mrs. Bernice E. (Nur)
 Herman, Isaac (IT)
 Hubbard, Robert F. (IT)
 Huss, Ralph Edwin (CLA)
 Ingwolson, Mrs. Gloria Mae (DentHyg)
 Ireland, Mrs. Dorothy V. (Nur)
 Jines, Miss Patricia M. (GC)
 Johnson, Dr. Kenneth J. (Med)
 Johnson, Wallace T. (Bus)
 Kaasa, Herbert D. (Bus)
 Krizek, John J. (Bus)
 Larson, Curtis Luverne (IT)
 Larson, Mrs. Ruth L. M. (Nur)
 Lebovitz, Mrs. Sonia Caplan (Ed)
 Lees, Mrs. Mary Catherine (Ed)
 Lemon, Paul C. (Grad)
 Lind, Doris M. (Ed)
 Lundgren, John E. (IT)
 Lyncker, Miss Hilde (Ed)
 Magner, Rodney Carroll
 Marthaler, Mrs. Maxine V. (HEC)
 Mattson, Mrs. Joyce M. (Nur)
 Mees, Miss Jane K. (CLA)
 Mittelstadt, Miss Marcia E. (Ed)
 Moe, Mrs. Lois Eileen (Bus)
 Murrish, Miss Elizabeth A. (Nur)
 Nelson, George W. (IT)
 Neumann, Mrs. Dorothy A. (Nur)
 Newhouse, Miss Janet Muriel (UC)
 Newkirk, Francis D. (Ag)
 Olson, Harold C. (Ag)
 Pederson, Miss Lila C. (HEC)
 Pehrson, Miss Anna Helen (Ed)
 Perkins, Miss Claudia (CLA)
 Peterson, Dr. Floyd R. (Med)
 Price, Ms. Betty (CLA)
 Saari, Oliver E. (IT)
 Salk, Edward Carl (Phm)
 Samuelson, Dr. J. Will (Dent)
 Schaffer, Miss Margaret H. (Bus)
 Scott, John W. (Grad)
 Shaw, Mrs. M. D. (UMD)
 Sleiter, Mrs. Joyce R. (HEC)
 Somermeyer, Harry J. (IT)
 Souba, Wiley W. (IT)
 Stapp, Dr. John Paul (Med)
 Storey, Mrs. Verna Mae (HEC)
 Sullivan, Miss Beatrice G. (Ed)
 Swanson, Kenneth T. (Bus)
 Thompson, Mrs. Genevieve M. (CLA)
 Trimmingham, Dr. Hugh Lock (Med)
 VanValkenburg, Robert E. (For)
 Vlahakos, Mrs. S. (CLA)
 Warren, John S. (Law)
 Westwood, Charles F. (IT)
 Whitcraft, Miss Ruth Althea (Nur)
 Wydeen, Russell D. (IT)

The Class of 1944



Abramson, Miss E. B. (CLA)
 Anderson, R. W. (Law)
 Anderson, Dr. Werner W. (Med)
 Baker, Mrs. M. E. (Nur)
 Ballou, Miss Camilla J. (CLA)
 Baxter, Mrs. Eva L. (PhysThpy)
 Berg, Mrs. J. (HEC)
 Berg, Robert John (IT)
 Berger, Mrs. M. J. (IT)
 Biske, Miss Marion R. (Nur)
 Blackley, Miss Eleanor A. (CLA)
 Bramold, Mrs. Ona M. (Ed)
 Brom, Joseph Richard (IT)
 Carlson, Mrs. J. E. (Nur)
 Cumbey, Mrs. Arthur A. (CLA)
 Davidson, Miss M. D. (CLA)
 Erickson, Miss T. M. (Bus)
 Evenson, Miss A. E. (Grad)
 Flynn, Clarence R. (CLA)
 Gimpel, Dr. Aaron J. (Dent)
 Gonyea, Miss Lorraine M. (MedTch)
 Grismer, Raymond L. (IT)
 Hallanger, Mrs. F. S. (Nur)
 Harfman, Dr. Mortimer A. (Med)
 Hay, William A. (Ed)
 Hellekson, Owen H. (IT)
 Hoky, Dr. Raphael J. (Dent)
 Huso, Miss Doris A. (Ed)
 Hustad, Mrs. Virginia (HEC)
 Johnston, J. R. (IT)
 Jones, Miss Marjorie A. (HEC)
 Kraft, Miss I. J. (Ed)
 Kremen, Dr. Isadore M. (Med)
 Kummer, Mrs. J. T. (CLA)
 Lawrence, Norman L. (IT)
 Levy, Mrs. I. H. (CLA)
 Little, David M. (Law)
 Lueking, Miss Linda B. (Nur)
 May, Donald R. (IT)
 McCullough, Stuart (IT)
 McFie, Mrs. J. (CLA)
 Moseman, Dr. Albert H. (Grad)
 Moses, Dr. Leo F. (Dent)
 Mountain, Mrs. R. (Ed)
 Nadeau, Dr. Gerald H. (Med)
 Nelson, Irving W. (IT)
 Nelson, Mrs. P. F. (Nur)
 Norell, Robert G. (IT)
 Orlich, Peter L. (IT)
 Popovich, Dr. S. J. (Med)
 Power, Sister M. L. (Grad)
 Renneke, Dr. Donald H. (Dent)
 Rogers, Mrs. Patricia M. (CLA)
 Ruud, Ms. Barbara (Law)
 Ryan, Francis T. (Law)
 Shapley, Mrs. L. (CLA)
 Simon, Mrs. Lauretta (CLA)
 Simonds, Rev. John H. (Ed)
 Simpson, Donald M. (IT)
 Sisterman, Mrs. L. J. (Ed)
 Sjoselius, Miss Sarah L. (CLA)
 Smith, Mrs. Grace B. (PhysThpy)
 Solheim, Miss Esther D. (CLA)
 Sperzel, Mrs. P. J. (Ed)
 Swinson, Mrs. Jesse L. (UC)
 Swisher, Dr. Scott Neil (Med)
 Taylor, Dr. Donald E. (Med)
 Taylor, Dr. Gloria A. (Med)
 Taylor, W. Bruce (CLA)
 Thompson, Jr., Mrs. H. (Nur)
 Tromontin, Miss R. A. (Ed)
 Van Dyken, Miss Blossom (UMD)
 Wallace, Miss Margaret (Grad)

Webster, Miss Dorothy F. (Nur)
 Wentz, Dr. Lydia M. (Med)
 Wilsnack, Mrs. A. J. (Nur)
 Wilson, Dr. Franklin C. (Med)
 Wolander, Mrs. H. F. (Ed)
 Wompler, Mrs. R. D. (Nur)

The Class of 1945



Action, Jr., Dr. Wallace E. (Dent)
 Baker, Mrs. J. J. (Ed)
 Becker, Dr. Lester A. (Dent)
 Begin, Ms. M. L. (Ed)
 Bergford, Miss Margaret A. (MedTch)
 Bergsten, Donald A. (GC)
 Billings, Mrs. James E. (CLA)
 Borreson, Miss Marion Y. (Nur)
 Brenner, Harry S. (IT)
 Brodt, Frederick A. (CLA)
 Brown, Mrs. L. J. (Nur)
 Burgstahler, Miss Meralyn J. (Nur)
 Burkman, Eugene E. (IT)
 Copeland, Miss Patricia A. (CLA)
 Decker, Edward C. (IT)
 Dedeo, Mrs. E. E. (Bus)
 Demopoulos, Christ A. (GC)
 Denzeng, G. C. (Ed)
 Dietrich, Miss Mary A. (Bus)
 Duisberg, Mrs. P. (Ed)
 Fonsgren, Mrs. Arthur L. (Nur)
 Furnell, Dr. Dale Q. (Med)
 Goldstein, Miss Anita (Nur)
 Graca, Dr. Louis H. (Dent)
 Graiziger, Robert A. (Ed)
 Holl, Raymond R. (IT)
 Howard, Miss Eleanor M. (Ed)
 Howe, Dr. R. F. (Med)
 Huskins, W. E. (IT)
 Jacobson, Mrs. K. A. (HEC)
 Jennings, W. C. (IT)
 King, Jr., Dr. Robert Lee (Med)
 Knop, Mrs. W. G. (Med)
 Kyle, Mrs. Kathryn (HEC)
 Lacey, Miss Maybelle J. (Nur)
 Leyde, W. L. (IT)
 Lindrees, Miss H. J. (UMD)
 Lucas, Dr. J. S. (Grad)
 McCaulay, Miss J. (MedTch)
 McCluskey, L. D. (IT)
 McKelvy, Mrs. Frances G. (HEC)
 Misbach, Dr. William Durward (Med)
 Molander, Dr. David W. (Med)
 Munch, Mrs. I. (Ed)
 Nelson, Mrs. Ethelyn M. (Ed)
 Nelson, Dr. P. A. (Med)
 Onomiya, Mrs. Minoru (MedTch)
 Pederson, Miss Anne S. (Grad)
 Peterson, Miss Lois C. (Ed)
 Preston, Donald L. (IT)
 Reed, Mrs. H. (CLA)
 Robertson, J. O. (CLA)
 Rost, Jr., Clayton O. (Law)
 Ruane, W. J. (IT)
 Saula, Miss H. (CLA)
 Schafer, Mrs. Betty J. (HEC)
 Schroeder, Jr., Herbert H. (IT)
 Selmer, C. F. (IT)
 Sevig, Ms. P. (CLA)
 Simmons, Ms. Mary Louise (CLA)
 Smith, Jr., Mrs. H. L. (CLA)
 Perber, H. (Ag)
 Stearns, Miss Gretchen (CLA)
 Stewart, Miss Betty J. (Nur)
 Thompson, K. R. (UC)
 Touhey, R. H. (IT)
 Tucker, William P. (CLA)
 Twedt, Robert M. (UC)

Usenik, Miss Frances A. (CLA)
 Ward, Harry (IT)
 Wente, Dr. Harold A. (Med)
 Young, Miss M. M. (Nur)
 Zaslow, Mrs. M. S. (CLA)
 Zustiak, Dr. Michael (Dent)

The Class of 1946



Abrahamson, Miss E. B. (Ed)
 Ackerman, Mrs. C. (Nur)
 Anderson, Miss B. J. (CLA)
 Anderson, Douglas Harley (IT)
 Anderson, Jr., Earle T. (GC)
 Baker, Mrs. H. (Nur)
 Baker, John Edwin (IT)
 Bartness, Garold L. (Grad)
 Bergquist, Miss Viola E. (Ed)
 Blegen, Robert D. (CLA)
 Bodin, Lawrence A. (IT)
 Borken, Miss A.
 Botelho, Mrs. John B. (CLA)
 Brackney, Dr. Edwin L. (Med)
 Bradley, Miss Mary F. (GC)
 Brownson, Dr. B. C. (Med)
 Bushnell, Miss Margaret (CLA)
 Chladek, Miss Flo C. (Nur)
 Christensen, Russell R. (CLA)
 Clauson, D. L. (Grad)
 Congdon, G. G. (IT)
 Cooper, Miss Anna M. (Nur)
 Cunningham, Paul (CLA)
 Deal, Dr. Harold R. (Med)
 Donaghue, Mrs. James L. (Ed)
 Dorseff, Jr., Ivan (UC)
 Dumais, Dr. A. F. (Med)
 Erickson, E. Walfred (CLA)
 Euren, Miss Florence S. (Ed)
 Falconer, Mrs. Jeanne (HEC)
 Frakes, Jr., James K. (IT)
 Francois, Pedrito A. (Nur)
 Fredrikson, D. W. (CLA)
 Gardiner, Mrs. Geraldine (HEC)
 Gendusie, Mrs. F. (Nur)
 Grabe, Miss Lois R. (CLA)
 Grabowski, Miss Florence H. (Nur)
 Grossman, Dr. Frank Donald (Ed)
 Hames, Mrs. Eugene S. (Nur)
 Hanson, Earl (CLA)
 Hedin, Miss Erma M. (Ed)
 Henk, Rev. Wallace E. (Ed)
 Holmgren, W. H. (Ag)
 Howell, Mrs. W. A. (CLA)
 Hursh, Neil (CLA)
 Hurtig, Miss Wanda J. (GC)
 Jenkins, Jr., J. M. (Ag)
 Jenkins, William L. (CLA)
 Johnson, Miss Mabel O. (Ed)
 Jordahl, Mrs. Merle (HEC)
 Kleinholz, T. G. (IT)
 Koog, Ms. R. S. (CLA)
 Kozelka, Richard B. (CLA)
 La Douceur, L. R. (Bus)
 Landmark, Miss Verna M. (Nur)
 Lodgord, Miss E. M. (Grad)
 Magota, Shuji (IT)
 Maher, Edward J. (Bus)
 Marsh, Marceline L. (Nur)
 McCabe, Robert E. (IT)
 McCluskey, Dr. William R. (Med)
 McFarland, Miss Ruth E. (UC)
 McLaughlin, Miss (Nur)
 McNutt, Dr. John H. (Dent)
 Melahn, Harold W. (CLA)
 Michaelis, C. E. (IT)
 Miller, P. R. (IT)
 Miller, Dr. William T. (Med)

MISSING ????

Moore, A. E. (GC)
 Nurmi, Mrs. C. O. (DentHyg)
 Nurmi, Dr. C. O. (Dent)
 Ostreim, Irwal M. (Ed)
 Ostrin, Louis (CLA)
 Perreault, Mrs. Marie (Phm)
 Perry, Miss W. F. (Ed)
 Perteet, Miss Charlotte G. (GC)
 Pinkert, Mrs. P. A. (Nur)
 Preston, Dr. F. W. (Med)
 Raymond, Mrs. L. J. (Nur)
 Regis, Robert J. (IT)
 Reigstad, Miss Ruth E. (PhysThpy)
 Rengel, R. (IT)
 Roberts, Mrs. D. D. (MedTch)
 Roberts, Mrs. Thomas R. (CLA)
 Rose, Miss Beatrice H. (GC)
 Rowell, R. R. (IT)
 Ruppert, Roger M. (CLA)
 Sand, Carl (Bus)
 Santala, E. W. (Bus)
 Schein, Jerome D. (CLA)
 Schifferes, Paul R. (GC)
 Schleicher, Mrs. F. J. (Ed)
 Schlitges, Miss Geraldine H. (CLA)
 Schmitzer, Mrs. Isadore (GC)
 Swanstrom, Miss Barbara A. (CLA)
 Syverson, Clarence A. (IT)
 Tanaka, Masayoshi (CLA)
 Thomas, T. Robert (Ag)
 Tuttle, Miss Aileen H. (Nur)
 Upson, Mrs. V. Ve (CLA)
 Vanstrum, Mrs. R. E. (Ed)
 Waag, Jr., C. (CLA)
 Williams, Jr., Mrs. R. B. (MedTch)
 Williams, Wilfred H. (Ed)
 Wilson, G. T. (Ag)
 Wind, Miss Nadine E. (Nur)
 Wystrach, Miss Arthemise A. (CLA)
 Zuhrie, Shameen (Grad)

Conner, Lester (CLA)
 Dannecker, Miss Audrey J. (CLA)
 Daws, Mrs. A. W. (Ed)
 Dedlow, Mrs. Doris M. (CLA)
 Devlin, Jr., John J. (MortSci)
 Diehl, Dr. Antoni M. (Med)
 Dobner, J. N. (Ag)
 Estebo, Mrs. Donald G. (Grad)
 Flygare, Robert J. (IT)
 Forsaith, Thomas S. (IT)
 Foslein, Floyd F. (Ed)
 Fries, Raymond S.
 Fulton, Miss Lavenia M. (Nur)
 Gabriel, Mrs. C. M. (CLA)
 Garrison, Dr. Maurice A. (Med)
 Gerstung, Fred B. (CLA)
 Gibbons, Dr. Thomas B. (Med)
 Gilpin, Jr., J. D. (CLA)
 Goldberg, Stanford L. (Bus)
 Gradert, E. (Ag)
 Graham, Mrs. William A. (CLA)
 Gray, Warren H. (Ag)
 Gutierrez, Fernando I. (CLA)
 Gutierrez, Jose A. (Grad)
 Haeusler, Kenneth R. (IT)
 Hair, Mrs. D. (CLA)
 Hanner, Jr., John A. (Bus)
 Hanson, Donald E. (IT)
 Harmon, Clerc M. (Bus)
 Harrison, Miss Frances L. (CLA)
 Harvey, Miss C. M. (Ed)
 Hauer, Mrs. Phyllis J. (Nur)
 Hdoubler, Mrs. Joan (Nur)
 Hedman, Harold S. (Ed)
 Hegemaster, Mrs. Lucille W. (GC)
 Hendry, Leslie E. (For)
 Hertog, Miss Joyce L. (CLA)
 Hokelsrud, O. S. (GC)
 Horton, Miss Lois C. (GC)
 Houglum, Ms. Shirlee J. (CLA)
 Howard, Miss Patricia A. (GC)
 Howen, Dean M. (Bus)
 Jackman, Duane A. (Ed)
 Jacobson, Mrs. P. R. (CLA)
 James, Bruce A. (IT)
 Jastram, Rupert M. (UC)
 Jereb, Edward R. (IT)
 Johnson, Mrs. L. (Nur)
 Johnson, Miss Marion E. (Nur)
 Johnson, Robert W. (For)
 Johnson, Roger T. (IT)
 Jokull, Miss M. Phyllis (CLA)
 Kapila, Indar P. (IT)
 Karakas, T. J. (Ed)
 Kayute, Dr. Sheldon W. (Med)
 Kieffer, Jarold A. (CLA)
 Kiley, Harry M. (IT)
 Kiplinger, Mrs. Harry D. (CLA)
 Kronhausen, Eberhard W. (Ed)
 Kropidlaski, Ms. N. M. (Grad)
 Kuth, John W. (CLA)
 Lacount, L. G. (GC)
 Lake, Dr. Corrinne E. (Med)
 Langford, Miss Eleanor D. (GC)
 Larson, Mrs. Carl H. (CLA)
 Lee, Donald E. (IT)
 Levang, Raymond K. (CLA)
 Levey, Daryl M. (CLA)
 Libera, Robert P. (Grad)
 Lindquist, Dean C. (IT)
 Lipshutz, Mrs. H. (Nur)
 Long, Mrs. M. F. (HEC)
 Loquai, Marvin C. (MortSci)
 Luby, Maurice F. (CLA)
 Lundahl, Jr., Lloyd E. (IT)
 Magne, Dr. John (Med)
 Malm, Dr. Robert E. (IT)
 Mandell, Miss Ruth J. (Ed)
 Mannigal, Raymond S. (Ag)
 Manning, Miss Eileen P. (CLA)
 Martje, W. P. (IT)
 Mason, Mrs. Edna K. (Ed)
 McCluskey, Mrs. William R. (Nur)
 Meium, Mrs. H. (CLA)
 Midanek, John C. (UC)
 Milner, Dr. Gerald H. (Dent)
 Murtberg, R. W. (CLA)
 Nakamura, Hideoyoshi (IT)
 Nelson, Prof. Marion John (CLA)
 Nelson, Miss Mary J. (HEC)
 Noble, George C. (CLA)
 O'Brien, Miss Anne S. (GC)
 Ocken, Miss Barbara J. (CLA)

Olive, R. A. (Bus)
 Olive, Richard M. (Bus)
 Olson, Chester H. (For)
 O'Reilly, James M. (Bus)
 O'Riol, Miss Evelyn (CLA)
 Orlich, Eugenia (Ed)
 Osgood, Miss Frances G. (CLA)
 Palosaari, Miss Taimi I. (Nur)
 Patterson, Irving A. (MortSci)
 Paul, Julius (CLA)
 Person, Robert J.
 Peterson, Miss Mary L. (Ed)
 Peterson, Stanley (Grad)
 Petty, Mrs. L. V. (HEC)
 Peugh, Charles D. (GC)
 Philip, C. (IT)
 Pils, Dr. A. R. (Med)
 Priest, Clifton F. (IT)
 Reifel, Dr. Albert D. (Med)
 Reinars, Mrs. R. A. (Nur)
 Reinfrank, Burton D. (Bus)
 Reinhard, Jr., Mrs. M. R. (Nur)
 Riley, Miss Elizabeth A. (CLA)
 Robbins, Howard M. (IT)
 Robinson, Mrs. F. E. (Ed)
 Rudd, Donald H. (IT)
 Samuelson, James B. (CLA)
 Sand, Mrs. Josiah (CLA)
 Sandberg, Miss Lynn W. (For)
 Sessions, Hal C. (Bus)
 Shieh, Milton J. (Grad)
 Simons, Gerald F. (IT)
 Smith, Samuel S. (GC)
 Smith, Wallace J. (CLA)
 Sorenson, Miss Ellen M. (Nur)
 Soucek, Jr., Albert J. (Nur)
 Spartz, Elmer D. (IT)
 Spindler, Mrs. Myra J. (CLA)
 Steinert, Miss Patricia A. (CLA)
 Strelow, Mrs. Verna M. (Nur)
 Swenson, R. T. (Ag)
 Tacke, Miss Charlotte R. (Nur)
 Thomas, Mrs. T. Robert (Ed)
 Thompson, Jr., George A. (IT)
 Tibbetts, Palmer G. (Bus)
 Towle, Leonard E. (UC)
 Turner, Harry W. (IT)
 Uebelacker, M. R. (IT)
 Vachhani, Moti V. (Ag)
 Van Deventer, Miss A. L. (CLA)
 VanPatter, Dr. W. (Med)
 Vogeler, Mrs. D. (CLA)
 Vokaty, Leo F. (IT)
 Walsh, Miss Eleanor A. (Ed)
 Walton, R. E. (Bus)
 Wedin, Donald H. (Bus)
 Weicht, R. W. (CLA)
 Wendtland, Miss Betty J. (UC)
 Westlund, G. B. (Bus)
 Wicklund, Dr. Jerome R. (Dent)
 Wilson, John R. (Bus)
 Womack, Miss Mary E. (CLA)
 Wood, Mrs. Lynn A. (Bus)
 Wynkoop, Miss Mary M. (Ed)
 Yarosh, Marvin M. (IT)
 Zacher, Miss Marion J. (CLA)

Bakke, Miss Lorraine I. (HEC)
 Banka, Miss Mildred A. (HEC)
 Barnatt, Miss M. E. (UC)
 Barrett, Frank A. (GC)
 Bartelme, Kenwood F. (CLA)
 Belanger, Edmund J. (Law)
 Belanger, Philip Joseph (IT)
 Bell, Dr. Wilfred B. (Dent)
 Benner, Donald G. (Bus)
 Benrud, Charles H. (CLA)
 Berg, R. I. (CLA)
 Berndt, Gerald D. (CLA)
 Blizin, Jera!J (CLA)
 Blooston, Mrs. Arthur O. (CLA)
 Boekekheidé, Dr. Priscilla A. (Med)
 Boll, Robert E. (Bus)
 Bothne, Miss C. (Nur)
 Bouma, Lewis R. (CLA)
 Branes, Mrs. Bernice Hagie (Ed)
 Brett, Miss Mary A. (DentHyg)
 Brueffy, Ernest E. (Ed)
 Burkholder, Mrs. Barbara H. (Grad)
 Burud, Miss Elizabeth L. (Nur)
 Butler, Miss S. L. (Bus)
 Campbell, William J. (GC)
 Carter, Warren W. (IT)
 Chachigh, Daniel F. (Bus)
 Chambers, Leroy H. (IT)
 Clark, Robert E. (IT)
 Clark, Willard P. (Law)
 Cleland, Charles E. (IT)
 Coen, Douglas E. (Bus)
 Coen, Richard P. (Bus)
 Cooper, Richard E. (Ed)
 Covell, John B. (CLA)
 Craft, Clarence H. (Bus)
 Crist, John M. (CLA)
 Daellenbach, George H. (Ag)
 Datel, Robert J. (IT)
 Davidson, Robert W. (MortSci)
 Davis, Douglas C. (Ed)
 Davison, Theodore A. (GC)
 Defenbacher, Mrs. D. S. (CLA)
 Degerness, Jr., Mrs. Maylon L. (UC)
 Derouin, James P. (IT)
 Dobie, Miss Suz A. (Nur)
 Eckert, Donald H. (IT)
 Edstrom, Carl A. (IT)
 Ellenbecker, John N. (IT)
 Elvig, Burton I. (CLA)
 Erickson, Roland L. (CLA)
 Fasbender, Miss Mary M. (MedTch)
 Felix, Luis C. (Grad)
 Fell, A. O. (Law)
 Finkelstein, Morton H. (Ed)
 Foresmith, Miss Ann L. (GC)
 Forns, Joseph M. (IT)
 Frey, Joseph L. (CLA)
 Fritze, Mrs. L. (Nur)
 Gallagher, Miss Mary (CLA)
 Garrigus, Ms. Patricia (CLA)
 Gelin, Roger F. (Bus)
 Giere, Robert W. (GC)
 Gilbert, John W. (Bus)
 Gilbertson, Arnold O. (IT)
 Gill, Clark C. (Ed)
 Gombold, Miss Dorothy R. (CLA)
 Gorder, Kendall E. (IT)
 Graves, William S. (GC)
 Green, Francis J. (IT)
 Greiner, Mrs. C. (CLA)
 Gustafson, Mrs. A. (HEC)
 Haakenstad, Gudbrand (IT)
 Hagman, Thomas A. (GC)
 Hall, Curtis J. (Law)
 Halloran, Miss Elizabeth J. (CLA)
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crib death: 3,000 years later, still no one knows why

by Jeannie Hanson

"And this woman's child died in the night because . . ." (II Kings 3:19)

Died because of what? To this day, no one knows.

The Old Testament writer thought the baby died because the mother rolled over on it in her sleep. We know now that this is not the cause of sudden infant death—"crib death"—which still kills one baby out of every 350 born.

The cause of these deaths still haunts us, as can the guilt implied in the Bible verse. Public health researchers at the University are working on both the cause of crib death and the counseling of families after a death, in a major attack on the problem.

"As we look for the causes of crib death, we need to get away from the Theory-of-the-Month Club," said Robert ten Bense, pediatrician and professor of public health. More than 150 theories on the causes of crib death have now been disproven, although the length of the procession is quite a testimony to the elusiveness of the "cure."

Among the disproven theories, according to ten Bense, are insufficient activity of various glands, vitamin deficiencies, blood sugar problems, chemical imbalances caused by baby formulas, and suffocation on bedding or on vomit.

"Researchers are looking into all kinds of things now," ten Bense said. "Even cats have been found to have sleep apnea." Interest has spread as funding for research on sudden infant death has risen from \$46,000 to \$4 million since 1971.

"It will all be worth it if crib death can be prevented," says Delphie Fredlund, a public health professor and colleague of ten Bense. She counsels groups on the effects of a baby's death on the family.

The parents, she said, need to hear that there was no way to prevent the death—no cry for help from their baby before it died—and that the quick death was without suffering. They need to know that crib death has always happened and that environmental factors cannot be blamed.

The parents especially need to know that their baby's death was not their fault, she said. Even well-meaning relatives sometimes imply that the parents could have been more careful.

After a crib death, family problems can be even broader than guilt, Fredlund said. Common repercussions are marital problems, miscarriages, anxiety about future pregnancies and babies, and fears among surviving children.

"Parents have a harder time letting themselves love the next baby. They are quite anxious until that baby lives longer than the dead one did," she said.

To increase understanding of what doesn't cause crib deaths, Fredlund

works with the Minnesota Sudden Infant Death Center at Children's Hospital in Minneapolis. There she works on programs for public health nurses, police officers, and even coroners, so that they can help the parents who have to deal with a sudden and still not understood infant death.

Although researchers have whittled away at the number of possible causes, the litany of statistics on sudden infant death goes on, ten Bense said. Crib death kills 7,500 to

Among the disproven theories: inadequate gland activity, vitamin deficiency, blood sugar problems, chemical imbalances caused by baby formulas, and suffocation on bedding or on vomit.

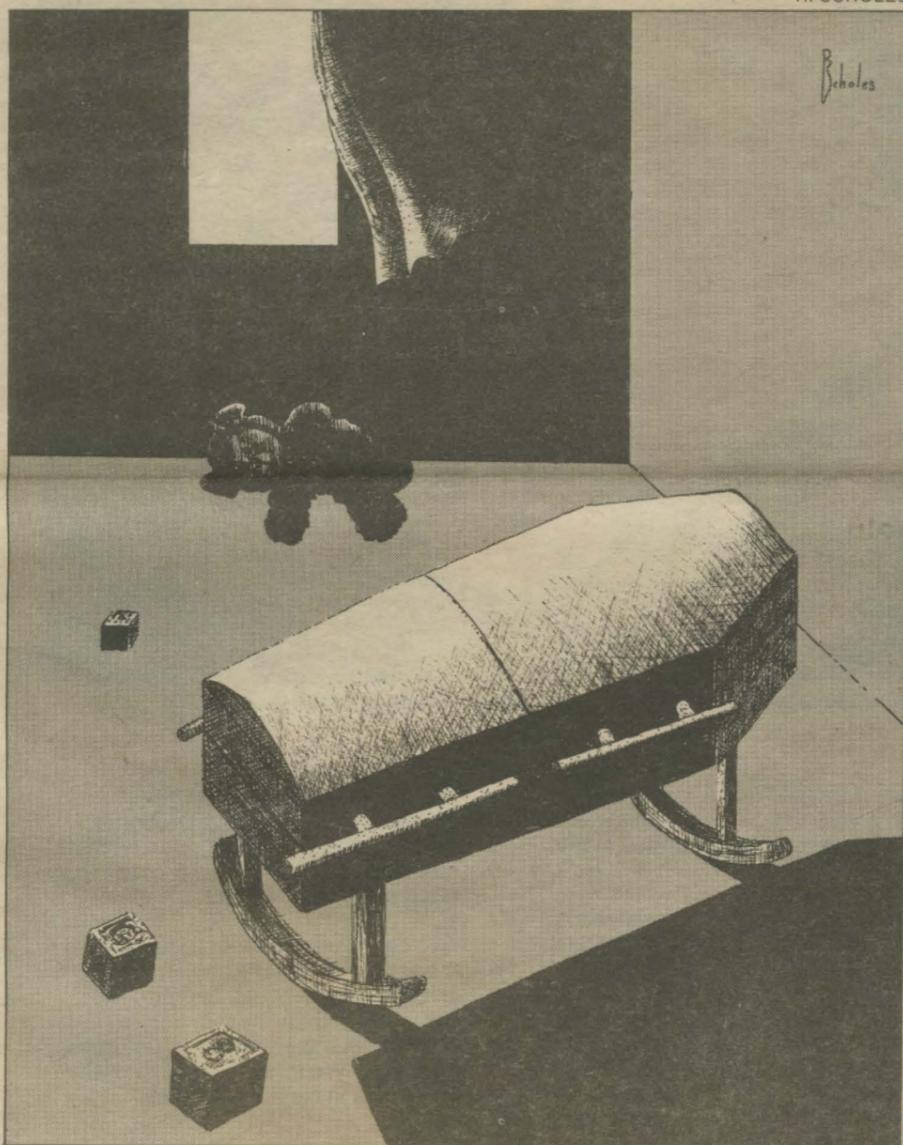
10,000 babies a year, almost always while they sleep, without pain, within a few seconds. It is the leading cause of infant death after the first week of life, peaks in frequency at two to four months, and tapers off as children become one year old. It is the second leading cause of death in children from one week to 15 years old.

Especially at risk, according to ten Bense, are male babies, babies with mild colds (especially in winter), premature or small babies, and babies with teen-aged mothers or mothers at a low socio-economic level. But no group is immune. The best care cannot prevent the death, and no one can predict it.

So far, the most promising explanation for crib death is "sleep apnea" combined with the common cold, ten Bense said. Sleep apnea is a disturbance somewhere in the body's automatic breathing system—if the system doesn't function properly breathing can stop during sleep.

This seems more likely to happen when a child has a cold. But no one knows exactly how the system works, how a cold could affect it, or whether some third factor—such as an irregular heart rhythm or a brain-wave irregularity of some kind—is actually the cause of death.

In the search for the cause, anything, even a pregnant seal, is welcome as help, ten Bense said. The Harvard Medical School is now beginning an investigation of the effect of mother seals' underwater diving on unborn Antarctic seals. The same mechanism that helps the seals cope with a lack of oxygen might help human babies.



Robert ten Bense and Delphie Fredlund

TOM FOLEY

the challenge of particulate pollution: are we doing asbestos we can?

by Brian Lowey

There's a little bit of asbestos in all sorts of things. It's in insulation, shingles, brake linings, boats, and Lake Superior.

Until 1973 it was sprayed on walls and ceilings for fireproofing, and it is still added to some kinds of caulking compounds, tiles, and fabrics. All in all, there are at least 3,000 applications for this handy mineral.

But asbestos also has been linked with cancer, especially cancers of the lung and stomach. When people who work with asbestos saw through it or dump out bags full of it, microscopic fibers (about 1/25,000 of an inch long) drift through the air and sometimes into their lungs.

The ultimate result, in some cases, is cancer. But is it that simple? Or are there subtler mechanisms at work?

Researchers at the University's Freshwater Biological Institute think it isn't so simple. Arousing their curiosity and that of other researchers in the field is the fact that while workers in contact with asbestos are seven or eight times more likely to die from certain types of lung cancer than are the rest of us, this probability is 92 times higher among asbestos workers who smoke than among their non-smoking colleagues.

In studies with laboratory animals, a number of researchers have also found that they can induce higher incidences of cancer with certain carcinogens only if some particulate matter such as asbestos or india ink is also present.

The conclusion is that asbestos fibers are ganging up with one of the various organic molecules found in cigarette smoke to cause cancer. This mecha-



Chrysotile asbestos—interesting to look at, deadly to breathe

nism, if tracked down, could shed new light on the link between cancer and particulate matter suspended in the air.

Particulate matter such as asbestos has the ability to absorb polynuclear aromatic hydrocarbons (PAHs), a family of chemicals found in cigarette smoke. Whether these PAHs cause cancer by themselves or whether they first have to metabolize in some way is not entirely known. The point is that they are delivered to cell membranes by the inhaled particulates.

The chemicals are then taken into the cell membrane, where microsomes, tiny subcellular organs, go to work on them and the mysterious process that results in cancer begins.

"We can measure when a PAH leaves the asbestos particle and enters the cell membrane," said Joseph Lakowicz, assistant professor and researcher at the Freshwater Biological Institute. "We think this is one of the first steps in carcinogenesis."



Joseph Lakowicz

Scientists have found that they can boost the occurrence of cancer using carcinogens only if particulate matter like asbestos or india ink is also present.

"These transport mechanisms are an interesting aspect of cancer research," he said, "and asbestos is interesting to study because it has such a high absorptive ability. It even absorbs oil from the jute bags in which it is packaged and shipped."

Another interesting aspect of asbestos is the fact that some 200,000 workers are involved in direct production of asbestos materials and products, and that between three and five million people handle the mineral in some way. Federal regulations already limit the number of asbestos fibers allowed in the air where people work, and there is talk of dropping the standards still lower. But the asbestos industry isn't the only place where particulates cause problems.

"It appears that particulates in general are suspect," Lakowicz said. "There are other areas, such as the cotton industry, where workers are exposed to particulates."

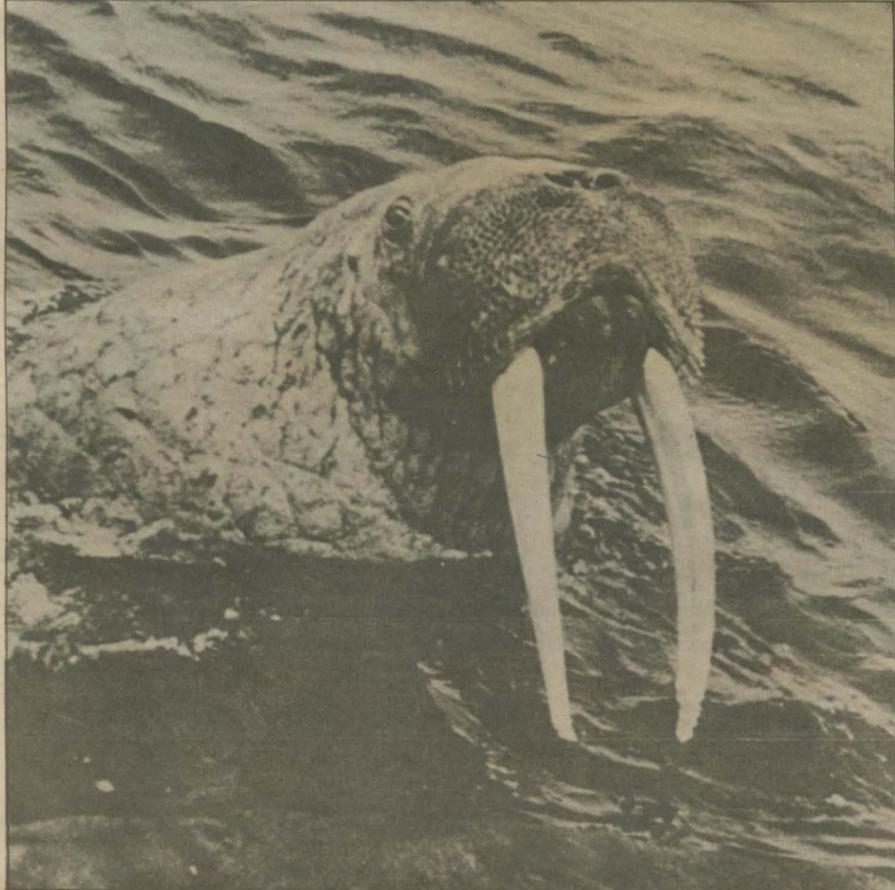
Lakowicz's research has included the use of a relatively new laboratory technique—fluorescence spectroscopy. This technique enables researchers to track the progress of substances such as PAHs into cells by watching the intensity of the light they give off when they are exposed to certain wavelengths of radiation and by charting how this intensity varies as they move from one chemical environment into another.

This technique will allow cancer researchers to take another technological step into the relatively uncertain realm of the relationship between particulates and carcinogens such as those found in cigarettes. If more links between cancer, smoking, and occupational exposure to particulates are found, cigarette smokers may find it wise to give particulates a wide berth, or to give up smoking altogether.

TOM FOLEY

some unendangered species: good environmental news, for a change

by Jeannie Hanson



there is no provision for enforcement. The United States has banned importation of any product made from marine mammals, but if another country's fishing industry takes too many marine mammals the only recourse is an international boycott.

"An import ban on Toyotas in retaliation for Japan's whale-killing is pretty unlikely," Siniff said.

Bureaucracy is a problem, too, although the procedures seem to be becoming more streamlined, he said. Permits ruled on by the commission must be routed through the Washington maze: seals, sea lions, porpoises, and whales "belong" to the Commerce Department; the State Department handles all international negotiations; the Interior Department has charge of sea otters, sea cows, and polar bears.

Siniff would rather see decisions made quickly, even by compromise, so that fishing industries and hunters would not be tempted to take the law into their own hands. He would like to see a special "science court" set up that would deal exclusively with scientific issues, have research information available to it, and have enforcement power.

The Marine Mammal Protection Act has done much to protect marine mammals, Siniff said, but part of its success should be attributed to its clients. "Marine mammals, with their brown eyes and fur, appeal to people," Siniff said. "We want plenty of them to stay around to be popular."

letters

prairies out east?

I especially enjoyed the article "The History of an American Family" (Vol. 4, No. 3). However, there are two minor points within the article that seem questionable to me.

My grandparents homesteaded a farm in 1875 in Grant County, just to the northwest of Pope County in which the Saglie family of your article settled. The old family records are in my possession and they show that on May 24, 1875, a payment of \$2 at the land office in Alexandria bought ownership of 160 acres. There was no additional charge of \$2.50 per acre as you described the Saglies as paying in 1869. The Lee farm was south of Elbow Lake, near Barrett, on the Pomme De Terre River, perhaps 20 miles northwest of the Saglie farm. I doubt that the cost of land went down in the years between 1869 and 1875.

Also, three times in your article you mention the prairie stretching "to the east." Gentlemen, from Pope and Grant counties, the prairie stretches to the west. To the east lay gentle rolling land with woods and lakes; one can stand on a rise near Glenwood overlooking Lake Minnawaska and see the flat land that was prairie extending west to the horizon. Perhaps at the Saglie farm there was a small patch of prairie segment on the eastern edge of their farm, like an island.

John R. Lee
Sebastopol, Calif.

In these days of airborne asbestos fibers, PBBs, oil slicks, and power-line controversies, good environmental news seems at a premium.

But at least one category of creatures seems to be surviving it all: marine mammals are in better shape for survival today than they have been in 30 or 40 years, according to University ecologist Donald Siniff.

Although the seas are not exactly pristine, polar seals, polar bears, and sea lions are still sliding across their ice in relative peace. Sea cows, otters, and even porpoises swim in great numbers, although they still must dodge motorboats, tuna nets, and abalone fishermen. Among the marine mammals, only whales are in extreme danger from man, Siniff said.

Much of the credit for protection of sea mammals goes to the Marine Mammal Protection Act, passed in 1972. Siniff is one of three scientists on the Congressional commission appointed to administer the act.

According to Siniff, the act has good points and bad. While strict procedures may protect the animals, bureaucratic red tape can sometimes push polar bears and seals one step closer to an end as dog food, winter coats, or trophies.

Thousands of porpoises owe their lives to the act, Siniff said. A few years ago, crews were sent to observe the behavior of porpoises caught in the nets of tuna fishermen. Until then, the tuna industry had claimed that porpoises gave up too quickly and drowned under water in the nets.

But preliminary observations indicated that the porpoises surfaced for

life-saving air after 10 or 15 minutes. Now efforts are being made to force tuna fishermen to wait this long before hauling in their nets, and they also are being told to use finer-mesh nets that porpoises can jump over.

The population of Hawaiian monk seals is being threatened by souvenir hunters looking for glass fishing balls among offshore rocks. They scare the females away from their pups and the pups die. If a "critical habitat" area were set aside, souvenir hunters would be excluded from the rocky atolls where seals reside, Siniff said.

Designations such as "critical habitat" and "threatened species" are the weapons of the Marine Mammal Protection Act. California sea otters in the Big Sur area that compete with the local fishing industry for abalones may need to be designated "threatened" to be protected. "The commission has recommended this, and the U.S. Department of the Interior is now considering it," Siniff said.

Among the commission's regular tasks is ruling on permits. Anyone who wants to touch marine mammals now needs a permit to do so. The commission also reviews international treaties dealing with marine mammals. Marine mammal hunting by foreign countries inside the new 200-mile national limit will soon be an issue.

A treaty covering Antarctic seals—designed to protect leopard, southern elephant, Weddell, crabeater, Ross, and southern fur seals—provides for exchange of scientific information and permits limited hunting.

"The treaty role points up one of the main problems with the Marine Mammal Protection Act," Siniff said. As with any international treaty,



Donald Siniff

mental jogging: paring the flab from our cerebra

by Michael Finley



"No, no, no—Who's on first!"
"That's what I'm asking you!"
—Bud Abbott and Lou Costello

Anybody who's listened to Abbott and Costello knows that they suffered from some chronic kind of communication disorder. The same goes for Laurel and Hardy, Martin and Lewis, and even our friends who somehow never manage to get their thoughts into sync with reality. For that matter, we ourselves may occasionally have lapsed into substandard modes of problem-solving.

Luckily for us there is Otto Schmitt, who is, among other things, a professor of biophysics, bioengineering, and electrical engineering at the University. Schmitt is interested in improving the way people think. Methods he's devised so far include mental jogging (which covers non-replicate redundancy, figures of thought, and language parity) and idea thievery.

"We know it's a good idea to get our bodies in good shape," Schmitt said, "but who ever considers that brains need exercise, too? They get flabby from underuse the same as any other muscle. So I came up with something called mental jogging to remedy that situation."

In its most watered-down sense, then, mental jogging means giving the brain regular work-outs with a varied regimen of exercise: doing crossword puzzles or writing poetry if the verbal muscles have atrophied, learning to play piano or guitar if the soulfulness quotient is at low ebb, learning to "shoot from the hip" if the spontaneity needle won't budge from the green area, and, above all, avoiding overspecialization.

But there is a more concentrated form of mental jogging as well. Applied in a regular program of problem-solving, it helps the individual avoid guesswork, idiosyncratic error, and intellectual sentimentality.

"Consider the following riddle," Schmitt said. "How do you pronounce this word: *u-n-i-o-n-i-z-e-d*?"

"Chances are, you just pronounced the word *u-n-ionized*, that is, 'made

into a union.' To the chemist, however, the word is *un-ionized*, meaning the ionization has been removed from a solution.

"The point is that the two answers to the riddle are equally valid, but not in every context. Your connotations, which you take to be fundamentally logical, can really mess you up."

Thus, Costello's confusion. He could only think of the word *who* as a relative pronoun. Abbot, meanwhile, employed it as a proper noun.

"The first thing you have to understand," Schmitt said, "is that any given situation is addressed in a variety of 'languages,' or 'figures of thought.' For instance, there is your personal-satisfaction language, your common-good language, your practicality language, your language as husband, homeowner, citizen, employee.

"Usually, when we come to a problem, we solve it by asking ourselves questions about it, and usually the questions are all in the same language. For instance, let's pretend that you are considering buying a car. Should you or shouldn't you?"

0640995	064448	0647955	065147
0675395	067878	0682155	068551
0708795	071208	0715355	071862
0741195	074438	0747555	075073
0772595	077568	0778755	078184
0802995	080598	0808955	081195
0832395	083528	0838155	084106
0860795	086358	0866355	086917
0888195	089088	0893555	089628
0914595	091718	0919755	092239
0939995	094248	0944955	094742
0964395	096678	0969155	097153
0987795	099008	0992355	099464
1010195	101238	1014555	101675
1031595	103368	1035755	103786
1051995	105398	1055955	105797
1071395	107328	1075155	107708
1089795	109158	1093355	109519
1107195	110888	1110555	111220
1123595	112518	1126755	112831

Schmitt says that you'll probably ask yourself whether you *want* one or not, and not consider the other languages: your common-good language, which would ask if it's useful to society as a whole for you to own another gas-guzzling, sulphur-spouting pedestrian-killer; your practicality language, which would want to know if you can realistically afford a car, or whether you can't accomplish your transportation objectives in a cheaper way

Schmitt calls this use of different figures of thought "non-replicate redundancy." Redundancy because the same question is asked over and over again. Non-replicate because the question is asked in a different language each time. Once all the answers to the question come in, the

asker checks them for "language parity." Are all the answers yes? All no? Which answers dissent? How important are they?

When you're done with mental jogging, you have an answer not based on one simple frame of reference, but instead one taking into account every possible consideration. Bud Abbott will say: "Lou, I believe you've misunderstood me. Who is the name of the first baseman, Elmer T. Who. Alex What is on second base, and Timothy I. Don'tknow plays third."

It's not as funny, but at least it won't cause a heart attack.

Schmitt, besides being a physicist and a bioastronaut and a million other things, is a mathematician. At least, he believes in numbers—only instead of using the word *quantification*, he prefers *quantitation*.

"Mental jogging will work best when the answers to the various language parity checks can be given in a standard form," he said, adding that some people will object to the notion that numbers can be assigned to qualities such as personal satisfaction, benefits, and risks. Philosophers have long argued that the basic unit of pleasure is the "hedon," but Schmitt goes even farther than that. He believes anything can be quantified, including human life.

"Of course human life has a value, and we use it all the time," he said. "We say we can't put a price on it, but whenever a search mission is called off, we've done it. Every time we come up with a plan for air traffic control, or building construction, we've done it. Take cars, for instance. It would be possible to build a car today, using existing technologies, that would be virtually accident-proof. But it would cost more than our current value for life."

Schmitt has participated in a planning session or two himself. One of the things he has learned in his experiences is that you can't just give people good advice and expect them to heed it. That goes against everything that is known about human nature. Instead, Schmitt has resorted over the years to a concept he calls "idea thievery."

In idea thievery, ideas get stolen, but not by Schmitt. He leaves them out in the open, unattended, until the right people come along and slip them into their briefcases. Of course, that's just a metaphor.

What idea thievery really is is a way for a good idea to gain acceptance quickly, without having to undergo the 20-year period that usually separates an idea and its publication from its acceptance in the scientific community. When the "thieves" become convinced that the ideas they've lifted from Schmitt are actually theirs, the ideas acquire the added impetus of their energy as well as Schmitt's.

Mental jogging, non-replicate redundancy, language parity, idea thievery—talking to Schmitt is like standing beside a great fountain that is forever pouring forth new ideas and new language. Or like being in a rocket ship with a poet. Or something akin to that.

"Somebody once came up with a system for figuring out people's motivations in life," Schmitt said. "Some people are in it for the money, others for pleasure, still others for power. Me, I'm into ideas."

"Of course human life has a dollar value, and we use it all the time.

Whenever a search mission is called off, we've done it. It would be possible to build a car today, using existing technologies, that would be virtually accident-proof. But it would cost more than our current value for life."



Otto Schmitt, flanked by a lot of numbers. Can everything be "quantitated"? That's one question he's asking.



prairie revolution: the great corn and alfalfa exposition of 1913

by Peggy Ness

December 9, 1913. Unseasonably warm, it was shirt-sleeves weather in the west central Minnesota town of Morris. The townspeople were decked out in gala attire for the opening day of the first West Central Minnesota Corn and Alfalfa Exposition.

Special trains from Willmar and Brown's Valley brought farmers and their families. An estimated 20,000 to 25,000 people are said to have attended the event, which not only helped introduce farmers to such scientific methods as crop rotation and farm management, but also brought townspeople and country folk of the region together in the common cause of improving the quality of rural life.

The exposition marked the beginning of an age of progressivism in west

central Minnesota. Its story is a chapter in the history in the development of the state. Drawn from the archives of the West Central Minnesota Historical Research Center and clarified by the research of University of Minnesota-Morris (UMM) students Gerald Gettle, Joe Moore, and Steve Niklaus in the historical research course at UMM, it presents insight into the heritage of this region of Minnesota.

One of the first things those attending the exhibition saw after leaving the depot was a giant arch, covered with green alfalfa, stretching the width of the street. At the next crossing was a huge stack of corn in the middle of the street for the corn-husking bee. Practically all the businesses on both sides of the street were decorated with

green and yellow bunting in celebration of the event.

The exposition itself was something to see. There was a farm school exhibit with rooms of a model farmhouse designed for efficiency and convenience and farm management exhibits on crop rotation and scientific farming, as well as a blacksmith shop, carpenter shop, and dairy operation.

In addition, some 1,280 corn entries and more than 50 alfalfa entries were displayed in competition for \$1,500 worth of premiums and the Playford Cement silo that would go to the grand-champion winner in the corn competition.

cities . . .

and neighborhood identity that is often absent in younger cities."

Baltimore, New Orleans, and San Francisco-Oakland are grouped together as "19th-century ports." The Twin Cities are grouped with Pittsburgh, St. Louis, Cleveland, Chicago, Detroit, and Seattle as "19th-century inland centers and ports," cities that grew up with the railroads and with canal and lake transportation.

Twentieth-century cities are Dallas-Fort Worth, Houston, Los Angeles-Long Beach, Miami, Atlanta, and—surprisingly—Washington, D.C. All were in existence in the 19th century, but the vast majority of what is in the cities now came in the 20th century.

Washington was "just a little town at the turn of the century," Adams said. "Most of the growth of the federal government came in the 1930s and since."

Houston is "the most spread-out city in the nation, settled in at half the density of Los Angeles, the place that is usually cited as exhibit A in the indictment against urban sprawl," Adams and Abler say in the atlas. "Houston sprawls twice as much as Los Angeles, yet it seems to work no worse than many other places."

In general, Adams said, "every chance that Americans have had to live at low densities, they've taken the chance." Although the move to the suburbs is slowing and may even be turning around, it has been one of the dominant facts of metropolitan life in the past 30 years.

When people move, it is usually because they choose to. A family that moves to a better neighborhood may be leaving problems behind. The issues are complex and "don't reduce easily to slogans," Adams said, but he and Abler caution against putting the "problems of places" above the "problems of people."

When an ambitious person moves from a poor region to a prosperous one, the move may pull down the average income in both places. "Both regions may consider themselves worse off as a result of the move, but the migrant may reckon that he is better off."

Information in the atlas is taken from 1970 census data. Even as Adams and Abler were at work, people were moving and cities were changing.

"There have been rumblings in the past five or six years," Adams said.

"Some of the older neighborhoods are not losing as rapidly as they once were. In the late 1950s, it was very unfashionable to live in areas near downtown. Everybody was in a hurry to move to Roseville or Golden Valley. Twenty years later, the fashions have changed."

Adams said it is hard to know if the new fashions represent a trend or an anomaly. Perhaps it is a simple matter of short supply: baby-boom babies are reaching home-buying age, few houses were built during the recession of the early 1970s, and houses once seen as decrepit are suddenly attractive again.

Another pattern that may be emerging, Adams said, is a move toward rural areas. "Rural populations have stabilized and started to increase. People are trying to use that fragment of information as evidence for some-



The first day of the exhibition was dubbed "Corn Day." It included afternoon lectures on the history, economic status, and chemistry of corn, as well as on seed selection and plant cultivation. A huge map made entirely of corn depicted the 19-county area served by the West Central Minnesota Development Association (WCMDA), sponsors of the exhibition.

For the ladies, there was a session that covered such topics as "The Part of Home Life in Rural Development" and "What Household Conveniences are Really Possible in the Average Farm Home?"

The next day was "Alfalfa Day." Some 10 Twin Cities businessmen came via special train for the day's activities,

and the morning began with a program for rural bankers and a county commissioners' meeting. The day's primary thrust, however, was the merits of growing alfalfa.

Previously, Minnesota farmers had relied principally on wheat crops, and because they were not familiar with crop rotation and other soil conservation methods, they were fast depleting the productivity of their land.

They did not believe that growing alfalfa was feasible. The exposition helped dispell that notion as well as the idea that "farming was farming" and there was nothing a farmer could do to improve his crops.

WCMDA furnished a carload of alfalfa to be sold at cost to farmers attending the meeting. By the end of the exposi-

tion, the entire quantity had been sold.

Dec. 11, the final day of the exposition, focused on farm management. The silver loving cup for the town having the most representatives at the exposition was awarded to Glenwood.

As the day drew to a close, it was apparent that the exhibition was a success, as was evident in the closing speech by WCMDA president F. W. Murphy.

"We are fairly well satisfied that we have made some history during the last three days. We have had the highest attendance of any development association meeting ever held in the state or in any other state, and we have started a good many things that will result in the advancement of this movement of ours for better farming, better business, better living."

morris

ing profound that's happening in the United States."

gain, he said, it is hard to tell. But it is at least possible that "the Main Streets that were closing down may be getting a new lease on life."

third shift is a continental one, away from the Northeast and toward the Southwest. All of these moves—back to the central cities, back to the small towns and rural areas, and toward the Southwest—are happening multaneously.

It isn't easy to make sense out of it year by year," Adams said. "We build cities using generations of lives."

In their atlas, Adams and Abler aimed only to present information, not to invent a thermometer to assess the health of the different cities.

ny city, once it reaches a certain size, has its own vitality that is self-sustaining, Adams said. Even the

big metropolitan areas that people think are in trouble for one reason or another—St. Louis, Pittsburgh, New York—are in trouble because of disorganization, not because of lack of vitality.

"New York has trouble meeting its interest payments on its bonds, but New York is not a poor city," Adams said. "Its richness isn't hooked up with the obligation to pay interest."

"It is doubtful whether the rest of the nation could survive without the invaluable specialized services only a vital, healthy New York City can provide," Adams and Abler say in the atlas. This, they say, is the best guarantee of New York's continued vitality.

A city such as Chicago combines problems and health: a declining population and a concentration of disadvantaged populations, but a

thriving downtown and the confidence of the area's leading citizens. "The decision to push the Sears Tower to a height greater than New York City's World Trade Center is evidence of the persistence in the city of the earthy self-confidence Sandburg captured so well," Adams and Abler say.

The Twin Cities enjoy both health and a comparative freedom from problems. An economy built largely on agriculture brings with it the promise that people will always be buying food.

"Minneapolis has more headquarters of national corporations than some larger cities do," Adams said. By contrast, Buffalo, N.Y., is "almost wholly owned by interests outside the city. As hard as Buffalo works, it's paying someone else the profits."

Two of every three Americans now live in metropolitan areas. "America is a metropolitan nation in an increasingly

metropolitan world," Adams and Abler say in the atlas.

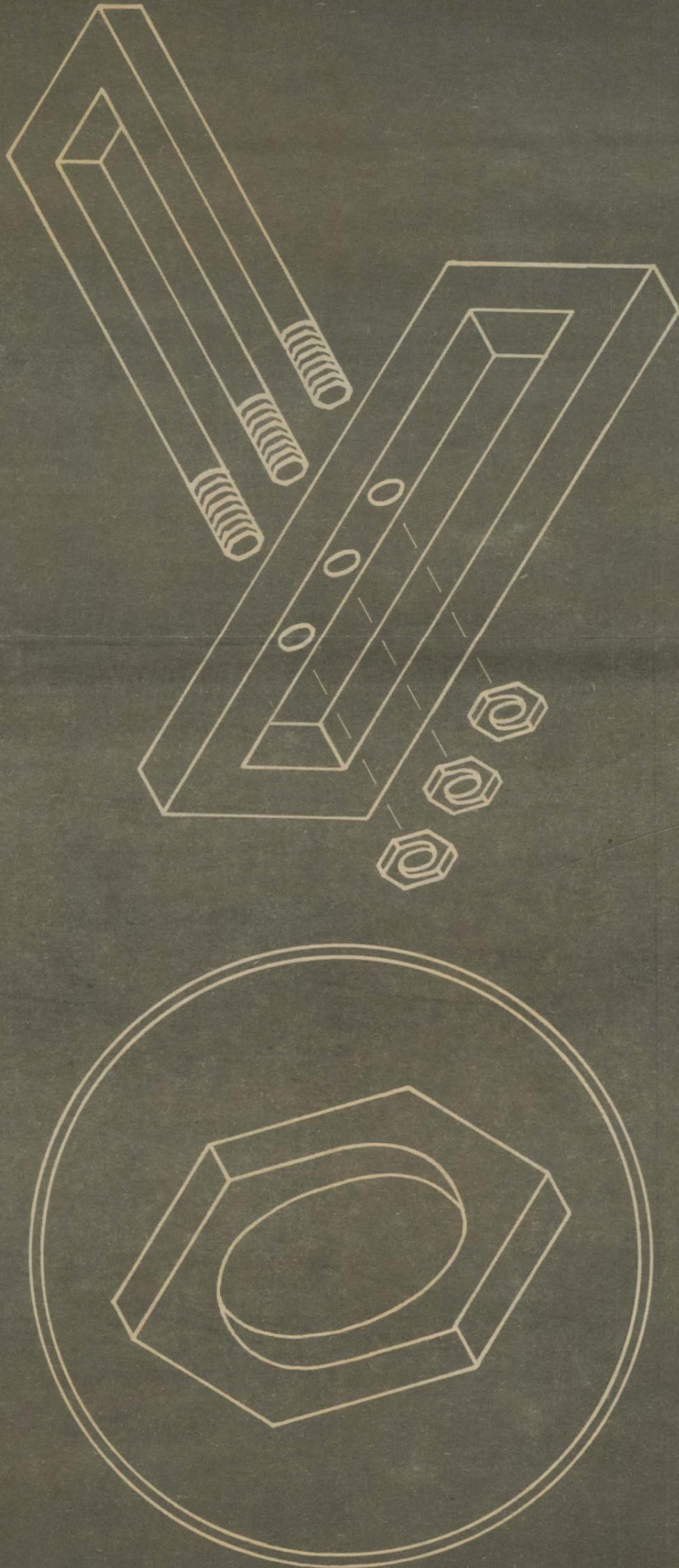
"There may indeed always be an England, but an England without London is unthinkable. So is an America without New York, Chicago, and Los Angeles."

Americans are romantic about their amber waves of grain and purple mountains' majesty. "But our alabaster cities—even considerably dimmed by human tears and smog—are equally important parts of our image of ourselves and of America's image abroad."

build your own impossibility!

This impossibility was recently sighted making the rounds in the Institute of Technology. Computer programmers in the University Computer Center have even figured out a

way to produce the design via a computer system. "CALCOMP can plot anything!" they claim. We are still waiting to see if they've discovered a method for squaring circles.



update

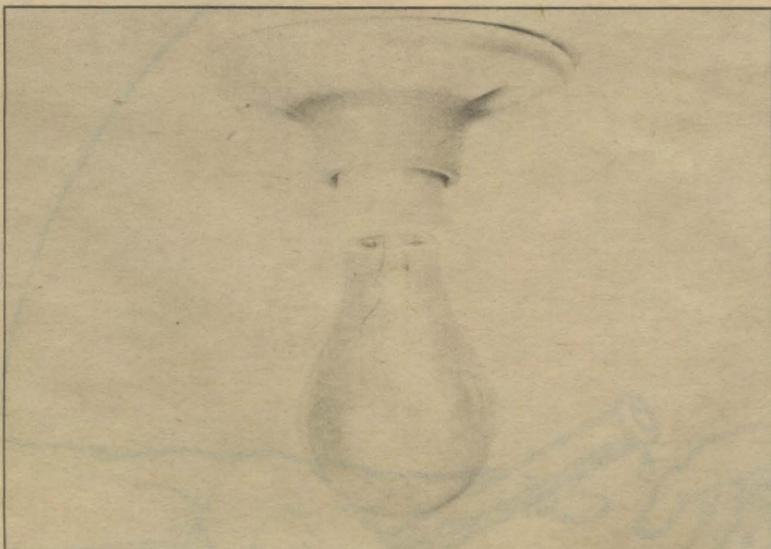
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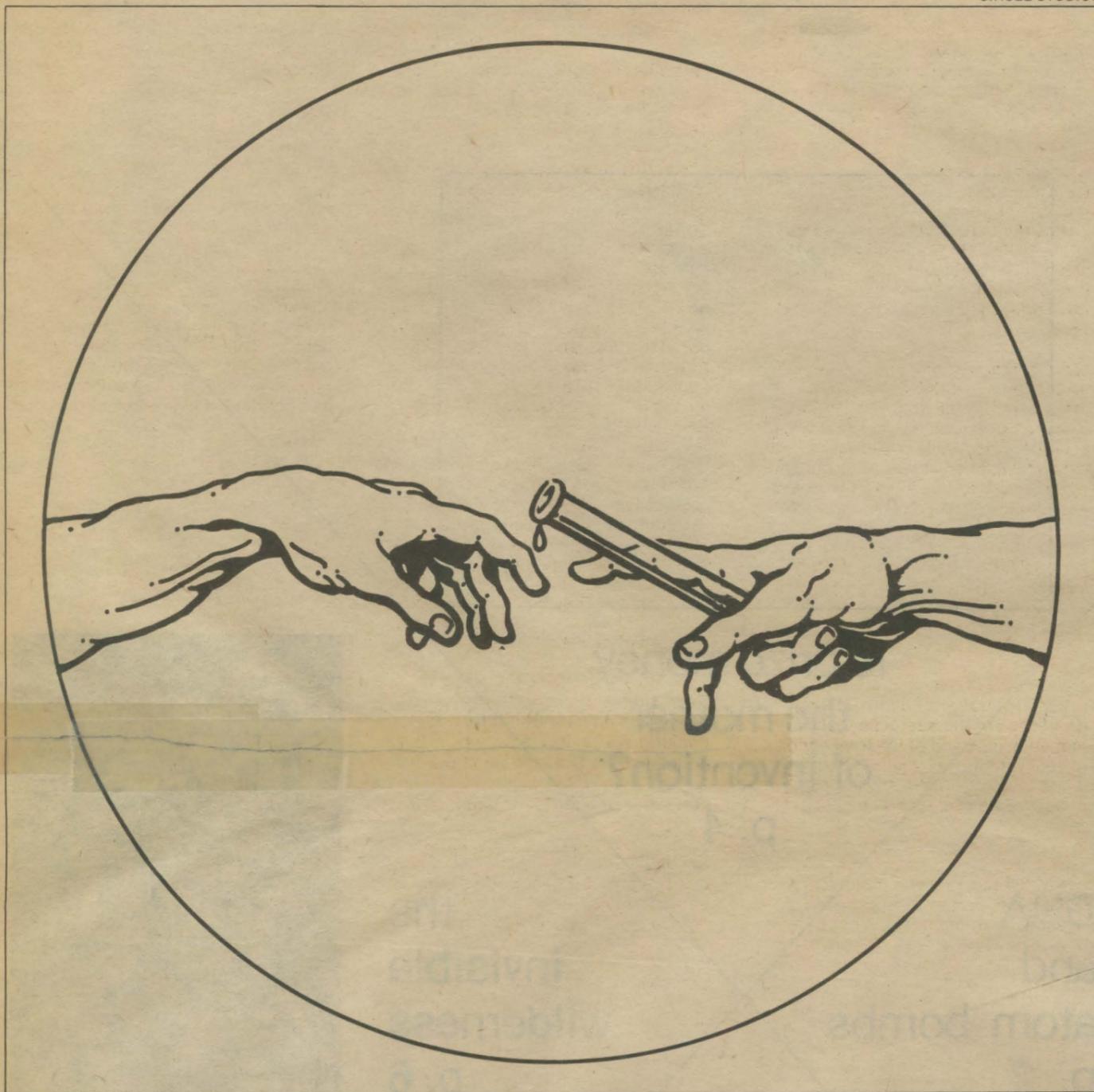


starvation:
a
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plus vikings, volvos, refrigerators, billboards, bureaucracy, and a little story

CIRCLE STUDIOS



As with nuclear power—and with the invention of fire those thousands of years ago—we suddenly find ourselves faced with an agonizing challenge: Will this new science of recombinant DNA manipulation save us from our species-old enemies, aging and disease, or will it complicate our lives with new terrors, as yet unimaginable?

new kinds of fire: recombinant DNA, nuclear power, and research

by Bill Huntzicker

A nuclear chain reaction set in motion the explosion of the first atomic bomb over Hiroshima in August 1945. The political chain reaction is still being felt—by scientists who want to explore a subject of research that could end up being as important as atomic energy.

Genetic engineering, like nuclear power, is coming to be seen as a force with the potential for either dramatic benefits or catastrophic consequences. In both cases, the research has safety considerations and moral implications.

The new methods that have become controversial are called recombinant DNA techniques. DNA (deoxyribonucleic acid) is a giant molecule in the nucleus of a cell that contains all of the genetic information that determines the characteristics of future generations of the cell.

The technique involves taking a small number of genes from one organism and introducing them into a second organism. This allows the scientist to

determine the specific role played by individual genes as the few genes from the first organism grow with the host organism.

The University of Minnesota, where the first uranium-235 isotope separation made possible a fuel for the atomic bomb, has not exactly pioneered in the research involving the new recombinant DNA techniques. A team of University scientists, however, has done recombinant DNA work at Stanford University, and they hope to begin similar work soon on the St. Paul campus.

Irwin Rubenstein, professor of genetics and cell biology, plans to do research involving the splicing of genetic material from young corn leaves onto a host virus that grows only in a certain kind of bacteria called *Escherichia coli* (*E. coli*).

As the new "recombinant" organism grows, it reproduces cells containing

the corn genes. Using this technique, Rubenstein said, he can learn more about the functions of corn genes.

Critics of recombinant DNA techniques have been concerned that the creation of new chromosomes could result in new disease-producing organisms with an evolutionary process that cannot be controlled by known antibiotics.

Robert Sinsheimer, chairman of the Division of Biology at the California Institute of Technology, told a University audience recently that the new forms of life may evolve in their own fashion, perhaps surviving their creators.

"The magnitude of our uncertainty reflects the magnitude of the scientific advance these new techniques make possible," Sinsheimer said. "I believe science has not taken so large a step into the unknown since Rutherford began to split atoms."

Sinsheimer, a leading critic of recombinant DNA, and Bernard D. Davis of Harvard Medical School, a leading proponent of the research, have both spoken to University of Minnesota

groups recently on the merits and the hazards of the research.

Five members of the University's Department of Genetics and Cell Biology have expressed their concern that the potential consequences of the research be publicly debated. In the *Minnesota Daily*, the Twin Cities campus student newspaper, they wrote:

"If the fate of re-DNA (and the fate of other issues that surely will arise from future scientific discoveries) is decided by those with political power today, the research will continue with haphazard containment and disregard for public and opposition opinion."

As the technological breakthroughs have been compared with those in nuclear physics, so has the political climate in which the debate is taking place.

Nuclear physicists, however, began their atomic bomb development in an atmosphere of secrecy for fear that Germany might build a bomb first. But the initial research before the war was not considered as important as it later became. After the war, the scientists themselves initiated the debate about the development of nuclear power.

"In 1945," said Roger H. Stuewer, history of science professor at the University, "the debate on the importance of public involvement was entirely generated, stimulated, and fed by the scientists in the field, particularly those who worked at the Los Alamos Laboratory, the University of Chicago, and the facilities at Oak Ridge, Tenn."

At that time, Stuewer said, the debate centered around whether atomic power should remain under the jurisdiction of the military and whether it should remain secret.

The scientists against secrecy said, in effect, that the genie was out of the bottle. The problem had become political. "Science will devise no defense to make the danger go away," stated the Federation of Atomic Scientists. "The new energy is, if you like, our common enemy; it must be made our common ally."

Alfred O. C. Nier, Regents' professor



Alfred O. C. Nier

of physics at the University, first separated the uranium-235 isotope in his laboratory in the Physics Building. The electromagnetic method he used in early 1940 was borrowed by the Oak Ridge laboratories to make the fuel for the first atomic bomb.

Nier said that scientists had little realization of the consequences of their discoveries when much of the basic atomic research was being done in the 1930s. "At that time no one took science, certainly not basic science, very seriously as shaping the affairs of the world," he said in a recent interview.

"I remember that one of our real problems of that day—if we were interviewed by the newspapers—was to try to put across the idea that what scientists did, really, was to try to explore what nature was all about and that they weren't looking for practical applications," Nier said.

Today, however, science is taken very seriously. Some scientists, having lived through the atomic age and the ecology movement, are raising more questions about their work.

Henry Koffler, a molecular biologist and University vice president for academic affairs, said the growing awareness of the interdependence of human beings and of the total concept of ecosystems has resulted in the kinds of questions that have surfaced in the debate over recombinant DNA research.

"We have become much more sensitive to the fact that changing something in the system may have consequences, but that it isn't always clear that you can predict those consequences," Koffler said.

The consequences of recombinant DNA research, Koffler believes, are predictable. When only one or a few genes are spliced onto a host virus, the result is more like a mutant than an entirely new organism, Koffler said.

"You are creating a different organism that has never existed before, but it is only different from the natural organism by one or a few genes," he said. "When you make mutants of naturally occurring organisms you do the same



Henry Koffler

thing—you change them by one or a few genes."

This simple level of development is in contrast to the image provided by the publicity that Koffler believes has exaggerated the dangers of recombinant DNA research. "This business of creating monsters or people is a fairy tale at the moment," he said.

Koffler supports recombinant DNA research at the University. "The knowledge that one needs for an understanding of humanity and the universe is best pursued by letting people satisfy their curiosities, and out of this has come our total scientific body of knowledge plus all the applications we have—most of which are useful, some of which are harmful," he said.

"The work in nuclear physics in the 1930s was really the purest of pure science, whereby you were interested in finding out what made things tick inside the nuclei of atoms," Nier said. "But the reason you got financing to build accelerators for physics in those days was the possible medical application. Physics was not supported for the sake of physics," he said.

The University's van de Graff generator, which now sits idle on the east side of the Physics Building, was constructed by the Rockefeller Foundation in the late 1930s with the understanding that it would be used part time for medical research, Nier said.

Recombinant DNA research also has medical possibilities, Koffler said. What controls the expression of certain genes through growth could be studied with recombinant DNA techniques. "We are bound to gain significant new insights into what is abnormal growth, such as cancer," he said.

There can be no assurances of the absolute safety of recombinant DNA research, but the University works safely with many biologically hazardous and radioactively hazardous materials, Koffler said. The University will be following guidelines established by the National Institutes of Health for recombinant DNA research, and the activities will be monitored by a biohazards committee composed of people who are involved in various kinds of biological research.

Each advocate of the recombinant DNA research has a historical parallel to the new breakthrough.

"Suppose we had discovered fire," Rubenstein said in a recent panel discussion, "and somebody said, 'What about the arsonists? What about forest fires? What about house fires and people being burned to death?' Yet fire is a useful tool that can help us improve ourselves."

Koffler said the insecticide DDT provides a good example of the trade-offs involved in deciding whether to proceed on a new technological development. "DDT allowed us to get rid of malaria and a lot of other diseases that killed enormous numbers of people," he said. "At the same

time, it created problems because it affected bird life. There is always this kind of balance that needs to be considered."

Atomic energy has introduced into the ecosystem substances that will not disappear for hundreds of years, if at all. Disposal of nuclear wastes has become a major problem, perhaps unforeseen by the early researchers into the structure of the atom.

Recombinant DNA techniques now raise the question of whether unforeseen new organisms could develop lives of their own beyond human control. This venture into the unknown, like the decision to explore nuclear energy, will occupy scientists and politicians for some time to come.

update

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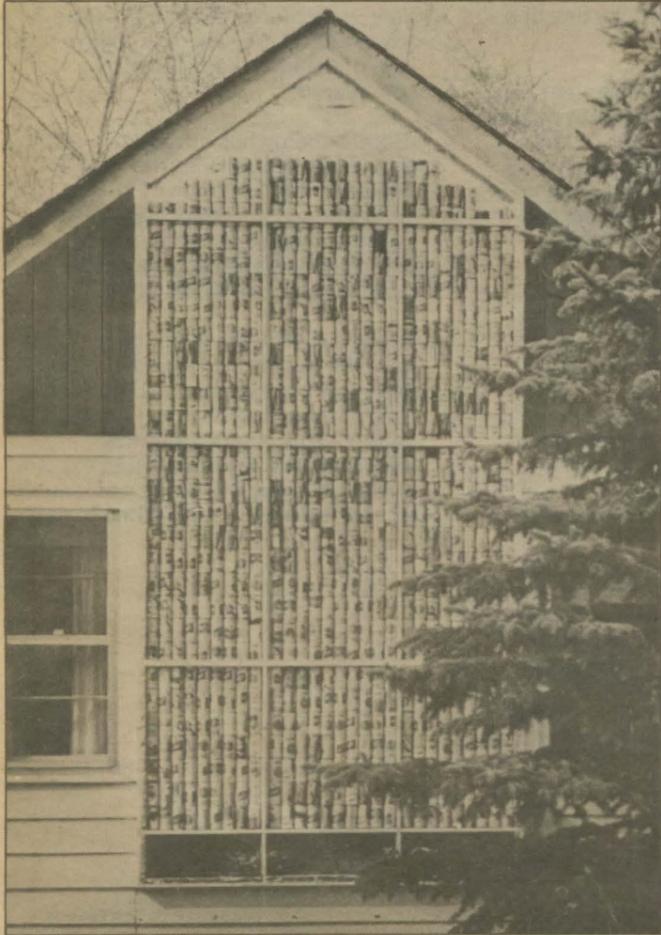
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FARGO, N. D., FORUM

Bruce Hilde's beer-can solar collector, prior to painting and glazing



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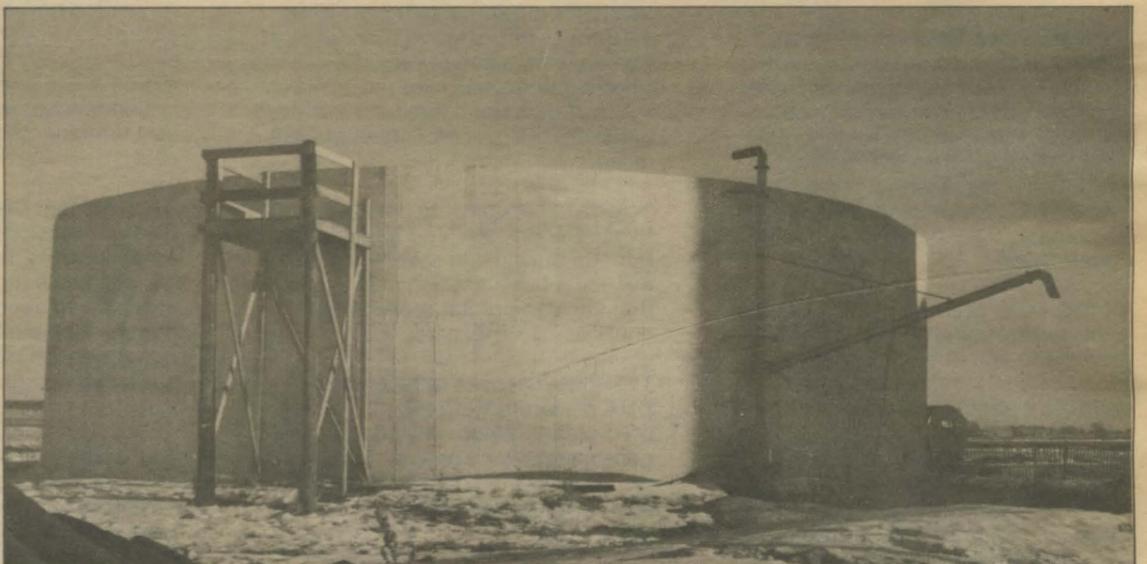
Richard O'Connel's ice-cream truck/mortar warmer

NATIVE WIT



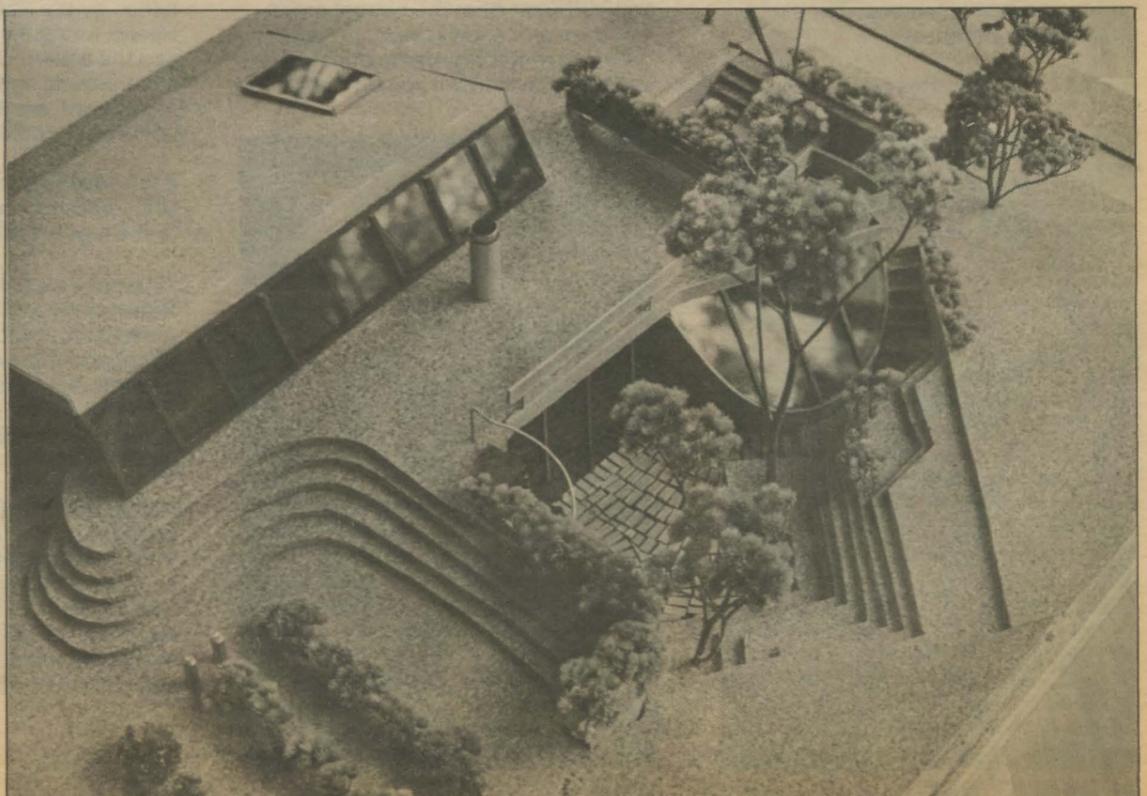
TOM FOLEY

Marie Goff and her asphalt-caulked home



Eugene Schaffer's manure slurry

DAIRY HERD MANAGEMENT MAGAZINE



Model of Michael Saphir's underground house

native wit: people around here are starting to get ideas

by Debra Kelley-Vaughn

The contest was open to everyone—not just scientists, engineers, and architects—and, as a matter of fact, was meant to stimulate the thinking juices of Mr. and Ms. Average Person. Ideas did not even have to be original—just simple, economical, and buildable.

In May, six \$1,000 cash prizes were awarded and 21 entries received merit awards for ideas ranging from using refuse for energy to building with salvaged materials, applications of solar and wind energy, ways to revive failing cities, and year-round planting ideas. And except where inventors have patented or copyrighted their entries, the ideas are up for grabs.

Bruce Hilde, a construction worker from Moorhead, Minn., won \$1,000 with his homemade solar collector constructed entirely of scavenged beverage cans. Using cans he had collected from ditches along the highway after an outdoor concert, Hilde built his low-cost collector.

He painted his cans black, punched holes in the tops and bottoms, stacked them in vertical columns between boards, and covered them with double glazing—windows of a sort. As the sun hits the cans, it is absorbed and heats the cold air traveling through the cans. The hot air flows into Hilde's attic, and a fan pushes the air into ducts that move it through the house.

Hilde saves \$150 a year on his heating bills and is now building solar collectors for other people. He has published a pamphlet with detailed instructions for building empty-can solar collectors.

Eugene A. Schaffer, a Cannon Falls, Minn., farmer, has been hauling manure from barn to field twice a day for 30 years. Sick of the chore, he invented his winning, time-saving manure slurry and cut his waste-handling chores from an hour and a half each day to about 20 minutes.

Now Schaffer scrapes the waste from his barn into a pit with a tractor. The waste is pumped underground to the slurry, which can hold the waste for up to six months. Constructed from a concrete above-ground silo tank, the slurry was built with plans Schaffer obtained from a silo company.

Minneapolis architect Michael Saphir won \$1,000 for his design for an underground house. Using standard techniques for heat conservation and heat exhaust, the design is "an attempt to make underground living an appealing and convenient option for an energy-conscious life style," Saphir said.

His plan can be used on a typical urban lot and uses the best and cheapest insulator available—the earth. In winter, a solar collector heats the structure with the help of a fireplace. Absorbent-radiant floor tiles, facing south, absorb and emit the sun's heat. In summer, the southern exposure is blocked by leaves on trees adjacent to the windows.

After several years of leaking roofs, damaged ceilings, and collapsed walls, "Grandmother" Marie K. Goff discovered that asphalt caulking applied to overlap gaps and to roof hips and valleys solved leakage problems. Now Goff is working on changing the state building code to make roof caulking mandatory in new homes. Her simple solution netted her one of the top awards in the competition.

Richard O'Connel, owner of the O'Connel Masonry Company in Rochester, Minn., found a way to use an old ice cream truck to solve some of his occupational problems. He placed a six-inch pipe with a torch at one end of the truck a few inches off the floor. Along with the existing insulating capabilities of the truck, his modifications made it possible to warm 10 cubic yards of sand, 2,000 pounds of mortar, 300 gallons of water, and two pallets of bricks during the winter at a cost of \$1 per day.

Before making his changes, O'Connel was paying up to \$20 a day to heat only four cubic yards of sand, using the conventional torch and culvert system.

Two students at the University of Minnesota, Bob Close and Mike Dunn, developed a plan to revitalize a small, stagnant town nestled in the hills of southeastern Minnesota. One of the key concepts used by the students in their design is the rehabilitation and maintenance of older areas.

In their plan, an old building erected by a local historical figure is turned into a soup shop and trailways headquarters. New trails for walking and biking are constructed on abandoned railroad beds. Unused alleys and "marginal space" are turned into courtyards, gardens, or private homes, and an old house is made into a museum.

Close and Dunn have combined living and working areas in the same structures and say their plans show residents how to live "in tune with the natural environment."

"We feel that the forces that caused the town to happen have been diluted by time, but are still present and are indeed the keys to its renewal," their statement reads.

Merit-award-winner Paul Hannon, Bloomington, Minn., designed a bus that can transport people and their bicycles from suburban and urban areas to recreation areas and back again. Onamia resident Clyde Bye built a wind-powered electric generator out of old parts and miscellaneous junk. Peter Carlson's nonmechanical air conditioner resembles a greenhouse, with an awning that lets in ventilation in the summer and a little heat in the winter. And the list goes on.

Plans for the cash-winning and merit-award-winning designs will tour the Upper Midwest this summer in an open exhibit. Contest sponsors have prepared a catalog of entries in the exhibit to give viewers more information, should they wish to use some of the ideas themselves.

The contest was meant to stimulate the thinking juices of Mr. and Ms. Average Person. Ideas did not even have to be original—just simple, economical, and buildable.

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TOM FOLEY

cedar creek: an eye on the invisible wilderness

by Michael Finley

Just because you can't see them doesn't mean they're not there—deer, that is, and beavers and badgers and foxes and grouse and so on and so forth.

But, then, that's the whole point of the Cedar Creek Natural History Area. It's not a zoo for people to troop through and gape at the wildlife, or a laboratory full of caged animals lassoed with tubes and electrodes, or a film location for a utility commercial. Cedar Creek, located a few miles from Bethel, Minn., is a beautiful place, but its work is mostly invisible.

Strategically positioned within the area are two radio telemetry towers, maintaining a constant radio vigil on the entire area. The two towers report on the whereabouts and activities of animals currently under study. Telemetry observers have figured out ways to attach transmitters to every kind of animal—from Cedar Creek species like deer, foxes, and various types of fish to such exotic species as moose, sea lions, and tigers.

All of which, if you think about it, is no small achievement. How, for instance, does one collar a fish?

"Actually," said director David Parmelee, "the greatest problem we've had with fitting radio transmitters on animals has been with beavers. They're good with their teeth, you know. We finally came up with a method for attaching the transmitter around the base of the tail. But even that is problematic, because beavers like whacking their tails on the water."

How do beavers and other creatures feel about wearing radios around their necks and tails? "They don't like it at first and find it to be a source of general annoyance, but after a day or two they reconcile themselves to it and forget it's even there."

Once the animal manages to forget it has a radio around its neck, observers such as bioelectronics expert Larry Kuechle in the Cedar Creek headquarters can avoid what is wildlife study's almost Einsteinian problem: the fact

that simply by watching something, the behavior of the thing watched is rendered abnormal. Telemetry, with its silent and invisible methodology, makes the fine art of sneaking up on an animal without being seen or chasing it from above in a helicopter obsolete.

With telemetry, researchers get a precise idea of, for instance, how much territory a fox claims as a hunting prerogative, how far it's likely to travel in search of food. The radio emits a signal every 45 seconds, so the fox can be followed electronically hour after hour, month after month, until the transmitter battery runs down.

"Think of the data one can accumulate," Parmelee said, "following a pair of foxes for a year, seeing how they interact, how much time they spend together, when they go off separately, and where they go. Or learning exactly where a mother grouse takes her chicks, what kind of habitats they find for themselves, season by season."

Occasionally researchers, despite all of their computerized patterns and predictable hunches, are surprised. Several winters ago, for instance, a deer wearing a Cedar Creek transmitter was struck by a car just outside Rice, Minn., 60 crow-flying miles and perhaps 90 deer-wandering miles away from Cedar Creek, through the woods and through the back yards of a dozen Minnesota towns, including St. Cloud!

Last winter, Alvar Peterson, resident manager of the area, counted 169 deer in the cedar bog area of Cedar Creek's woods. Extrapolating from that number, he figures there were more than 200 deer huddled in the protection of the bog through the cold season. Chances are good that many are in the area right now, but sighting one is still a matter of naturalistic serendipity.

The work in telemetry at Cedar Creek extends far beyond the 5,300-acre preserve. Donald Siniff, professor of ecology and behavioral biology and head, along with Prof. John Tester, of Cedar Creek's telemetry program, has exported the methodology to Antarctica for his work with seals.

Parmelee himself has observed the migratory patterns of the South Polar skua, a gull-like bird that travels the entire longitude of the planet every year. Skuas that Parmelee and graduate student David Nielson have banded at Palmer Station in the Antarctic have turned up later in Arctic Greenland.

Meanwhile, Cedar Creek is a stopping place for ecologists from around the world who wish to learn from the telemetric techniques practiced there.

Besides telemetry, other more conventional methods are used in a variety of wildlife studies. The most visible work going on at Cedar Creek is the maintenance of its oak savannah land by burning. Contrary to popular belief, fires are not necessarily the arch-nemeses of woodlands—in fact,

some seeds, like the cones of the jack pine, germinate only under the extreme temperatures of a ground fire.

At Cedar Creek, controlled fires are set every year to insure that the oak savannah—prairie land with scattered oak trees—remains oak savannah and doesn't undergo the natural metamorphosis into bush land and, finally, forest. The burning procedure, which utilizes forestry students from the St. Paul campus, is the only way such a natural habitat in a limited area can remain a habitat for the same varieties of species. (Otherwise, grouse might have to forfeit their grasslands while squirrels and owls enjoy the newly created woods.)

In May the dragonflies at Cedar Creek—a great many of them—underwent the transformation from nymphs to mature flies, shucking off their old beetle-like skins and taking to the air. Donald Lawrence, professor emeritus of botany, and researcher John Haarstad were both on hand to make their observations.

Everywhere in the area, University graduate students and faculty members and researchers from Macalester College and elsewhere found other things to watch: energy needs of chickadees, life cycles of mud minnow parasites, digestion in barred owls, and hunting habits of sparrow hawks.

Not everything there is invisible. A given cup of Cedar Lake Bog, held up to the light, will reveal hundreds of different kinds of little lake creatures, eating one another. Alvar Peterson claims that a recent census found 761 different kinds of plants in the area, including lady's-slipper, our seldom-seen state flower. A nature trail, which has lamentably become a favorite with local vandals, is maintained so the general public can see what's going on.



An ant



Some caterpillars

evolutionary bargains, and other ant-thropomorphisms

by Michael Finley

The ants and the cherry tree have an unwritten agreement: the ants work as security guards for the tree and the tree gives them caterpillars and sugar-water to eat.

No one knows when this cunning alliance began, but the two species are firm friends now. Dave Tilman, assistant professor of ecology and behavioral biology, has been studying the way the ants and the tree get along, and he understands why the two species, which seem to an outsider to have so little in common, are so close.

The scientific term for it is *mutualism*, the interaction of two species in which both contribute to the growth and reproduction of the other. It happens all the time, Tilman said. This specific—or as ecologists would say, interspecific (between species)—example is drawn from Tilman's work at Cedar Creek Natural History Area.

Tilman paints this scenario:

The black cherry tree has a problem: tent caterpillars love to eat its sweet green leaves. No tree in its right mind wants to stand still for that. Fortunately, there are red-headed ants nearby with a problem of their own: filling their stomachs.

The solution—one that has been arrived at through millions of years of evolution—is a simple one. The cherry tree has developed glands—extrafloral nectaries, actually—that secrete a sugar-water substance that the ants collect and eat. The tree secretes the nectar at the exact time of the year—springtime, just when the buds are beginning to break—when the tent caterpillars are little and vulnerable to attack by ants.

Open covenants openly arrived at: the cherry-tree/ant compact has much to recommend it. Tilman even acknowledges the legitimate complaints of the third party, the caterpillars.

The caterpillars, however, have adopted the excellent defense of being colonial creatures. They live together in groups of 300 or so, finding safety from red-headed ants in their own numbers. When a tent-caterpillar moth lays her eggs, she prefers to place them on a small branch of a large tree. Because of the vast number of small branches on large trees, ants have

trouble guarding every twig. Thus, enclaves of leaf-munching tent caterpillars live through the ant attack and grow to adult caterpillar size, at which point the ants don't mess with them any more.

Dave Tilman has this admirable system all written up in a scientific paper that's currently making the rounds. Ants aren't his only area of research—population studies of lake algae are his main concerns. But the incidence of mutualism in the black cherry tree points to something that has always interested him: coevolution of species, and the evolutionary devices utilized to survive. Few and far between are creatures that somewhere, somehow, haven't struck some kind of bargain.

magrath testifies on government regulations

University President C. Peter Magrath said in June that greater demands are being placed on the nation's universities at a time when their budgets are being cut.

Magrath testified in Washington on problems with federal regulations and with the Veterans Administration before a U.S. House of Representatives subcommittee on postsecondary education.

"We are now in a situation where more instruction, research, and service are either required or desirable, but we will not be granted many, if any, additional personnel to handle these functions," Magrath said.

"Further, we are faced with more restrictions, more guidelines, more compliance and accountability reports, and more procedural and legal hassles in general, all of which require substantial and rapidly increasing attention, time, and faculty and administrative costs.

"This comes at a time when we cannot afford it, and there are very few instances in which new demands are accompanied by new dollars to help us meet the demands," he said.

Magrath said that the University of Minnesota spends at least \$1 million annually to comply with federal regulations, and that estimate does not include the cost of faculty time.

An example of a program that has created some tension between the campuses and the nation's capital, Magrath said, is the Veterans Administration (VA) education benefits program, which has been reduced at the University of Minnesota. He said that 1,235 students—about a fourth of the University's enrolled veterans—lost their benefits last fall because of standards established by the VA.

Yet, he said, Minnesota veteran-students progress academically at

TOM FOLEY



C. Peter Magrath

least as well as their non-veteran-student counterparts. More than half of the veterans who lost benefits were in their junior and senior years and more than three-fourths were maintaining a C average or above, he said. Only about 10 percent of those who lost benefits were able to return to school, he said.

Admitting that there were "a few cases of downright abuse," Magrath said that "the VA efforts to curb abuses have gone so far as to threaten the veterans program." Negotiation between the University and the VA will not solve the problems, he said, adding that he hoped the courts would resolve the issue.

tuition to go in the usual direction: up

Tuition is likely to increase by \$33 a quarter for most University of Minnesota undergraduate students next fall.

Anticipated tuition increases, along with the University's 1977-78 budget and the 1977-79 biennial appropriation from the Legislature, were discussed by the University administration and Board of Regents during two days of meetings in June. Final approval of the budget, including tuition, is not expected until the July Regents' meeting in Rochester.

In discussions of faculty salary increases, President C. Peter Magrath recommended that 4 percent of the 7.9 percent total increase in faculty compensation for next year be allocated as merit raises. He also suggested that faculty members get a cost-of-living raise of \$400 across the board rather than a percentage increase. "A percentage across the board would give more to the higher-paid than to the lower-paid faculty," he said.

One-half of 1 percent of the total will be set aside for equalization of pay at the various campuses if the Regents approve the budget in July.

In other action, the board granted tenure to 84 faculty members, including Mischa Penn, who nearly lost his annual appointment two years ago. Penn was promoted from assistant professor to associate professor in University College. He has been on the faculty for 13 years and has won a number of teaching awards.

The Regents also voted to borrow \$3 million to construct and install bag house filters on the Minneapolis campus heating plant and to continue construction of a coal-gasification plant on the Duluth campus, in the hope that the 1978 Legislature will pay the costs of the projects.

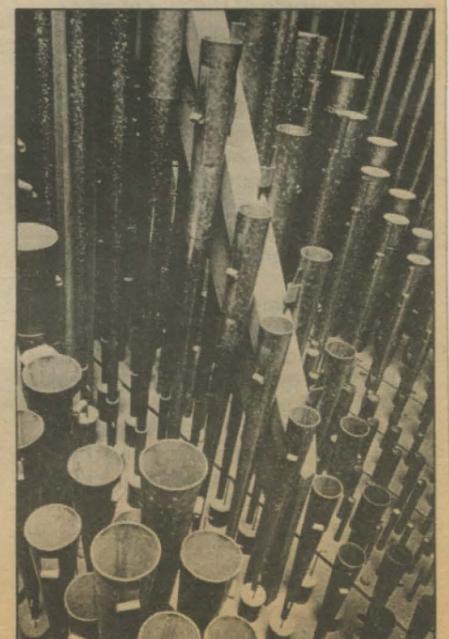
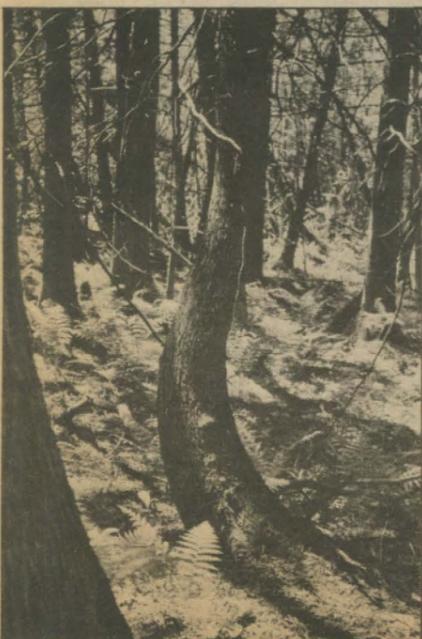


Wenda Moore

University officials said the bag house filters are necessary to make the Minneapolis campus smokestacks conform to federal pollution standards. The Minneapolis project, which was begun with a \$1 million legislative appropriation in 1976, will cost an additional \$1.9 million. The Duluth project will cost about \$1 million.

The Regents also approved a \$2 student fee for intercollegiate athletics on the Morris campus pending an administration study of all potential funding sources for intercollegiate athletics on the Morris, Duluth, Crookston, and Waseca campuses.

pictures from the university



moore elected to chair board of regents

Wenda Moore has been elected chairman of the University Board of Regents by unanimous ballot.

Moore, who has been vice chairman for the past year, succeeds Regent Neil Sherburne. Regent David Utz was elected new vice chairman of the board.

Moore has been active in Minneapolis civic affairs as a director of the Women's Institute for Social Change, a member of the executive board of the Metropolitan YMCA, and a director of the Minneapolis League of Women Voters.

For two years, she was a staff aide to former Minnesota Gov. Wendell Anderson, with liaison responsibility in the field of education. She was originally appointed to the board by Anderson in 1973 and was elected for a full six-year term by the 1977 Legislature.



T. Woodrow Wilson

also-rans dept.

In a recent article on former University of Minnesota presidents, **Update** made no mention of candidates for the office who fell by the wayside. To rectify that omission, here is the story of one person who never became president:

"After this second serious defeat Wilson again considered resigning as President of Princeton. He had an additional reason to do so because at this juncture he was approached about becoming President of the University of Minnesota. There was little in his previous tastes or training to fit him for the post of head of a great state university. The University of Minnesota was over twice the size of Princeton and far more complex in organization. With its colleges of dairying, metallurgy, mechanic arts, and pharmacy, it represented the antithesis of the general education and

devotion to pure learning that Wilson had been preaching. Nevertheless, Wilson's first reply to the Minnesota offer was so encouraging that three members of the Board of Regents took the long journey to Princeton to confer with him. For a short period Wilson apparently felt that he would rather take his chances with a state legislature than with the Princeton Board of Trustees, and was ready to throw in his lot with the plain people of a prairie state rather than continue dealing with young gentlemen from Lawrenceville and St. Paul's."

The excerpt is taken from Henry Wilkinson Bragdon's *Woodrow Wilson: The Academic Years* (Cambridge: The Belknap Press of Harvard University Press, 1967; p. 364).

letters

on 'mental' jogging

Your article on Otto Schmitt was really on the nose. You were able to translate him in a way that I've not been able to do for 20 years. Congratulations.

Henry Blackburn, M.D.
Laboratory of Physiological Hygiene
University of Minnesota

an alumnus writes

I enjoyed the articles on cancerophobia immensely, for they help clear up and bring some perspective to "old wive's tales" and modern doomsayer tales that are smeared across the pages of the popular press on cancer.

As a proud alumnus I thoroughly enjoyed Bill Huntzicker's account of the presidents of the University from William Watts Folwell to C. Peter Magrath as seen through the eyes of Dr. Owen H. Wangensteen.

Maureen Smith's excellent article on Dr. E. C. Stakman brings back many fond memories at the university where I had the good fortune to be privileged to walk in the shadows of many great educators. Certainly, Dr. Stakman left great imprints on me, from an educational, scientific, and humanitarian point of view. I have never met anyone with as much breadth of interest across disciplines, combined with great enthusiasm, physical vigor, mental toughness, common sense, and humanitarianism as is embodied in Dr. Stakman. From my point of view he was one of the great educators of this century—if not of all centuries.

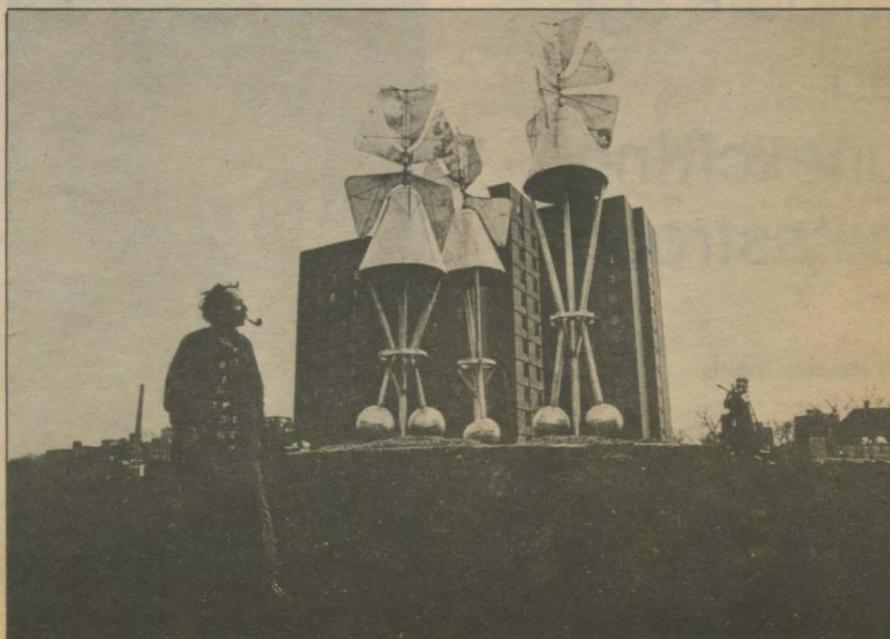
What I'm trying to say to you is that the fall 1976 **Update** reached out and brought me back after 44 years to my happy years at the University of Minnesota. Thank you for giving me this pleasure.

Norman E. Borlaug
International Maize and Wheat
Improvement Center
Londres, Mexico

July 5-23—Twin City Federal Atrium, downtown Minneapolis
July 25-Aug. 12—Northwestern National Bank, downtown St. Paul

Aug. 26-Sept. 5—Apache Mall, Rochester
Sept. 12-25—Twin Cities International Airport

Update readers who have enjoyed the photography of Tom Foley may wish to see an exhibition of Foley's work that is now traveling around the state. The schedule for now is:





Rembrandt liked portraying in his paintings the stout Flemish burghers of his time: middle-aged men, enjoying the prime of their lives, yet not without a suggestion of anxiety about what comes next.

middle age: an unexciting catastrophe

by Maureen Smith



Beulah Compton

TOM FOLEY

Your young adult children are telling you that you're old-fashioned, you don't understand, you're not with it.

Your aging parents are asking accusing questions: "Why do you let your daughter live with that boy without marrying him? That is sinful, so why don't you do something about it?"

You're middle-aged, and that's just where you're caught: in the middle.

"The middle-aged person catches it from both sides," said Beulah Compton, professor of social work on the Twin Cities campus. "Many of them find that they stand on very insecure ground. They are so vulnerable to criticism from the other generations in the family."

In a fast-changing world, she said, the role of advice-giver to young adult children becomes very difficult. Parents can no longer say: "Do as I do, and when you are my age you will stand where I am standing."

At middle age, people begin to ask themselves: "If I have only so much time left, how do I add up my life? When I look back 20 or 30 years from now, will I be able to say I did some things I'm satisfied with?"

Even while the accusations are coming from the younger and older generations, Compton said, so are the demands. Children may expect support through increasingly extended periods of education. Parents are living longer and making their own demands. If you send them off to a nursing home, you may feel guilt and something even more unsettling: the knowledge that 20 years from now that's where you will be.

"In the last 100 years the life span has increased enormously," Compton said. The result has not been simply to add years onto the end of life.

Years ago, she said, people fit into three age groups: children, adults, and old people. Now two more stages have been added: adolescence and middle age. "We've opened up the life cycle," Compton said.

Middle-aged people, and adults in general, are Compton's special interest. "If you look at books that purport to discuss the life cycle," she said, "you'll find that a tremendous amount of attention is given to children and adolescents." More recently, the aged have become a subject of study and concern. "Somewhere in the middle, adults get lost," Compton said.

"My assumption is that we learn all through life," she said. "You don't just reach a plateau called adulthood and stay there."

Compton doesn't have any firm ideas about when middle age begins or ends. It may come at different ages to different people. "My own tendency is to have it keep starting later and later and going longer and longer," she said. Although she wouldn't want to argue with anyone who set different years for middle age, she usually thinks of it as starting at about 40 and ending at retirement age.

"Middle age may either sneak up on us or come as a crisis," she said. Most often, she said, the recognition comes when people's bodies give them hints—or their doctors give them warnings—that they need to slow down.

In middle age, Compton said, men and women become "aware as they haven't been earlier of the mortality of their bodies." For a woman, menopause may be the sign that she is well into middle age. A man may have problems with his weight or his heart or his blood pressure. And Compton said that "increasingly in the literature you see articles about the male menopause."

Whatever the specific physical changes may be, people see that their bodies are changing and that "the changes are no longer forward-moving and developmental," Compton said. "They're moving in the other direction." People start taking care of their health not out of a desire to develop their bodies but in an attempt to ward off negative changes.

Another reason for the new awareness of mortality, Compton said, is that "by the time you're in the middle of middle age you will have lost significant others through death."

People then begin to ask themselves: "If I have only so much time left, how

do I add up my life? When I look back 20 or 30 years from now, will I be able to say I did some things I'm satisfied with?"

Just at the time people are asking these questions, events in their lives may erode their sense of worth. A woman who has stayed home and poured herself into her family may be hit hard when her children leave home. Often this jolt coincides with the physical changes of menopause. One resolution of the crisis, Compton said, might be for the woman's wife role to expand. "She can go on business trips with her husband, play golf with him."

For a middle-aged man, Compton said, the crisis may come when he sees a younger colleague promoted over him. All of a sudden he knows that he will not rise any higher. From now on, his job responsibilities will be diminishing instead of expanding.

Even worse, a middle-aged man or woman may be let go as a company turns to younger employees. "If you're a university professor and you have tenure, you may not have to worry," Compton said. In industry, it can be tough. "Society is saying, 'We have no use for you.'"

A marriage may be thrown off balance as a woman, freed from any worries about childbearing, becomes more interested in sex just as her husband is worrying that he is losing his sexual capacity (whether or not his fears are based in reality). "Men and women may be out of sync," Compton said.

In an attempt to deny that he is middle-aged, a man may turn to a younger woman. This may mean a severe crisis for his wife, especially if he divorces her to marry the other woman. The loss of a marriage partner through either death or divorce is a painful crisis faced by many people in their middle age, Compton said.

Finding a younger partner is an option that is "largely denied to the woman," she said. "It's a tragedy, to feel suddenly unwanted. Our youth culture makes it difficult for these women to socialize with younger groups. They tend to find their social group among women who are similarly alone."

The middle years can be bleak. But, Compton said, they can also be a time of creativity and growth. For people who have the resources, middle age may be a time to go back to school, travel, start a new career, run for the school board, discover art or music.

Some of the elements of a happy middle age, such as good health and financial security, are beyond the individual's control. But to a large extent, Compton said, a satisfactory middle age rests on the relationships and interests that the person has cultivated earlier in life. "Being active and curious about life is something the person brings to middle age," she said.

Marital or friendship ties to meaningful others are usually established before middle age, she said. "If not, you'd better get busy."

Compton said, too, that "relationships with children don't get built in middle age." One of the joys of her own middle age is sharing with her young adult children. "My kids and I can kick around a lot of issues. I'm no longer giving advice—it's just the fun of two minds working at something."

Because a satisfactory middle age depends so much on what has been built earlier, Compton said, another burden of middle age may be the nagging question: "Why didn't I?"

Middle age is "a very long time in someone's life," Compton said. "It's a critical time, and we haven't given it a great deal of thought."



R. SCHOLLES

GOOD-NIGHT

In the evening before I go to bed I look to see if everything's in order.

You see, when I'm in bed and imagine that my glasses aren't in their case I can't get to sleep. They have a lovely, soft leather case. It matters a lot to me whether my glasses are well taken care of; they belong to me.

I look to see if the Black Forest clock is wound, the door is locked, whether the faucet is dripping. I know that the bread and butter and cheese are well wrapped up and lying on the window sill, but I still look once more and push the packages together. It's a cold night! Yesterday was Thursday, the 23rd of November. Yesterday it snowed for the first time. Through the wet mush of snow to shop! As long as you take little steps you're all right.

I'm saving money for a bird. The cuckoo on the cuckoo clock is, after all, not alive! My son wrote he would send me 20 Marks for it. The cage costs over 40 Marks; the bird has to have room to move. His name will be Hansi. He'll be a canary. I used to have a 'Hansi' who would eat seed out of my hand; I'm looking forward to it. At night I'll have to fill the stove because that kind of bird needs it warm.

In a moment I'll go to the bathroom. It's cold in the hallway. The toilet on the landing is the worst thing about this apartment. At my age one can get by without a bath. I'll lock the door and hang my shawl on the doorknob so no one can look through the keyhole. Then I'll lay the key on the night table. On the ceiling above my bed is a small crack that always looks at me. I always say good-night to it. I hope I'll sleep the night through; the nights are so long.

("Good-Night," from *Eleven Thirty*, by Katrine von Hutten, translated by Diane Kent. Published in *Canto*, edited by Minnesota alumni Diane and Robert Kent, 11 Bartlett Street, Andover, Mass. 01810.)

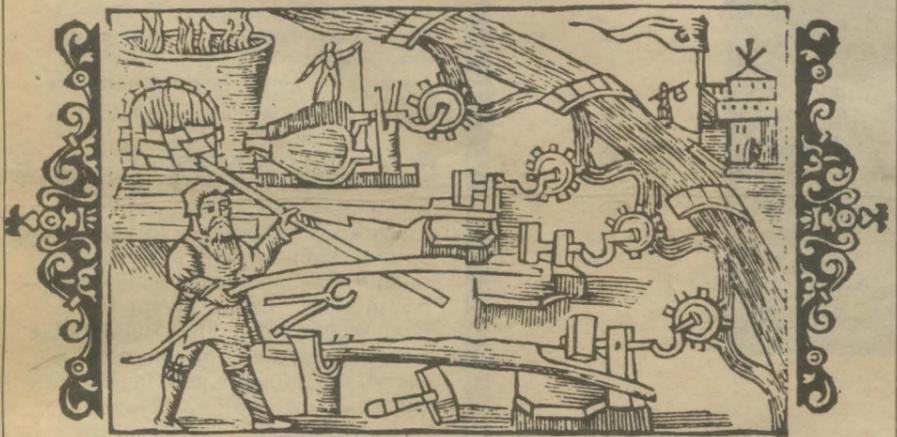


Illustration from *Sweden: The Nation's History*, by Franklin Scott. Originally from Olaus Magnus, *Historia de gentibus septentrionalibus* (Rome, 1955), the woodcuts illustrate portaging, making fur coats, crafts and manufacturing, military stratagems (firebirds used against a fort), and Lapp hunters on skis.

book on Sweden fills in blanks between Vikings and Volvos

by Ronaele Sayre

Interesting tidbits abound in *Sweden: The Nation's History*, an ambitious 600-page effort by Franklin Scott published recently by the University of Minnesota Press.

Among other things, the reader learns that the infamous Vikings were only a small group when measured against the total home population, and that most Swedish people chose to stay home fishing and farming; that the Swedish government banned the use of coffee in 1794 as an economic waste and a danger to health; and that the Vikings brought Christianity back to the homeland from countries they had visited.

To attempt to present in one volume the social, political, and cultural development of a country whose earliest verifiable settlement dates from somewhere between 7000 and 5000 B.C. is commendable, but Scott, an emeritus professor of history at Northwestern University and author of several earlier books on Scandinavia, manages to do it while entertaining the general reader. He also will please the serious student of Swedish history with his 20-page bibliography.

Scott, currently curator of the Nordic Collections at the Honnold Library of Claremont (Calif.) Colleges, traces Swedish history from the days of the Vikings through the instability of the Middle Ages, independence and expansion efforts, massive immigration to the United States, and political and cultural redevelopment in the 18th and 19th centuries.

The Vikings, the famous men of the fjords who roamed as far as the Baltic Sea, Italy, and Greenland between 800 and 1100 A.D., represented but a small segment of the total population of their home territory, Scott tells us. Most people stayed at home to fish, till the fields, and tend the livestock. The Viking Code of individual rights and responsibilities, emphasizing the dignity of the individual, remained long after the Vikings were gone.

The first converts to Christianity in an area of pagan worship were the Viking traders who returned as individual believers, Scott writes. Because of the strong influence the formal pagan

religions had on Sweden's institutions and legal processes, Christians were excluded from the ceremonies of the community. As a result, Christianity was accepted by a process of evolution rather than revolution, he says.

The medieval period was chaotic, with kings rising and falling amidst confusion. The feudalism so common in other countries in this period never took hold in Sweden, perhaps because the poverty level and harsh climate made the refinements of courtly life difficult to maintain, Scott writes.

Between 1397 and 1521, Norway, Sweden, and Denmark were united under one ruler. Sweden, unthrilled by Denmark's domination, declared its independence in 1521. But in 1814 Sweden again found itself aligned with Norway when the Treaty of Kiel gave Norway to the King of Sweden.

Predictably, the Norwegians were not happy with the arrangement and declared their independence. There was consternation in Sweden over the loss, Scott writes, but little interest in a full-scale battle to convince Norway it should remain tied to Sweden. A brief military move was made into Norway and the new Norwegian king taken prisoner. An armistice was signed on August 14, 1814, but the new union, providing for a common king and Swedish administration of joint foreign policy, was not a happy one and was dissolved by a plebiscite in 1905.

One aspect of Swedish history of special interest to Americans of Swedish heritage is the mass emigration of Swedish citizens to the United States in the late 1800s. By 1930 there were three million first-, second-, and third-generation Swedish Americans, while the population of Sweden was only six million.

Despite the mass exodus, Scott writes, the home culture remained intact, since those who left were "surplus people." Most of the emigrants in the mid-1800s were families, while by the turn of the century most were single men and women.

But Swedish leaders did not ignore the departure of that many of their people. A national inquiry was undertaken to determine people's reasons for leaving, and the study became the basis for social legislation. A national Society Against Emigration published dire predictions of what was in store for emigrants, but it had little effect because its warnings were not believed, Scott writes.

In his historical view of Swedish sexual mores, Scott writes that for the Swedish peasant sex was natural, and what was natural was considered right. Estimates are that in Stockholm in the 1840s, approximately 45 percent of all births were out of wedlock—and

under Swedish law, a child born to an engaged couple was considered legitimate.

But Scott also describes the reaction to the 1839 novel *Sara Videbeck*, by Carl Joan Love Almquist, which told the story of a middle-class young woman and a soldier. In the novel, Sara proposes that she and her lover

live together without benefit of marriage and that each preserve complete independence.

Although the novel became very popular, the plot horrified many Swedes of the period, Scott writes,

and Almquist was forced to resign as a teacher and cleric, experienced financial problems, faced murder charges, and was sent to an unhappy exile in the United States.

design laws may save us from our own tackiness

by Jeannie Hanson

The problems are common to many cities and towns: sagging downtown business districts, suburban sprawl, historic buildings hemmed in by fast-food restaurants, rural areas choked with billboards.

The diagnosis is poor design, and a possible solution is a local design ordinance, says Dewey Thorbeck, assistant professor of architecture at the University.

Such design ordinances are becoming common, and they generally establish some sort of design review board that enforces guidelines when new buildings and new ways to use land are proposed.

Ordinances may give such boards the power to stop fast-food chains from building next to historic buildings, or to require a church to flank its parking lot with bushes, or to tell land developers that their buildings must not shadow adjacent playgrounds.

Design ordinances are being considered in Minneapolis and already exist for parts of St. Paul and Pipestone, Minn.; New Orleans, La.; Boston, Mass.; and Williamsburg, Va. Many European cities have such laws, as does Tokyo, Japan. Tokyo's law prohibits new buildings from blocking the "sunlight rights" of buildings crowded nearby, Thorbeck said.

Design ordinances are meant to benefit a whole area by regulating or perhaps preventing actions planned by a few people, Thorbeck said. However, they also can be seen as a way for a few people to impose their judgments on the larger community and interfere with private property rights, said Alan Freeman, associate professor of law and land-use planning at the University.

To reach a proper balance between design factors and property rights without putting all decisions into the hands of a few people or stepping on constitutional rights, design ordinances are generally quite limited in scope, Freeman said.



TOM FOLEY

Most apply to no more than a few blocks in a given community. Minneapolis, for example, is proposing a design ordinance to cover only a handful of neighborhoods: the area around the Minneapolis Institute of Arts, Nicollet Island, the warehouse district, and Lowry Hill. The proposed ordinance would not apply to one- and two-family dwellings because restrictions on individual homeowners could be considered a violation of the right to free expression.

"The courts generally have upheld limited design ordinances that regulate historic areas like the New Orleans French Quarter or St. Paul's Historic Hill District," Freeman said. This kind of ordinance is constitutional because the property rights of people forbidden to build or destroy buildings in the area are outweighed by the community's right to the economic gain resulting from tourism in the historic area.

Another area successfully covered by design ordinances, Freeman said, is

display advertising—billboards and signs. Local ordinances can regulate the size and placement of such outdoor ads.

Design ordinances written to go beyond historic areas and signs must tread carefully, Thorbeck said. Aesthetic standards such as "visual pollution" and "suburban sprawl" must be translated into terms of public health, safety, and welfare, as with other zoning ordinances.

The proposed ordinance in Minneapolis, for example, may lead to guidelines regulating sunlight rights—for health reasons and to enable buildings to use solar energy, Thorbeck said. Prohibiting land developers from blocking the sunlight on an existing playground could be understood as consistent with public welfare.

Specific guidelines are usually another problem of design ordinances, Freeman said, and can lead to court cases that overturn regulations. If an ordinance is passed with guidelines for administration left to a design review board, the legislation

itself may be considered vague and the authority of the board excessive. The Minneapolis ordinance may run this risk, he said, and an affected property owner might appeal successfully.

Still another key problem with design ordinances is the membership of the review board, Freeman said. The Minneapolis ordinance calls for three design experts appointed from the city as a whole and four citizens appointed from the areas covered by the ordinance. "The professionals will not be able to outvote the citizens, and they both will be able to outvote poor designs in their area," Thorbeck said. Since family homes are not covered, no one will be able to tell anyone else not to paint a home purple and chartreuse.

In the future, Thorbeck said, the proposed ordinance might be used to encourage housing around transit lines, cluster housing such as townhouses and garden apartments, and strengthened neighborhoods.



Ruth Seiler: no longer a "prison camp refugee"

TOM FOLEY

500-calorie brandy milkshake— starving woman's treatments are treats

by Robert Lee

A 63-year-old Minneapolis woman who could not digest food properly has won a battle against life-threatening malnutrition through treatment at University Hospitals.

By her own admission, Ruth Seiler looked like a "prison camp refugee" when she began her unique therapy five months ago after her weight fell to 69 pounds.

"I was so gaunt I couldn't walk," she said. "I'd been in for surgery and nothing seemed to work. The doctors

didn't have the answers, but they were trying. I didn't have much hope. I guess I was just humoring them when I came in at the end of January."

For years, Seiler had suffered from bowel problems. In 1949 she was treated successfully with radiation therapy for cancer of the cervix, and over the years the radiation apparently affected her intestine's ability to absorb food.

Two years ago the problem worsened. She began to suffer periods of severe vomiting and diarrhea, and her weight fell to 62 pounds. Within the last eight months she underwent two surgical resections of her bowel, but neither corrected the problem. Despite intravenous nourishment she was given while recovering from surgery, her weight continued to drop.

In January, a last-resort series of concentrated intravenous feedings containing highly experimental amounts of nutrients—a process called hyperalimentation—was begun at University Hospitals.

The experiment worked, and recently Seiler and her physician, Dr. Theodore Buselmeier, along with University Hospitals nurses, celebrated the fact that her weight had climbed to 100 pounds—only 10 pounds under her normal weight.

Seiler will continue her "feedings" twice a week at the hospitals, but Buselmeier hopes that as her bowel begins to regain function she will be able to cut down her visits to once a week or take her feedings at home.

Surprisingly, the treatment was possible because seven years ago Seiler's kidneys failed and she received a kidney transplant. Prior to the transplant, when Seiler's kidneys had stopped working, Buselmeier created an arteriovenous fistula by surgically connecting an artery and a vein in Seiler's arm to permit her attachment to a dialysis machine to cleanse her blood. Although the kidney transplant was very successful, the fistula was never removed.

"It was the presence of that fistula that made me think she could tolerate amounts of nutrient solution that would be dangerous if given by normal intravenous methods," Buselmeier said. "By creating an artificial loop between the high-pressure artery and the low-pressure vein, I thought we'd be able to avoid the irritating and clotting effects of the solution in the peripheral veins as well as the danger of infection, which is common when intravenous feeding is done by a central line placed in a large vein close to the heart."

In addition to the threatening starvation, Buselmeier was concerned about Seiler's bones, which were degenerating because of her bowel's inability to absorb calcium and phosphorus. "Her bones were extremely weak and I was afraid she'd have spontaneous fractures from simply trying to walk up stairs with a cane," Buselmeier recalled.

Seiler was reluctant to be hospitalized, so her feedings were designed to

be given in a University Hospitals clinic during the day. In six hours she would receive 3,000 calories and nutrients, two to three times the recommended 24-hour dosage in a fourth of the time. "By subjecting her metabolic functions to stress," Buselmeier said, "we hoped they would 'turn on' and naturally resume their nourishing function."

Every weekday for three months, Seiler received 500 cc of Intralipid, a fat solution only recently approved for intravascular hyperalimentation by the federal Food and Drug Administration, and 2,000 cc of a combination of 25 percent dextrose and 4.25 percent freeamine (a balanced carbohydrate-protein mixture) and concentrated solutions of calcium, phosphorus, and iron.

Because one of the few things her bowel could still absorb was alcohol, Seiler was under doctor's orders to drink a 500-calorie brandy milkshake every night. Seiler said she never did get used to her nightly "brandy alexander" and had to drink it in bed because of its potent effect.

But the experimental feedings and the medicinal nightcap worked, and she began to gain weight immediately. Her metabolism adjusted, her bones strengthened, and, as she continued to gain weight, her problems decreased.

Seiler is still occasionally bothered by the side effects of her malfunctioning bowel, but she does feel her life has turned around. "I still can't make any long-range plans, but my husband and I are going on a four-day fishing trip to Lake of the Woods this month," she said.

By her own admission, Ruth Seiler looked like a "prison camp refugee" when she began her unique therapy five months ago after her weight fell to 69 pounds.

the next big thriller: 'it came from the refrigerator!'

by Michael Finley

Your refrigerator is going to kill you.

It's true—at least, it might be true. The problem is one that many of us are vaguely aware of: fluorocarbons. And while no one is sure of the extent of the danger, one thing has been proven: fluorocarbons are destroying the earth's ozone shield, and ozone is the only thing protecting us from the ultraviolet rays of the sun.

"The problem centers around two members of the fluorocarbon family, fluorocarbon 11 and fluorocarbon 12," said Robert Carr, professor of chemical engineering and materials science. "It first gained attention several years ago when a few researchers became interested in seeing where small amounts of inert chemicals—ones that don't react easily with other chemicals—went after being released into the open air."

The inert chemical used in some of these experiments was fluorocarbon 11. What surprised the researchers was that considerable amounts of it were already detectable in the atmosphere.

Where did the fluorocarbon come from? Researchers noted that fluorocarbon 11 was a man-made substance—no natural source of it is known to exist—used throughout the world as the pressure ingredient in aerosol

sprays and the cooling chemical in refrigerators, air conditioners, and freezers. Furthermore, they noted that the total amount detected was almost exactly equal to the amount of fluorocarbons that had been manufactured up until that time on earth. The fluorocarbons were diffusing and as they diffused were slowly making their way up into the upper atmosphere, where the ozone layer is.

"The atmosphere near the earth is divided rather crudely into two parts, the troposphere on the bottom and the stratosphere on the top, with a boundary area between the two known as the tropopause," said Carr. "Back in the late '60s a research group came up with a figure for the amount of fluorocarbons that had reached the stratosphere over New Mexico. Five years later, that amount had already doubled."

So what, right? Here's what: When fluorocarbons finally reach the ozone layer, they react with the rays of the sun and break up into, among other things, chlorine monoxide and molecular oxygen. Then a long chain of reactions—10,000 reactions per atom of chlorine, in fact—occurs between ozone molecules and chlorine. In each of the reactions, ozone is destroyed, leaving ordinary oxygen. And oxygen simply isn't as good a filter against the sun's ultraviolet rays.

Again, so what? How can a few thousand cans of hair spray threaten the atmosphere of an entire planet?

They can, Carr said, and it is happening right now. What we have to bear in mind is that freons in spray cans are highly condensed—their transition from tight liquid to loose gas is what makes the "spray"—while the molecules of ozone 20 and more miles above the earth's surface are very rarefied—far apart.

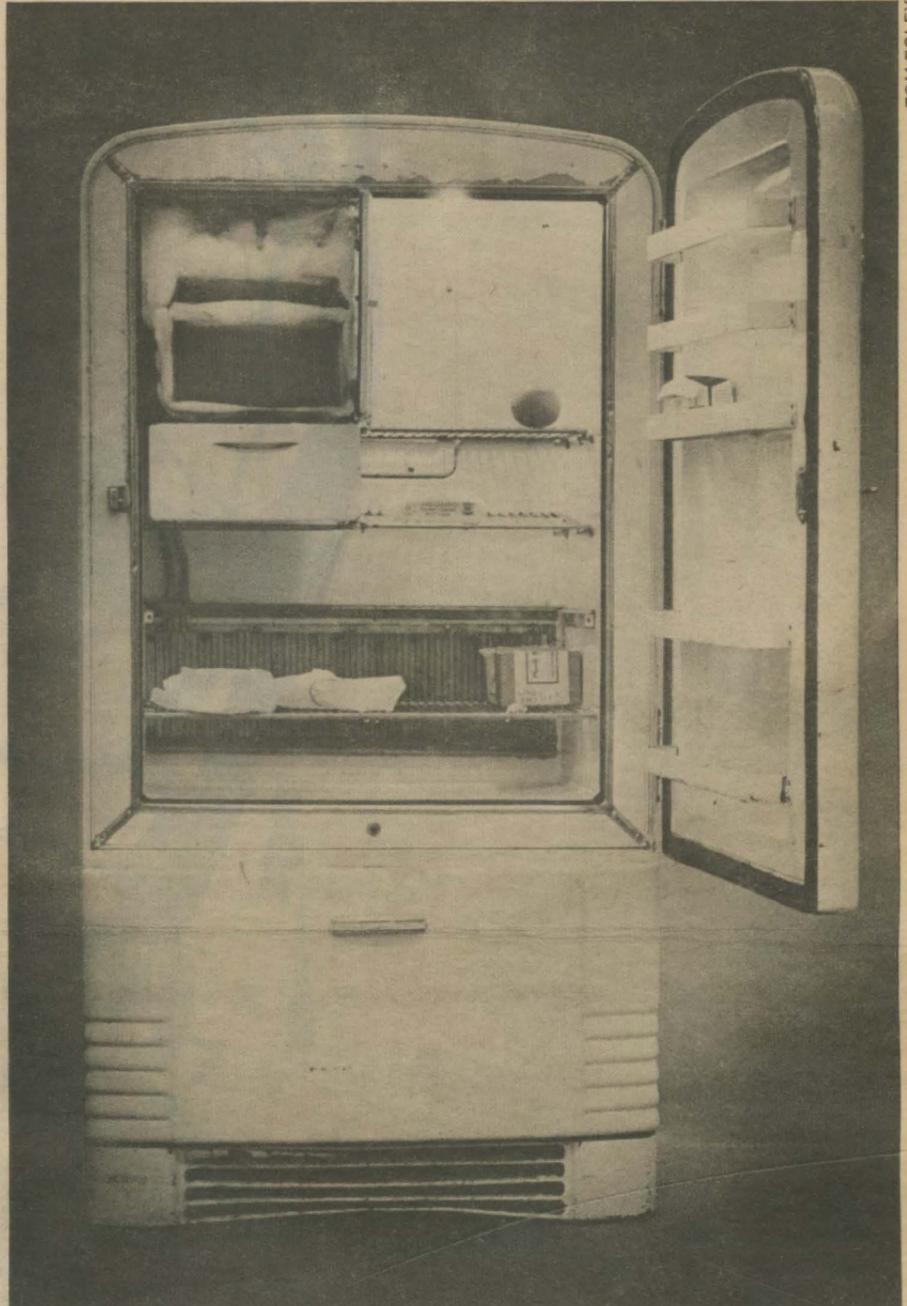
In other words, there isn't all that much ozone up there in the first place, and each atom of chlorine destroys 10,000 molecules of what little ozone there is. We should also consider that the amount of fluorocarbon 11 produced each year on earth is in the vicinity of 500,000 tons.

"To date," Carr said, "a great deal of evidence has been put forth corroborating the basic theory that freons are destroying the ozone, while to date not a single solid argument has been offered to refute the theory."

What is less precise than the heavy statistical artillery brought to bear on the question of fluorocarbons is what might happen. If freons keep destroying the ozone throughout our lifetimes, what is in store for us?

Carr isn't saying. The fact is that the effects are largely unknown and the dangers of ozone depletion are too far-flung to express in numbers. Among the long list of speculations, however, are the following plagues:

- ultraviolet rays may penetrate through to the lower atmosphere and cause skin cancer;
- the earth's temperature could rise;
- the polar ice caps might melt;
- the ocean levels might, accordingly, rise;



TOM FOLEY

- there could well be harmful effects on vegetation and agriculture.

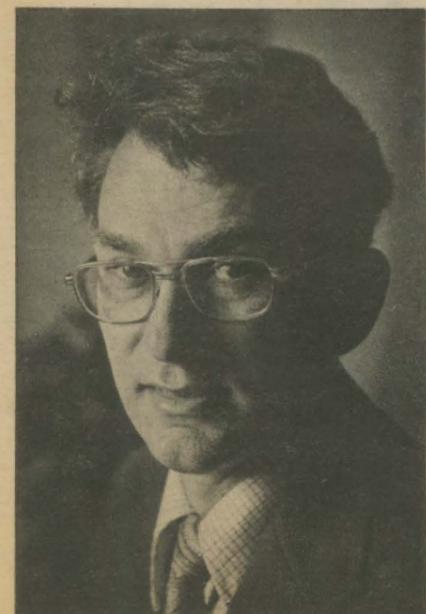
And on and on, each possible result leading to a host of other possible results, each one permanently changing the nature of life as we know it.

Meanwhile, Carr said, the Food and Drug Administration's recent labeling law ("Warning: Freons Are Hazardous to the Earth's Upper Atmosphere") and the public's growing awareness of the problem may be slowing down aerosol pollution of the ozone layer. Ironically, free enterprise may be contributing to the rebalancing of natural forces.

"But there seems to me to be, perhaps, an even greater problem," said Carr. "The shelf life of aerosols is only about six months, after which they cease to be a factor. But the fluorocarbons used as refrigerants will be around for a long time. And while we can learn to go from spray-on to roll-on deodorants, we are not likely to retreat from modern refrigeration back to the days of ice trucks and salt preservation." Carr and others around the world are at work now on non-fluorocarbon chemical refrigerants, but he says there's a long way to go yet.

Your refrigerator may indeed kill you. Carr wouldn't say that—scientists have enough to think about without alarming the public with horrific possibilities. The freon issue has been good to science in general. It's proven that good solid research can't be denied, even by a flood of self-serving chemical industry press releases.

Moreover, the controversy has a lot of people thinking. If such innocuous items as hair spray and air conditioners can pose a threat to life on earth, what else might we be doing wrong?



Robert Carr

TOM FOLEY

Fort Velona, a socialist Italian caricaturist who later immigrated to the United States, drafted thousands of

political cartoons and posters for labor and anti-Fascist publications in the '30s and '40s. The University's Immigration History Research Center

recently acquired a number of his originals. This sketch appeared in the center's newsletter, *Spectrum*.



MIG
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UPDATE

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A Publication For
Friends of the
University of Minnesota



FUTURE TALES

Visionary essays by:

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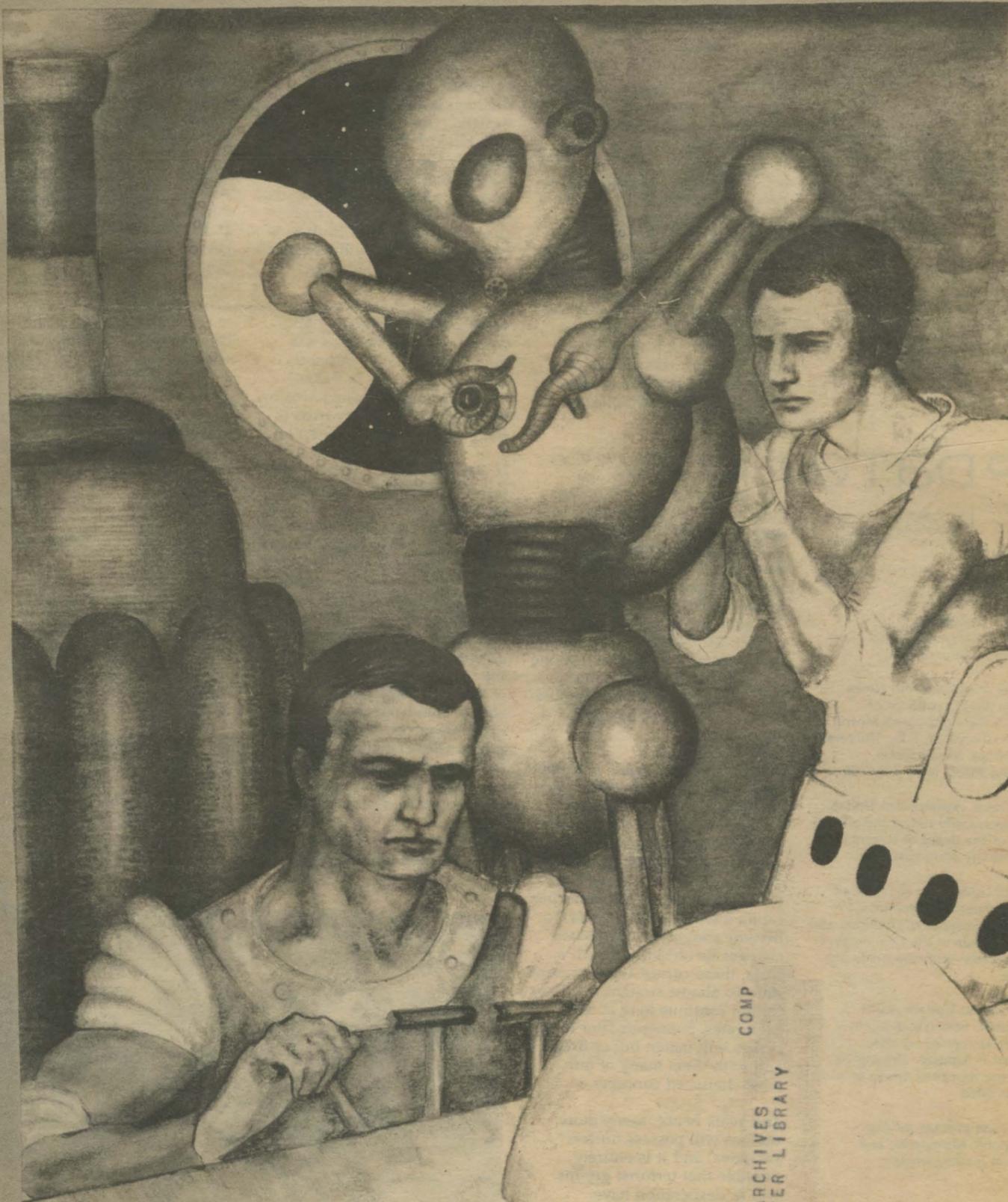
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R. SCHOLES

Fifty-Four Eyes on the Future

Welcome to *Future Tales*, a special issue of *Update*. A while back, an interesting question occurred to us: whatever will happen to the University of Minnesota? Management theory tells us that, contrary to popular suspicion, institutions are like people: they come into being, they experience their triumphs and their difficulties, they slog through their share of drudgery, and then, ultimately, they are supposed to (what's a good institutional term for it?) *terminate*.

Of course, there are those who hold that termination isn't the end, either. To get a collection of different views together,

Update has invited a number of people associated in some way with the University of Minnesota—faculty members, students, alumni—to give us a look through their crystal balls. Whatever will become of the University, say, 500 years from now?

It's interesting how varied, how downright contradictory, the different futures are. The differences say a lot about the diversity of the University right now, today.

transition period ahead to be smooth and free of distress. Solving problems with more and more regulation seems often in retrospect to be throwing fuel on the fire, but this piecemeal approach may be inherent in present legislative processes. Maintaining individual freedom while applying needed restraints, coordination, and leadership is democracy's greatest challenge.

In 2477 A.D., with all of these problems long past, what may the University of Minnesota be like? If the Twin Cities are not a radioactive pile of rubble or a victim of a new ice age, and the University enjoys continued existence for 500 more years, what may one find?

That the role and method of education will have changed beyond recognition goes without saying. By 2477 A.D., I trust that recognition of the importance of integrative education in dealing with the impacts of human actions will have become widespread. The Institute of Technology, if it hasn't been abolished, will be teaching its students to think deeply in terms of integrative systems rather than of isolated specialties, which by then will all be taught much more efficiently by programmed-learning techniques.

Students will go through the separate disciplines individually paced, going to the faculty for help over the rough spots, marveling at how long it took for the professors to give up their chalk and blackboard, and eager to enter team-taught courses related to broadly defined systems, where the synthesis of their learning can begin.

Positive assurance that one has the answer to every new problem, a primary cause of many past blunders and partly a result of narrowly specialized education, will have given way to an attitude in which one can genuinely reserve judgment. A leader will be able to admit that he or she doesn't know all the answers but will explore all options to find them.

But, this is only one of 33,554,432 possibilities. *Update* hasn't given me space to comment on the 33,554,431 others.

J. Edward Anderson
Anderson, a professor of mechanical engineering, is best known for his advocacy of personalized rapid transit (PRT) systems.

Major social changes have occurred in periods of roughly 20 years. Twenty years ago, in 1957, Sputnik was launched, there was a great flurry of activity to improve education to keep up with the Russians, and people were building fallout shelters. In 1937, America was trying to recover from a Great Depression and still thought she could avoid involvement in the wars in Europe and the Far East. On April 6, 1917, she entered World War I. A little reflection will show how far off one may have been in predicting in each of those years conditions just 20 years ahead.

But 500 years? That is 25 times 20. Five hundred years ago, Columbus had yet to discover America. What would he have said about conditions in Spain in 1977? If at the end of each 20-year period there were but two paths, the number of possible futures in 500 years would be 2^{25} , or, if my calculator is correct, 33,554,432! One must be presumptuous indeed to feel one can say anything about the future. But, having been invited to do so, it is tempting to speculate.

Many of today's trends portend great change—not in 500 years but perhaps in ten or fifteen. One need only plot the growth of the world's population on a scale from 500 years ago to 500 years hence, or the growth in the use of material resources per capita over the same period, to become convinced that drastic changes lie ahead. On such a scale, these curves at the present time go almost straight up. They cannot continue long at such high rates. Sooner or later these curves will flatten out or drop, and with them many of our most cherished concepts.

Ten years hence, many more nations will possess nuclear weapons, and it is entirely possible that terrorist groups will in desperation have exploded crude plutonium bombs, wiping out whole downtowns rather than the restrooms in department stores.

Ten years hence, world oil production will cease to meet demand, creating perhaps the only kind of crisis that will generate the political support needed to convert to renewable forms of energy on a large scale. But it will then take ten more years to convert, and in the meantime nations will scramble for the remaining supplies. I would like to believe that nuclear war can be avoided in such circumstances. (In 1973, bumper stickers in Arkansas proclaimed: Let the bastards freeze in the dark. In the late fifties, people talked of shooting their neighbors if they tried to share their fallout shelters.)

In 1997, potable water will be scarce enough to command a prohibitive price if, as now, we dirty it first and then try to clean it up. Materials common today will be more valuable than gold. As nations all over the world attempt to improve their economies, demands for raw materials will again and again exceed supply. No longer will the United States, with 6 percent of the world's population, be able to command over 30 percent of its resources. To cope, profound social and technological changes will be necessary. People need to prepare for these changes.

In 2477 A.D., all of these perturbations will have long

since passed. If the dreaded wars are avoided, the world will in some other way have to come into balance.

Growth in production will long since have been replaced by a minimum-waste economy either at the subsistence level, if governments persist in jumping from crisis to crisis, or at a comfortable level, if future generations learn to develop and use conserving, recycling technologies. For instance, technologies are either available today or can quite readily be developed that will permit houses to be built with no external energy or water supplies and no sewer hook-up—genuinely self-sufficient housing.

In transportation, communications, agriculture, and other fields, the opportunities for building humane, minimum-waste technologies are great. Certainly, in 500 years we will have learned to come into balance with a finite earth and its ecosphere or we will have destroyed ourselves.

But years of experience in dealing with bureaucracies and watching how they can take sound ideas and turn them into the most preposterous schemes gives me cause to fear how unlikely it will be for the

TOM FOLEY



J. Edward Anderson

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The University of Minnesota is committed to the policy that all persons shall have equal access to its programs, facilities, and employment without regard to race, creed, color, sex, national origin, or handicap.

In a recently published book, *A Heritage of Stars* (Berkley & Putnam), science-fiction novelist Clifford Simak postulates the possibility of a very run-down University of Minnesota, thousands of years hence. Parts of his portrait are reproduced here:

He had hoed all the afternoon and now, with the sun finally gone behind the river bluffs looming to the west, he crouched beside the river and stared across the water. Upstream, a mile or so, stood the stone piers of a ruined bridge, with some of the bridge's superstructure still remaining, but nothing one could use to cross the river. Still farther upstream, two great towers rose up, former living structures that the old books called high rises.

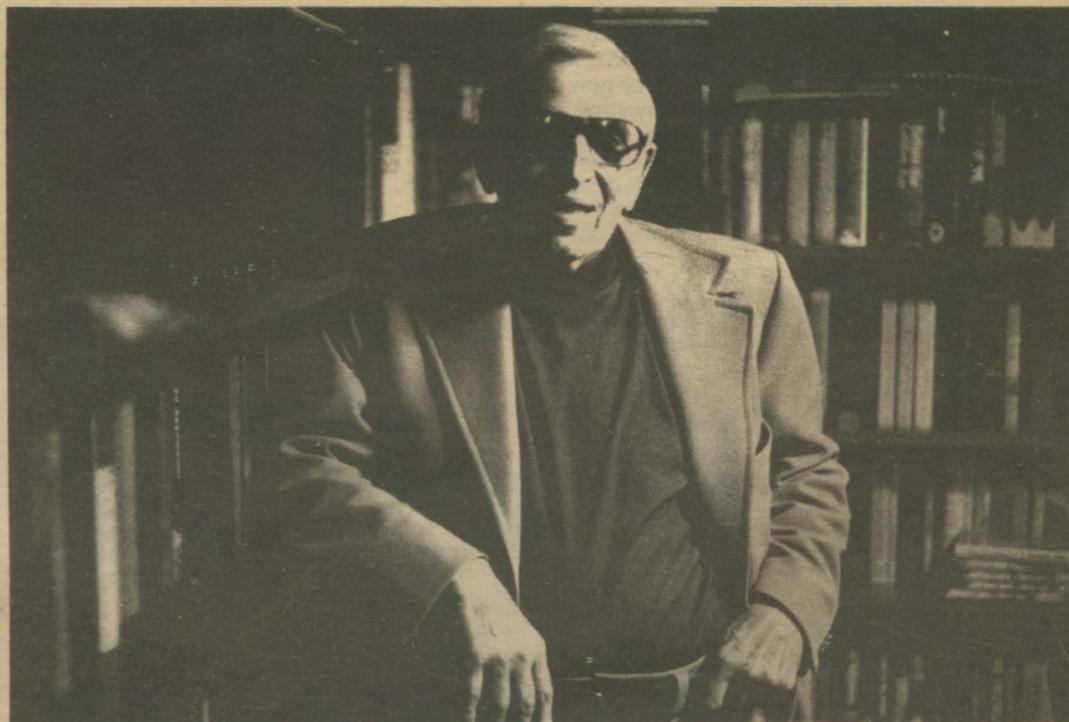
This he had seen when he first came to the university and had experienced himself when he had been taken in. . . . The University . . . had given him equality and kindness. He had, in the last five years, become as truly a part of the university as if he had been born to it and had known what he came to recognize as a unique kind of happiness that, in his years of wandering, he had not known elsewhere. . . . He had gained much from his five years here: the ability to read and write; some acquaintance with the books that, rank on rank, lined the stacks of the library; a better understanding of what the world was all about, of what it once had been and what it was at the present moment. Given, too, within the security of the walls, the time to think, to work out what he wanted of himself.

Old maps of the campus show that at one time there were several buildings that were devoted to the teaching of technology and

engineering. These buildings now are missing. There is a legend that the stones of which the buildings were constructed were used to build the defensive wall that now rings in the campus.

The completeness of the destruction and the apparently methodical manner in which it was carried out indicate an unreasoning rage and a fine-honed fanaticism. Seeking for cause, the first reaction is to conclude that it came about through an anger born of a hatred of what technology had brought about—the depletion of non-renewable resources, pollution of the environment, the loss of jobs resulting in massive unemployment. But this sort of reasoning, once it is examined, seems far too simplistic. On further thought, it would seem that the basic grievance that triggered the destruction must have lain in the social, economic and political systems technology had fostered.

There must have been a period of stress and confusion during those early years when the destructive forces were leveling the scientific and technological centers on the campus and editing books in the libraries to eliminate all significant mention of technology. It may have been that in the heated enthusiasm of the destruction certain faculty members associated with the hated institutions may have met their deaths. The thought even occurs that certain members of the faculty may have played a part in the destruction. Reluctant as one may be to think so, it must be recognized that in that older faculty body, intense and dedicated



Clifford Simak

men and women built up storied animosities, based on conflicts of principles and beliefs, with these sometimes heightened by clashing personalities.

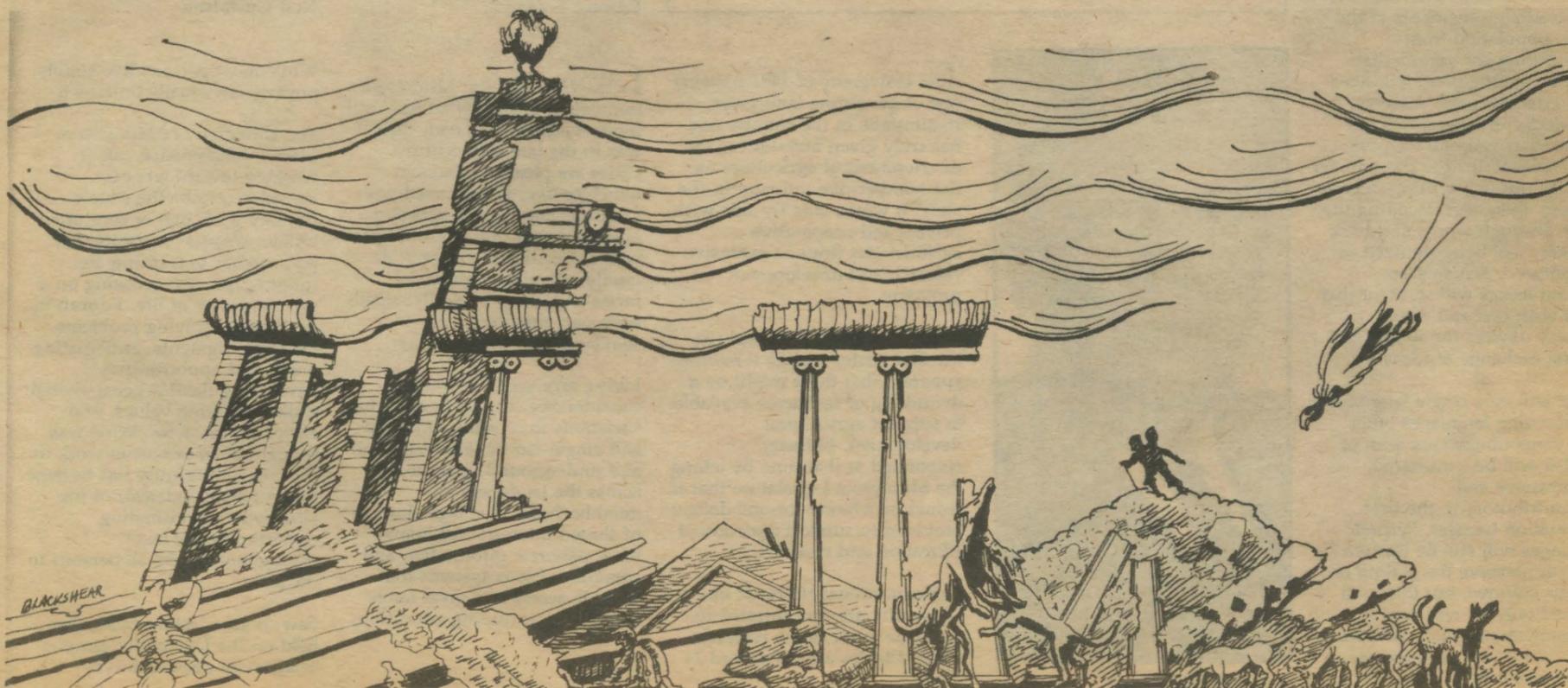
Once the destruction was done, however, the university community, or what was left of it, must have pulled together again, burying whatever old differences that might still exist, and set about the work of establishing an enclave that stood apart from the rest of the world, designed to preserve at least some fraction of human sanity.

Immediately to the east and west of us, in what once were fair and pleasant cities, now largely gone to ruin, are several tribes grubbing a bare existence from the land and occasionally warring with one another over imagined grievances

or to gain some coveted territory (although only God knows why coveted) or simply for the illusionary glory that may be gained from combat. To the north is a farm commune of perhaps a dozen families with which we have made trade accommodations, their produce serving to augment the vegetables we grow in gardens and our potato patches. For this food, we pay in trinketry—beadwork, badly constructed jewelry, leather goods—which they, in their simple-mindedness, are avid to obtain for their personal adornment. To such an extent we have fallen—that a once-proud university should manufacture and trade trinkets for its food.

We have often idly speculated among ourselves whether there may be other colleges or universities still existing in the

same manner as we exist. It would seem reasonable that there might be, but we've had no word of them. In turn, we have not attempted to find out and have not seen fit to unduly advertise our presence.



Living without learning will be recognized many years from now to be as impossible as learning without living.

Walled institutions of learning will no longer exist. Education will not be intramural or extramural: it will be a-mural—without walls. People will not go to institutions of learning, but learning will be brought to wherever they are—in cities, communities, or rural areas—by electronic or other means. The city itself will recognize that its prime function is not as in the past, for barter, the exchange of things, but that its purpose is learning, education, and the exchange of ideas through social intercourse. Learning will be recognized as a human pleasure (other pleasures such as the flavor of good food may have disappeared via processed, unrecognizable, sterile nutrition).

Indicating invidious comparisons of achievement in formal learning will ideally have disappeared. Degrees, which are essentially licenses to practice, may still be issued by some limb of whatever government exists, but they will not be confused with the more important business of learning and scholarship. They will not, as they do today, cause peristalses in the continuum of learning throughout life.

The drive upward in one specialized field for salary incentives will have been replaced by drive for stimulating horizontal mobility to learn and excel in multiple activities. The measure of success thus will not be the number of dollars amassed, but the number of disciplines encompassed. This will be a return to the true accomplished dilettante. The millionaires will become millidilettantes.

The tyranny of letters that now excludes large segments of the world population from contributing the genius that must be among them will have been circumvented. Literacy, a knowledge of letters, will be regarded as just one memory and retrieval device. The transfer of ideas through writing in code (letters), then later decoding the letters through words and back to ideas, will be recognized as complicated. Scholarship without letters will shortcut this route with oral and visual memory devices for simple and natural exchange of ideas.

There will be a single language, and learning languages other than some ubiquitous form of English will be considered retrogressive and noncontributory to the best information transfer. Second languages will still be learned by some to preserve the texture of various cultures, but they will be used only by reluctant communicators—such as spies and “diplomats,” if these are still in business.

We will have long since recognized that the mind of man is uniformly gray and not affected by superficial colorations such as white, black, or yellow. We will recognize that the mind is designed and should be cultivated to make choices and that cultivation of it should

not be to mold or point it toward some particular form or philosophy of government, whether it be communism, fascism, autocracy, or even such foolishness as “education for democracy.”

Universities such as the University of Minnesota, I would hope, will be leaders in obsoleting themselves as entities by merging with the communities. Thus, they will have returned and aggrandized their function by becoming one with the city; education will

have returned to its true purpose—the cultivation of the mind.

Athelstan Spilhaus

Spilhaus, formerly dean of the Institute of Technology, is a fan of things that work.



A Man for All Times

Update asked a lot of University friends to participate in this future forum, including the gentleman above. Admitted to University Hospitals in August, alumnus Hubert Humphrey was found to have a malignant obstruction around his pelvis. Dr. John Najarian of the Department of Surgery broke the news to the press, and to the rest of the world, that the cancer was of an inoperable, incurable type. Humphrey stayed at the University for a couple of weeks and will be returning from time to time for therapy.

The news of Humphrey's condition followed by only a month the announcement of creation of the Hubert H. Humphrey Institute of Public Affairs, to be put together around the University's current School of Public Affairs. Vice President Walter Mondale, also an alumnus, announced the \$20 million fund-raising project.

Asked about side effects, Humphrey replied that therapy at the University was keeping them to a minimum: “The people at the ‘U’ are just superb. They're the best.”

The feeling, now or 500 years from now, is mutual.



Athelstan Spilhaus

The University of 2477 remains one of the strong land-grant institutions in the country and has truly given attention to the development of agriculture as the number-one industry in the state. It works side by side with private and cooperative agribusiness firms in extensive research and development programs.

This effort was begun early in the 21st century when it became apparent that there might be a dwindling of resources available to support agricultural development. Industry responded at that time by telling the Minnesota Legislature that it would match one-for-one dollars provided to support agricultural education and research.

The educational efforts of the University are concentrated in the same areas as the research effort. Classes are conducted 24

hours a day on a year-round basis, and no distinction is made between regular and continuing education courses.

The University is producing agricultural production specialists (they used to call them farmers) who can utilize computers, weather modification equipment, orbiting satellites, sensors buried in the field, and nuclear and solar energy to produce food and fiber at production levels undreamed of about 500 years ago.

Edward C. Frederick

Frederick is provost of the University of Minnesota Technical College, Waseca.

employment, health care, and retail goods. Communication thereby reduces the need for travel; most trips are for personal or recreational purposes. The home has become the principal center for work, learning, and entertainment.

Changes in American values continue to occur. The primary concern of individuals is to understand and live in harmony with themselves and nature. Development of the unique talents of each individual is seen as vital to continued human progress. Freedom is measured in terms of intellectual and spiritual awareness, rather than in terms of material possessions.



Edward Frederick



Neil Gustafson

In the 25th century, Minnesota's population is somewhat less, but more evenly distributed, than it was in the late 20th century. Cities are pleasant places in which to live, interspersed with generous amounts of appealing open spaces. Rural environments of the state include large-scale family-operated commercial farms and, more typically, small-scale part-time farms or semisubsistence residences.

Living arrangements vary considerably, and there are great variations in housing: multiple- and single-family, above-ground and underground, scattered across the landscape in neighborhood or village clusters of shared interests. All homes have elaborate information and communications systems that provide access to a great range of services, including education,

While most persons live simply, poverty is virtually unknown.

The University of Minnesota plays a fundamental role in working toward what is considered to be the state's primary goal, that of continued human resource development. Approaches to learning are interdisciplinary, focusing on a systemic view of life. Education emphasizes solving problems, making judgments, anticipating needs and opportunities, developing flexible occupational skills, clarifying values, and enriching lifestyles. What was thought of as extension work in the late 20th century has become the principal endeavor of the University: coordinating opportunities to learn throughout life for all persons in the state.

Few, if any, lecture classes are held on the University campus. Traditional classroom-type

learning takes place largely through the communications network at a time and place convenient to the learner. Face-to-face and small-group learning situations are emphasized, as in seminars or retreats where learning through sharing experiences, active involvement, and experimentation can occur. This type of learning takes place partly on the campus, but more often in homes, businesses, and cultural institutions throughout the state. The campus is important as a research center with its libraries, laboratories, and facilities.

Because of the University's expanded influence, public participation in developing University policy has become much more direct and meaningful. Responsibilities of the Board of Regents are greatly expanded—as is its visibility. Since the University is a vital element in achieving the state's goals and objectives, its performance is carefully monitored and accountable to the public through state government.

Neil C. Gustafson
Gustafson is executive director of the Commission on Minnesota's Future.

The view of the future is perhaps found in our past. When it all started in the 11th century in Bologna, students hired and paid their own teachers. That system permitted the consumers of information to vote with their feet, so to speak, not only on how effectively teachers taught, but also on which ideas merited discussion. The system was destined to fail eventually because students by their nature do not know what they need to know.

So the teachers, using the advantage of maturity, co-opted the students with THE BIG LIE, a carefully orchestrated campaign to convince students that separating "who will teach" from "what will be taught" was an infringement of academic freedom. The new status quo perpetuated itself until students recently discovered a rather obvious way to evaluate teaching skills without interfering with the teacher's judgment about what they should be taught.

Because the essence of teaching is communication, the principles of effective communicating are the same whether the course is mathematics or history. All the



Jack Baker

student has to do is compare the teaching competencies of all teachers in the same department, and gradations of teaching skill will emerge. In the long run, teachers who cannot communicate with students, and who refuse to correct bad habits, will be forced to move on.

The thrust of the 25th century, then, will be a revival of student control of teaching. Teachers will, of course, continue to decide what is taught, but students will say who will teach. Administrators and teachers will both have to give up power to the youthful student collective, which will become the only true defender of academic freedom.

Students will again vote, but not with their feet. Grading a teacher's teaching abilities on a report card will work much better. The natural bonding of teachers to students will cause the teachers to abandon the administrators as their primary source of political support. This will in turn decrease the importance of the administrators, who will assume the role of political advocate for issues students decide they and their teachers should explore.

From my perspective, then, I see a changing university in a changing society, each changing the other, the end product of which we have not yet glimpsed. As always, the university of the future will adapt to whatever gadgets attract the masses. In so doing, it may eliminate the daily trek to the classroom by emphasizing personalized communication systems. But it will remain an identifiable institution, primarily because we need disciplined learning to survive as a society.

Jack Baker
Baker, a Minneapolis attorney, was once president of the Minnesota Student Association.

The universe (which others call the Library) is composed of an indefinite and perhaps infinite number of hexagonal galleries, with vast air shafts between, surrounded by low railings. From any one of these hexagons one can see, interminably, the upper and lower floors.—Borges

Jorge Luis Borges, in "The Library of Babel," postulates one vision of the house of information. In approaching the University of Minnesota as it might function in 2477, this writer is provided by Borges with a honing device for interpreting the many voices of today's futurists.

While the University campus and its geometric contents will be quite unrecognizable by 2477, its primary functions will remain, will still be necessary and somehow performed. As things, places, organizations, information—even people—change, the needs to learn, relearn, commit, and disengage still remain.

A future matrix, one that we can do much to direct, will still be engaged in our corporeal and psychological responses to being and becoming. Higher education now provides an environment for modulation of sensory, cognitive, and decisional stimulations and attempts to manage their burgeoning facets.

The University, serving as one of Toffler's "stability zones," whatever its future configuration (bureaucracy/adhocacy), can provide designed experiences for coping with change, a change that enlivens and enriches human experience by accelerating increased knowledge of ends, i.e., recognition of just how important "being/becoming" is. Emphasis in the future, grafted upon the past, will require continuing group and person-to-person communication. The University provides one model for creation of future nodes that could structure human experiences of the past, present, and future—a cluster of functions guiding a spectrum of options.

In my opinion, the University could continue to market such an array of services if it creatively supports its changing library functions. Rather than myopic concern with past/present/future technologies, it could assume creative responsibility for large-scale social change by manipulating our gross national product, a product centering in information, i.e., content concerned with human needs and processes.

Undoubtedly, a technology exponentially evolved from our present nascent forms (computers, telecommunications, vacuum tubes, nuclear reactors, radar, etc.) will generate saltations of knowledge acquisition and its applications. A structured system that can creatively cope with avalanching information in written, visual, audio, and as yet unknown formats will require an intelligent source, perhaps centralized and temporary, that can provide people with varied means to achieve a full life. Specialized centers—universities, if we wish—could become change agents deliberately acquiring, organizing, and disseminating information.

In my view the University, perceived as an ecosystem, will



Harris McClaskey

achieve balance as it makes the library its dynamic nexus, a library unlimited as well as cyclical. As Borges posited, "Let it suffice now for me to repeat the classic dictum: THE LIBRARY IS A SPHERE WHOSE EXACT CENTER IS ANY ONE OF ITS HEXAGONS AND WHOSE CIRCUMFERENCE IS INACCESSIBLE."

Harris C. McClaskey
McClaskey, an associate professor in the University's Library School, inadvertently inspired this special issue six years ago.



Two Sides to Every Story

Lots of futuristic ideas contain the seeds for mass paranoia. Will University-sponsored recombinant-DNA experimentation unleash a green blob upon the unsuspecting world? Or will it pave the way toward eradication of humanity's last, worst nemesis—cancer? Will cloning experiments create a race of robot armies that will conquer the world? Or will they yield invaluable techniques for restoring damaged tissue? Will genetic experiments and counseling lead to a totalitarian, "master race" civilization? Or will they drastically reduce the number of birth defects and infant deformities? Will University-pioneered transplant techniques create two-headed monsters or extend the limits of useful life?

The best way to answer these questions is to forget what you've seen in the movies. That sort of thing could never really happen.

"Oh, yeah?" the other head asks.

The second great education revolution began on a crisp fall morning in 2167 when a freshman honors student from Crookston laid down her coder in Introductory Shakespeare and refused to continue computing the use of consonants in Prospero's speeches in *The Tempest*. After reading the lines describing men as such "stuff as dreams are made of," she decided she would rather study that image than count consonant clusters.

Miraculously, other students stood up from their IBM kompu-keyboards to echo her "no." Rebellion spread quickly across the tiny liberal arts campus near Northrop Auditorium, and by the end of fall quarter only a few determined political science and sociology students kept usage figures up at the computer center just west of the Mississippi, where the University's great library had once stood.

Word of this outbreak reached College of Agriculture students at their outposts under the oceans and on satellites circling the earth and moon. Although the Ag students were not unsympathetic they had no time to join the protest, for they were pressed, as usual, in development work. The moon group had finally produced a

new strain of evergreen to replace those lost in the acid rains of 2044. The ocean group was searching for a grain substitute that might survive in the deserts in the southern United States.

Although formal communications had been broken off with the Health Sciences complex during the cloning controversies of the late 21st century, when Health Sciences and most of Minnesota's medical research facilities were relocated to the Iron Range for protection of the staff and so that research might continue, word quickly penetrated the complex. When the Complex Chief flashed the news on telecommunicators, some researchers cheered out loud.

For the past several decades researchers had been struggling with morale problems in patients whose bodies were preserved from disease and old age but who displayed little will to live. The staff had hunted in vain for philosophers who might explain what life was about, but had found only symbolic logicians; the poets they brought to staff meetings rhymed mostly in numbers.

Among the last to learn was the University Information Officer, who had been busy for nearly a week repairing the University's



Andrea Hinding

lines to the country's publication center in Chicago. (When books and journals were abolished in the early 21st century, they were replaced by a national information center to which University staff members hooked up desk and home reader-consoles; the entire library staff was phased out until just one specialist remained.)

The Information Officer was in no mood for rebellions for he was fighting a head cold aggravated by working in the damp sub-basement beneath the Rarig Center parking lot. To make matters worse, a Regents'

TOM FOLEY

professor who was calling for articles on superconductivity but getting Faulkner novels on his console was threatening to have the Information Officer reclassified as Petty Clerk. Before returning to his snarled lines, however, the Officer nevertheless managed to send a message to Rosemount.

At Rosemount lived a renegade band of humanists, feminists, and archivists who lived the Old Way, emerging from their salt caves only on raids to save rare books and manuscripts from destruction after microforming. As students of history they were naturally inclined to pessimism, but report of the small outbreak gave them hope. During their seminars that year they considered the meaning of the rebellion and wondered if the validity of the subjective and the importance of ultimates would be reasserted. They concluded finally that integration had begun.

Writing now in 2477, we know they were correct.

Andrea Hinding
Hinding is curator of the University's Social Welfare History Archives.



Famous Name, Unfamiliar Face

Who is this man, and what does he have to do with your future? Quite a lot, as it turns out. Allan Bakke is a graduate of the University's Institute of Technology. If he had let his education stand at that, he would be just another U of M alumnus. It was when he applied for admission to the University of California, Davis, medical school, however, that his place in history began. Twice rejected, Bakke learned later that his test scores were higher than those of minority students accepted into the classes. His case, now in the Supreme Court, challenges the fundamental thesis of "affirmative action": that preference to minority applicants is necessary to offset disadvantages inherent in being a member of a minority group.

It is a case that deeply disturbs practically everyone. It asks what is fair, and whether individual rights or group rights, free enterprise or societal good, should take top priority. Whatever the decision of the court, it is one of the most important cases of all time.

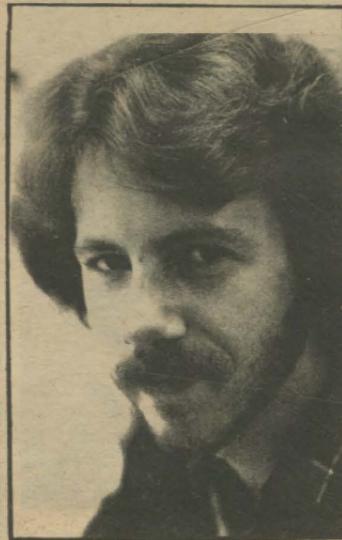
Engineering. Society already is too specialized to employ liberal arts graduates, and the more specialized it becomes, the less willing it will be to pay for a relatively useless liberal education at a state-supported university.

So members of the Class of 2477 probably will be highly useful, but boring, people. They'll be able to get jobs but not to discuss Shakespeare.

But then, Shakespeare's work will be 900 years old. Probably no one will remember him anyway.

Eric Ringham
Ringham is editor of the Minnesota Daily.

TOM FOLEY



Eric Ringham

It's doubtful that, 500 years of technological advances from now, such a contradiction will be allowed to stand. It has only barely survived until now. Specialized fields have a higher priority on campus today than the liberal arts.

The East Bank in Minneapolis quickly is becoming a massive Health Sciences complex, for instance, seemingly growing a new building each year while students majoring in something as impractical as English spend most of their time in a building occupied primarily by the Institute of Technology and known until recently as Main

Fuel of the Future

What's new in the world of energy? Coal.

The University of Minnesota, Duluth, is building a \$4.8 million coal-gasification unit on campus to heat its 30 buildings. Coal gas used to be thought of as old-fashioned, horse-and-buggy stuff. But no more. Coal is coming back into style. Coal is groovy.

Consider: Solar energy has been around since the second or third day of Genesis. Ditto the bonding power that holds atoms together. But coal is much more modern than that: as late as the early Pleistocene, coal was but a glimmer in the earth's dense skull.

The Duluth gasification unit will be groovy, too: a tower 80 feet tall, with temperatures approaching 1900 degrees F.



One could spend hours dreaming up a vision of the University to rival *Star Wars*, complete with a monorail intercampus transit system and a Department of Interplanetary Geology renowned for its spectacular field trips.

But University life in 2477 probably will not be altogether different from what it is today. The mere passage of time will not cause the state Legislature to stop making hash of the University's budget requests. The Gophers may never again play before a standing-room-only crowd. Most of what University students experience five centuries hence probably can be predicted from trends observable today.

An easy prediction is that educators in 500 years will have long since abandoned the notion of a liberal arts education. Today, students entering the College of Liberal Arts are lauded for their idealism but told nonetheless that they are embarking upon a four-year, \$4,000 indulgence that will not help them when they try to find work. Society, the freshmen learn, is too specialized to employ them. Liberal arts will improve their minds but not feed them.

The University of Minnesota drifted at one-tenth the speed of light, fusion engines suddenly darkened after one standard year of ceaseless burning. Students confirmed for the millionth time the accuracy of the trajectory that would take the University to Posturer VI in the constellation Greek's Revenge. Other Students received and transmitted continuous messages over the ultralight, some of them

The mile-long University cylinder rotated as it moved, producing the effect of gravity along inner walls of steel covered with soil, trees, and buildings. Thick glass windows divided the land area into three equal parts running the length of the University; all of this land resembled portions of the original campus on Earth and part of its surroundings. Students monitored their ecosystem with care, paying especial attention to regulation of the illumination systems in the agricultural pods and to the source of their energy, the fusion power plants.

The Students cooperated symbiotically in the management of the University. All were intelligent regardless of species or electronic nature, and all would eagerly contribute. The cats could sense some phenomena as could no humans without elaborate assistance from complex hardware; the eagles could provide continuous aerial coverage of the University interior; the general factota

Constantly under repair, it was also constantly under redesign, sometimes with assistance from Earth but usually through the strength of its own resources. It was an *inquiring* system of temporary questions and of great power and responsibility, and it led the way wherever it would.

The Cosmosophs were increasingly aware of this, and, not being pleased, prepared their Final Answers for the University's arrival.

Arthur M. Harkins
Harkins, an associate professor in the Department of Social, Psychological, and Philosophical Foundations of Education, has been doing a lot of work lately in the area of extraterrestrial habitation.

requires the art of a poet or philosopher. Few politicians are thought to be visionaries, unless visions are of elections to come. But a line from "The Screwtape Letters" by Clive Staples Lewis—"The future is something which everyone reaches at the rate of sixty minutes an hour, whatever he does, whoever he is"—gives me courage to match visions with dreamers and futurists.

When William W. Folwell assumed the presidency of a

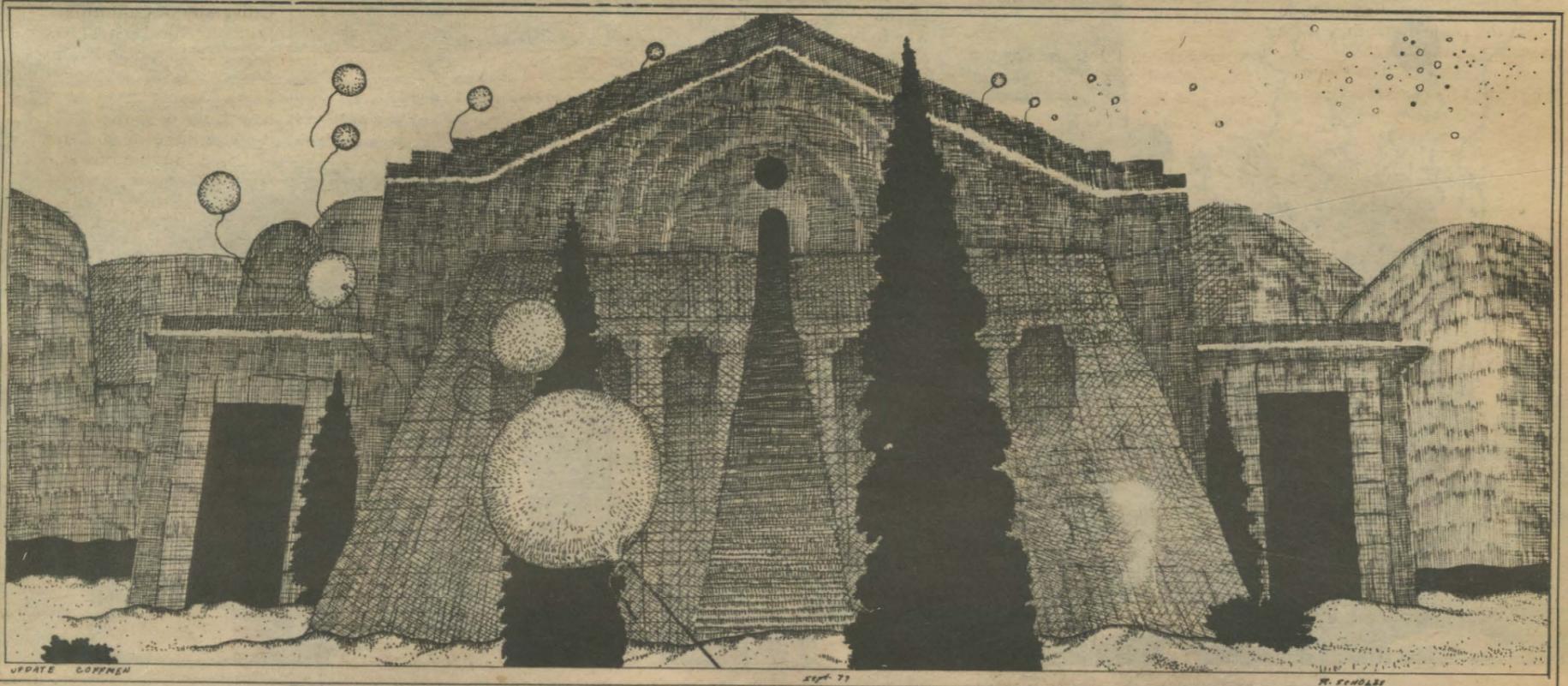
philosophers, problem-solvers. Every field will be interdisciplinary. Agriculture students will learn ethics, politics, and art. World interdependence—perhaps universal interdependence—will lead to increased studies in languages, culture, communication, and philosophy.

The concerns of the University will be to help the student develop a love of knowledge and wisdom, struggle with questions of ethics that we barely surmise

Arthur Harkins



TOM FOLEY



R. SCHOLE

to and from Earth, close to where the voyage had been initiated, and some to and from the planet of destination, home of the recently discovered Cosmosophs, claimers of all Final Answers.

In the garden pods, Students directed the work of specialized agricultural factota as food was raised for the animal populations. No food save minute amounts of electricity was necessary for certain other entities, although all animals on the University were to some extent bioelectronic systems, including the humans.

outside could inspect and repair damage without cumbersome protective gear. All were Students, and all were in continuous symbolic and emotional communication. Some of the Students were the products of extensive genetic engineering, but none were without at least some evidence of this technology, whether suggested by nonstandard shapes or by startling mental abilities.

The University of Minnesota was in every sense a whole system, studied and maintained as such by its Students.

Five hundred years in the past, the world rested on the brink of the "scientific revolution"—a force so great that it sounded the destruction of the Aristotelian physics and made other great eras of history appear incidental.

The last fifty years have seen changes more astounding than the sum of discoveries in the previous half millennium.

Now to be asked to see again 500 years into the future

217-pupil preparatory school near the Falls of St. Anthony in 1869, perhaps he could see 100 years into the future and envision the University of Minnesota as one of the leading education centers for journalism, agriculture, medicine, and public affairs. Perhaps he could also see my vision of the future: a University of a slightly smaller size where emphasis is less on specialization than on universal knowledge.

Because precise disciplines will be best handled by machines, the University will exist to develop great thinkers,

today, learn to defend views and opinions in the light of reason, grope to combine earthborn scientific knowledge with the knowledge of the heart and the heavens.

This picture may be more closely aligned to ancient Athens than to today's technology-oriented society. But it's not so much a circle back to the beginning as it is a spiral to new heights.

George Latimer
Latimer is a former member of the Board of Regents and currently mayor of St. Paul.

It all seemed to happen so fast. Felt like just two seconds after I had croaked, after the relief of passing out of this disheveled corpus, the meeting with Light, the sense of astral serendipity, I was being roused to a resurrection interruptus, surrounded by the faces of peering old compatriots paying their last respects.

I say it seemed like two seconds. Then I realized that those spectators were not old acquaintances at all, but perfect strangers. I squinted at a nearby calendar: November, 2477.

About the only consolation I had for being reincarnated in a used body and against my will was seeing that the people of Minneapolis had missed me so

much, they were still mourning. Either that, or they just were having such a grand time at my funeral that they couldn't bear to end it.

But now I was back. Imagine the shock to the onlookers when I hobbled to the pane of the department store window in which I was displayed, flattened my shriveled nose against it, and drooled organic saliva on the cotton snow below.

And imagine what a series of shocks to me when I strolled over to the University campus to see what sorts of changes—if any—had transpired during my five centuries of peace.

I learned from one young co-ed that, during my long respite

from the physical, the U and surrounding area had miraculously survived not one, but two, unsurvivable global catastrophes. The first had occurred in 2134. There was a devastating nuclear world war, and only the U of M was left standing. It seems the enemies all agreed that it was the one and only spot on the face of the earth that was not worth wasting valuable ammo on.

During the following hundred years, the surrounding Twin Cities were rebuilt and partly repopulated, just in time for a short ice age that began in the middle of the 23rd century and lasted about 75 years. The Twin Cities escaped it because nobody noticed.

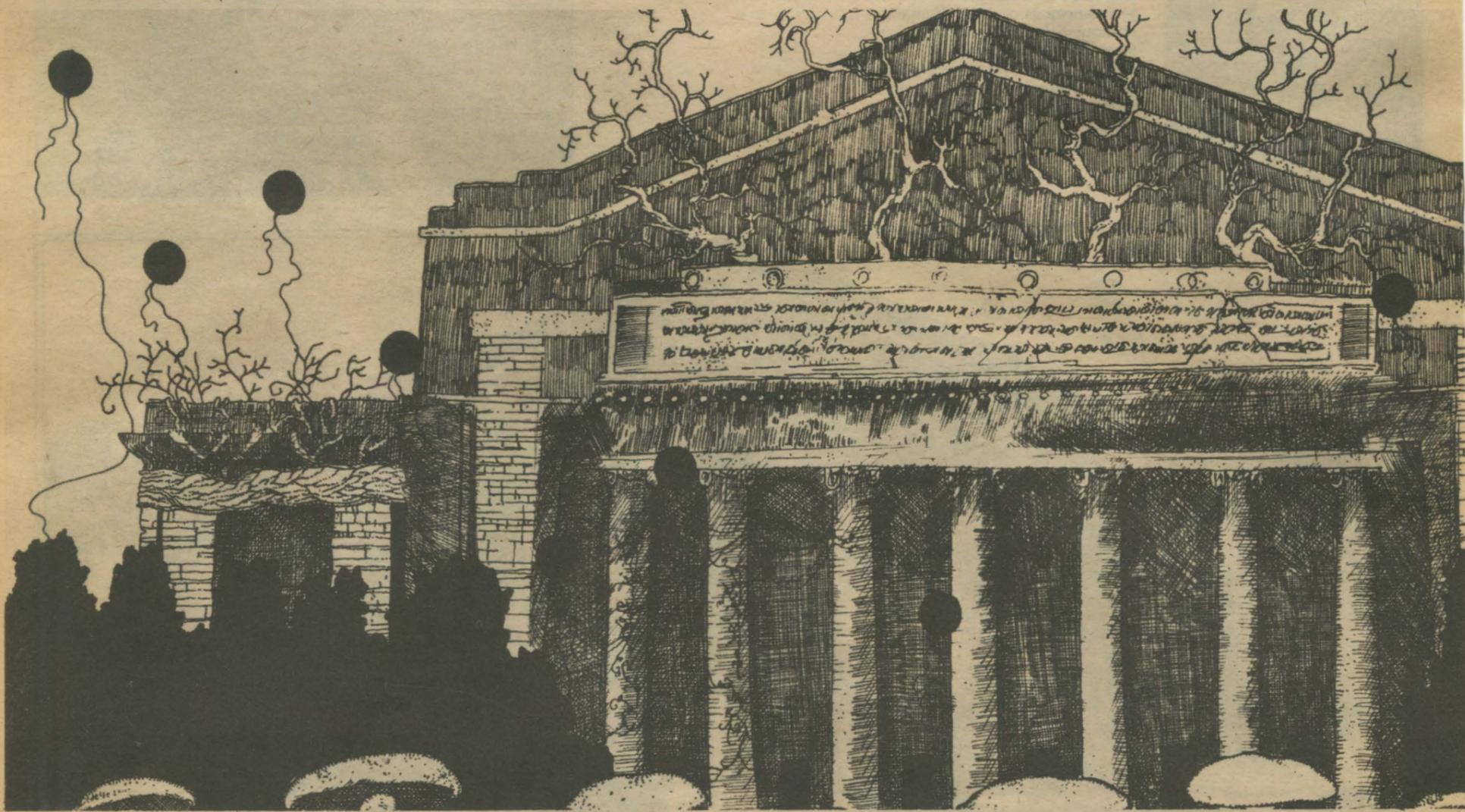
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Pete Wagner

I learned that Coffman Memorial Union had recently been remodeled to art deco due to the influence of the U of M Gay Student Union, which is now the predominant campus organization. I was surprised to discover that the medical complex had been torn down for a new astrodome stadium (I thought the Med School had more clout than that).

Another big change of scenery was the disappearance of the Mississippi River, which had been filled in and built over. It turned out that this change was for the best, however: by replacement of the dangerous Washington Avenue Bridge with the giant Dudley Riggs Memorial Comedy Complex, the campus suicide rate (pardon the



Wendell Anderson



Wendell R. Anderson
Anderson is a United States senator and a University alumnus ('54 and '60).

Eugene McCarthy



I appreciate the opportunity to write a piece for *Update*, but I believe it would be arrogant of me to make a projection for 500 years.

I have limited myself to 200 years' advance judgment on political and cultural institutions.

Eugene J. McCarthy
McCarthy, an alumnus of the University, is a celebrated poet.

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expression) dived to an all-time low of some 24 percent. (If they would stop showing those old Ingmar Bergman films on campus, I'd bet it would drop even further.)

Housed, appropriately, in the comedy complex was the office of student government. Happily, there have been a few impressive strides since my day. For instance, Ovinavian students (the descendants of St. Paul campus husbandry students who were genetically crossed with sheep) have won the right to vote in student government elections. On the other hand, though, most things about student government have never changed and never will. The party in "power" at the time of my visit was called United

Students Concerned and they were already promising to win more student rights, better services, and more control over fee expenditure decisions in 2478.

It made me long for the old Washington Avenue Bridge.

Pete Wagner
Wagner, formerly cartoonist and provocateur for the Minnesota Daily, is continuing his cartoonism in the city of Madison.

Whatever any one of us says about the future represents either our dreams or what we dread. My "prediction" for the University represents my hope for it.

I think the University will still exist and with the same mission: "Dedicated to the advancement of learning and the search for truth." But it will not only look physically different, there will be other major changes:

Since knowledge in all areas is constantly growing and will become more and more interrelated, there will be no separate departments. Students will get a degree from the University as a whole. They will focus on some problem or knowledge or practice area and choose their curriculum from a wide variety of inputs relevant to what they need to learn. Most students will need study in both technology and humanities, and there will be no difference in status between the two. Students may study mathematics and music or physics and environment or arts and social work.

The student and faculty population will include a much greater racial, cultural, ethnic, and national variety. It will include all ages and, surely, both men and women. Practically all students will meet informally throughout their study with faculty they select to discuss ethics, since anything they learn will demand this basic thinking through of human relations.

Computers will teach basic information, but the contact between learner and teacher will be immensely increased compared with today. There will be no status difference between teacher and learner, but there will be a common sense of being engaged in significant pursuit of knowledge.

Just as today, there will be laughter, crying, joy, disappointment, elation, despair, and some bickering, because all those people will still be humans. Yet departmental jealousies will not exist any more, there will be no separation between "town" and "gown," and there will be a stronger sense of a wider community with the whole world.

Utopia? Yes, but possible.

Gisela Konopka
Konopka, director of the University's Center for Youth Development and Research, is author of several books on the lives and problems of adolescent girls.

Gisela Konopka

Secret Research for CIA Revealed



In September, President Magrath released to the public a Central Intelligence Agency document stating that the University had been involved in two subprojects of something called MK-ULTRA.

MK-ULTRA was the CIA mind- and behavior-control research program of the 1950s.

Little is known about the two subprojects, except that one cost \$12,000 and involved hypnosis. The other subproject was a continuation of the hypnosis research and involved \$520.

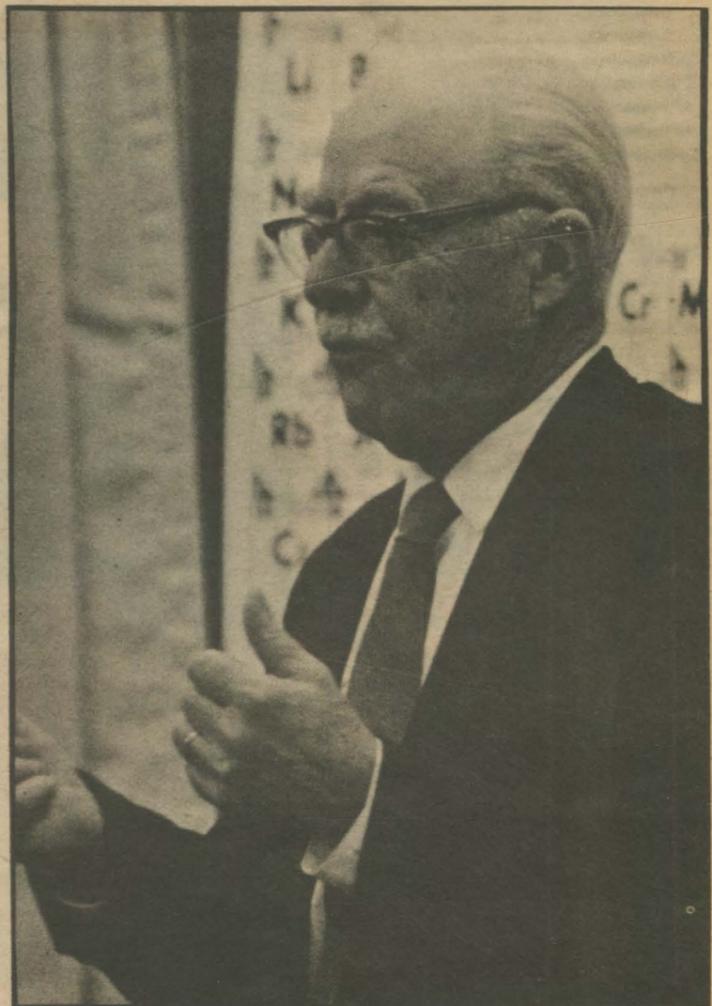
The idea behind the research was to discover if amnesia could be induced through hypnosis, or, conversely, to see if memory could be improved.

Neither goal was achieved.

A University policy against secret research of this type has been in effect since 1971.



Northrop, 2477 A.D., by Lisa Blackshear, '72



Walter H. Brattain

There will probably be another "dark age" if we do not soon solve the problem of overpopulation and the energy problem because it is too late. Whether any university will survive in such an age is doubtful.

This is about all I have time for. Anybody who really tries to be a prophet should have his head examined.

Walter H. Brattain
Brattain, winner of the 1956 Nobel Prize in Chemistry, is now at Whitman College in Walla Walla.



TOM FOLEY

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Harrison Salisbury

The University of Minnesota 500 years from now? I hope that it will still exist. But permit me to express my doubts.

If we look back 500 years (and the past is the only guide that faintly illuminates the present), we see that in 1477 not only did the University not exist, but the continent had not yet been "discovered" by Columbus (regardless of what Leif Ericson may have been up to in earlier years).

Were there universities extant in 1477? Yes, a few—Paris, Oxford, Cambridge, Bologna, Upsala, I think. Maybe a few others. Mighty few. True, they are all still there today and, recognizably, function a bit as they did in the past.

But the U of M has a short history as the world goes. So does the USA. I expect to see the USA still in existence 500 years from now, unless the whole world has been wiped out by our debonair attitude toward the thermonuclear process and numerous pollutants. But the University? I wonder.

I suspect there will be a marked consolidation of educational facilities in future years. Instead of the U of M, we may have a vast midcontinent institution, located in Iowa or Missouri, replacing all of the present universities from Winnipeg and the Canadian midwest as far west as the Rockies and as far east as Appalachia. Perhaps, of course, midcontinent will be in Austin, Texas, and service everything from the Panama Canal to the Hudson's Bay. Jolly thought!

If the U of M does exist, it may continue solely as an institution for philosophical speculation and spiritual research. By this time we may have learned to communicate with each other by brain waves, and this may be the function of the institution. Goodbye Engineering School, Ag School, Medical School. It will all be done by brain waves with control centers possibly in Berkeley or Brooklyn.

Or, we may have an interplanetary control, feeding a network of small line institutions such as the U of M may then be.

But whatever the future brings, I cannot imagine it containing all of the elephantine Big Ten institutions in present-day terms, nor the dozens of ancillary smaller colleges and sub-branches. Thought transmission could make it just as easy, or easier, for everyone to get an education at home, or in the north country paddling a canoe (don't ask me if there will

still be canoes in 2477—canoes are a lot more durable than universities), or simply while throwing a fishing line into Lake Nokomis.

Five hundred years ago, universities were rather monastic refuges in which thoughtful men had some escape from the dangerous world outside. Maybe that is what the U of M will be in that future 500 years hence.

One thing I will bet a sackful on: there will be no fighting Gophers, no football, no basketball, no stadiums. But there may be scholarly research into the function of the feminine cheerleader. It would be fun to be around and read the conclusions of the Ph.D.'s.

Harrison E. Salisbury

This is Salisbury's first publication in Update. When not free-lancing, he writes for a prominent New York daily.



Whole Greater Than Some of Its Parts

It was the dream of Dr. Frankenstein to create the "new Adam," a new race of man-made men superior in every way to ordinary *homo sapiens*.

The science of bioengineering has, short of putting old body parts together to make new bodies, done its share of work over the centuries. One could say that the crutch was the first big step: an artificial leg. Real artificial legs were to follow, then artificial knees, hips, fingers, and shoulders. The iron lung was

an external device, as was the tried-and-true hearing aid. The kidney dialysis machine is a kind of artificial kidney. Meanwhile, plastic corneas, artificial glands and blood vessels, and even an artificial heart—experimentally implanted in a calf—are fixtures of contemporary medicine, as practiced at University Hospitals and elsewhere.

All that is lacking are hordes of villagers with torches.

The state of the University 500 years in the future clearly depends on the state of the state and the world. I anticipate that the world population will peak at about 16 billion people about 2025 and then remain there, held at that high level only by continued massive technological changes. It will probably not grow to any higher figure due to major problems in increasing the world food supply by more than about a factor of four. The fossil fuels, coal and oil, will have been burned, forcing a reliance on combined solar and nuclear power and making long-distance transportation of electricity far more obnoxious than now.

Minnesota will probably continue to hold about $\frac{1}{1000}$ of the world's population, which implies that the Twin Cities metropolitan area will be about 10 million people—directly comparable to New York today, with all the attendant problems that city has. Due to the inflation that will likely continue for the next 500 years as it has during the last 500, the smallest coin will be worth \$100,000 or more and University tuition will be astronomical in present-day terms, but comparable in terms of the hourly wage or the price of eggs. With no fossil fuels, transport will be by electric railways and the parking problem will be gone (unless fuel cells for electric storage become far cheaper than I think).

Because of the burning of fossil fuels, global temperatures will

be 5 to 10 degrees C higher than at present and sea levels will have risen by 50 meters (150 feet) with the melting of the Greenland and Antarctic icecaps. Our January and February temperatures will be like the present November, but late July and August will be abominable. Minneapolis may even have to abandon the Aquatennial. We will miss New Orleans, San Francisco, and London, and perhaps miss Manhattan, but no one will miss Washington, D.C. ("Foggy Bottom"), or Los Angeles.

The United States will likely be bilingual, with the University departments of English and Chicano equally large and important, mainly due to the influx of immigrants from Mexico and South America in the next 25 years. The common language will likely be a mixture of both tongues.

A new department or complex of departments concerned with resources and recycling engineering will have developed, as will one concerned with water supply and purification. With a loss of the wilderness experience, I anticipate that continuing education, continuous technical retraining, and extended liberal education for adults will become far more common than now.

As University enrollment grows to 200,000 to 300,000 students, the buildings of the University will have to grow, most likely

Woebegone marked the beginning of Minnesota's rise to international dominance for the next five centuries.

The decision to locate the University at the heart of the new city, to guide its technology and development, was a stroke of genius. It radically restructured the concept of a university—to one that served as the organizing force for the total city. As such, it was natural for the city to receive vast new sums of money from both public and private sources. Industries found it advantageous to combine their experimental efforts with those of the city. Thus it developed from an idea to a self-contained domed city to a center for international air travel and interplanetary rocket travel.

The ease of transporting people and products led to the city's expansion into the world's largest high-technology industrial area. Its automated system of handling and recycling waste materials gave it a cost advantage over older cities. Because people were happier living in such an "open



TOM FOLEY

downward into the St. Peter sandstone. This will be more for air conditioning purposes and space than for reduced heating bills.

Except for antiquarians such as myself, books will be passé and small portable microfiche readers will take their place. Even these readers, which are now with us, will probably be obsolete and more compact ways of storing information will be in vogue. Paper will be in short supply because of conversion of forests to food supply. Most of us will not miss the departmental memos and trash paper from the deans.

society," they were more productive and hence labor costs were lower. Home-based computer terminals provided a steady stream of information and education, enabling people to vote instantaneously on major public questions and to order food, clothing, and other materials that would be delivered by automatic vending devices.

Because this environment attracted the finest talent and intellects from around the world, it was only natural for Minnesota to become the center of the new world order, playing a major part in eliminating war, famine, and disease. The small group of far-sighted people from Minnesota had dared to be different, and had succeeded in integrating the academic world of teaching, service, and research with the total environment.

Robert J. Odegard
Odegard is executive director of the University of Minnesota Foundation.

In general, the human problems associated with the high population density will be expanded and so will the departments whose mission is related to people. The basic departments of sciences and engineering will have faculty who will become obsolete in far shorter times than at present, and regular retraining of faculty will be far more important than at present.

All in all, I fully expect the U of M to be present in 500 years, still perceiving problems in all fields somewhat in advance of the Legislature and the general public, and continuing to solve

problems and instruct people in the art of being human. The biggest errors I expect in my predictions are in the direction of not having predicted enough change.

Robert E. Sloan
Sloan is a professor of geology and geophysics, specializing in dinosaurs and old trains.

I have difficulty predicting what might happen tomorrow, much less 500 years from now. Nonetheless, my response to your request follows:

Five hundred years from now, institutions of higher education, including the University of Minnesota, Morris (UMM), will have missions that are more narrow and specialized than they are at present. Concurrently, and not inconsistently, there will be a stronger commitment to and appreciation of the liberal arts because of a better understanding of their value and, indeed, of their necessity. Educated persons will know more about less, but they will also have a greater awareness and understanding of themselves and their cultural underpinning.

By the 25th century, state, national, and even planetary boundaries will be reduced or



John Imholte

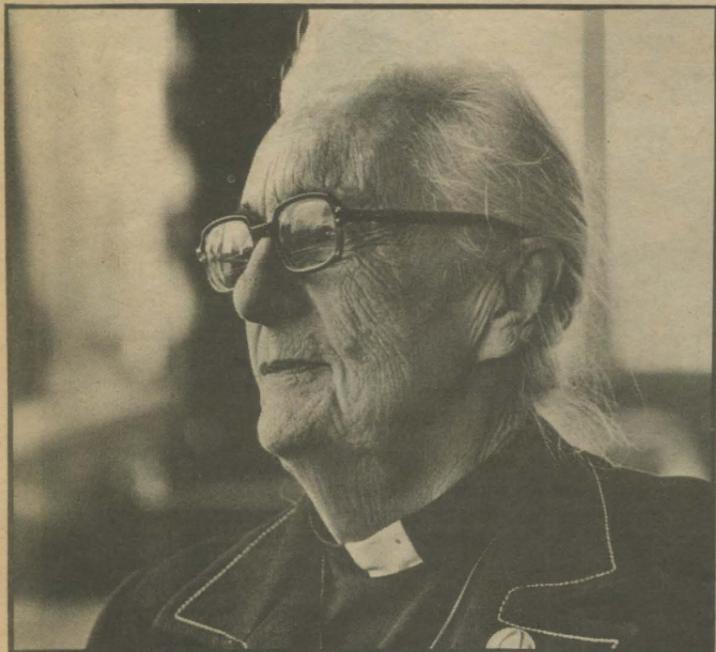
removed. The UMM of the future may be the University of Minnesota, Mars.

John Q. Imholte
Imholte is provost of the University of Minnesota, Morris.



Robert Odegard

Looking back from 2477, it is easy to see how the decision of the Minnesota Legislature in 2000 to establish an experimental city 100 miles north of Lake



Jeannette Piccard

MINNESOTA DAILY

When I was a child, people often died of typhoid, measles, scarlet fever, tuberculosis, pneumonia, appendicitis. Clothing was fastened by drawstring, buttons, hooks and eyes. I was seven when the Wright brothers flew the first airplane and when I saw the first automobile in Evanston, Ill. Talkies, radio, TV, snappers, zippers, plastic film, stretch materials, electric kitchen equipment, vacuum cleaners, oil and gas heat, antibiotics, toxin-antitoxin, rockets, satellites, transoceanic telephones, direct dialing, atomic fission, microfilm, computers, miniaturization, solar heat, the stratosphere balloon, the bathyscaph, and space travel, among other things, have all happened in my lifetime.

Perhaps future changes will be in the field of communication, and not just in the technology of

communication. We may be learning how to communicate so as to bring about understanding and acceptance of individual differences as well as class, group, and national differences. Today we recognize but do not accept such differences. We pretend that since God is one and people are created in the image of God, all people must think and act alike. Today, we don't realize that since God is infinite, we who are finite but created in God's image must each be different from one another—different, not better or worse.

Maybe in 500 years we will be learning to recognize that diversity, rather than sameness, is the essential characteristic of unity. Maybe we will be learning how to communicate not for dominance, propaganda, or power, not just to achieve personal profit, glory, or

prestige, but to break the syndrome: "the rich get richer and the poor get poorer," the powerful get more power and the dependent greater dependence.

Maybe in 500 years education will be directed toward caring for and supporting one another so that war, crime, prisons, and mental illness, as well as hunger and want, will be experienced only existentially through history.

Jeannette Piccard

Piccard is one of several women ordained two years ago as priests in the Episcopal church. She is also an alumna of the University and an adventurer.

In 2477, capitalism and the profit motive have been gone for nearly 500 years, money is no longer being used for the distribution of goods, and all human activities are based on the relations of cooperation and assistance in an atmosphere in which the individual and social interests have become identical. The formerly mechanical and monotonous physical and mental labor are done by machines and computers.

Society has created the material and spiritual prerequisites for realization of the goals that the 20th-century socialist countries set for themselves: universal higher education as a means for ensuring the development to a maximum of human creative powers. The conflict between the two cultures—the technological and the aesthetic—vanishes as the creative element in human labor begins to govern the quality of the product of labor, the latter increasingly having the character of scientific knowledge; through the widespread use of automation and

computerization, this knowledge acquires material form.

The new society requires universal higher education. The idea that a university education should be restricted to a select part of the population appears just as ridiculous as a similar idea would have appeared in 1977 in reference to elementary education.

The internal development of the typical university during this transformation process could have been something like this:

The first major structural change was the vanishing of the Law School and General College, neither of which was needed any longer once corporate capitalism, and the poverty it gave rise to, were abolished. The College of Business Administration was replaced by the College of National Economic and Social Planning. The Institute of Technology was merged with the Colleges of Forestry, Agriculture, and Biological Sciences as industrial techniques began to dominate agricultural production and biological processes found increasing application in industry. These units, along

with the Medical School, were then integrated with the College of Liberal Arts as the natural, social, and aesthetic sciences established deeper interconnections. Because the stress on creativity requires extensive training in the arts as well as in the natural and social sciences, university graduates are people of broad culture.

Only the University of Minnesota was able to maintain most of its traditional curriculum during these 500 years. After seeing what the adoption of two courses on Marxism was leading to, the University channeled 97 percent of its research budget into a newly created College of University Administration. This new college enabled the University of Minnesota to resist the tide of social change by supplying the strategy to prevent the adoption of a third course on Marxism.

Erwin Marquit

Marquit, a professor of physics and occasional candidate for office, has been an advocate and teacher of courses on Marxism on the Twin Cities campus.

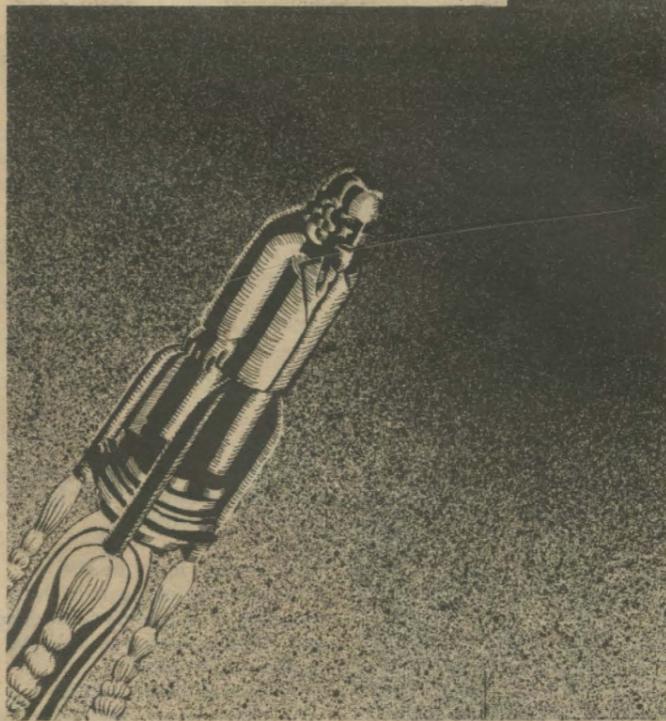
Erwin Marquit



TOM FOLEY

LISA BLACKSHEAR

Pillsbury Fellowship Relaunched as Presidents Club



Speaking of the future, and speaking of illustrious alumni and friends, there are some people who have put their money where their mouths are: the Presidents Club.

The Presidents Club used to be the John Sargent Pillsbury Fellowship, named after the 19th-century Minneapolis businessman, state senator, governor, and regent who single-handedly saw to it that the University made it to the millennium. Ten years ago there were only 100 fellowship members, people who made a gift to the University of \$10,000 in cash, \$15,000 in deferred giving, or \$1,000 per year.

Today, under the new name, the Presidents Club numbers 501 members, their names inscribed on a bronze tablet in the lobby of Northrop Auditorium.

Contrary to common knowledge, the University is not a state-supported institution, at least not completely. Private giving plays an important part in keeping the University going: the University ranked eighth nationally in the amount of private funds raised last year (\$27.1 million) and second among all public institutions.

If Minnesota makes it half way to the next millennium, it will be due in large part to these friends.



Donald K. Slayton

Education methods will have changed so drastically by 2477 that people of today would not recognize them. At the present time, we utilize a very small portion of our brains. As more is learned about this amazing part of us and our learning processes, education may well begin immediately after birth, if not before, through automated methods yet to be developed.

Education will be a continual process that will be a natural, normal, ongoing function carried on by each individual using these automated means. Vast information systems involving highly advanced miniaturized computers will have to be utilized by everyone—the way we now use a telephone or hand calculator—in order to allow immediate access to information that will be continuously changing and being updated.

Greater emphasis will be placed on testing of individuals, and more accurate methods of testing, probably automated also, will be used to determine where individual abilities and interests lie. Training in those areas will begin at an early age. With so much being handled by automation, I feel a tremendous emphasis will be placed on individuals developing to their

full potential, and the uniqueness and individuality of everyone will be recognized and appreciated.

As far as degrees to be earned are concerned, most of the areas in which we now offer degrees will not be necessary because information systems will have advanced to the point where computers far beyond our imagination will handle decisions now considered quite complex. Most problems that will have to be faced 500 years from now, and areas in which men's and women's minds and creative abilities will be required, would not even be recognized by us if we could hear the names and titles they will carry. People will be very specialized, and groups of experts will work together solving the problems of the times. It will be a vastly different society from the one we know today, one that will make ours appear very slow-paced and simple indeed.

D. K. Slayton
Alumnus "Deke" Slayton, one of the original seven astronauts, is still with NASA in Houston.



Thinking Thing

Edgar Allan Poe drew this "chess-playing machine," a device that caused quite a stir in Europe in the 19th century until someone opened one of the drawers and found a dwarf inside, making the decisions. Today, computers can play chess, table tennis, or respectable keyboard compositions, without a single dwarf inside. Jay Leavitt of the University's computer science department has been a leader in bringing together people from the fields of humanities and cybernetics.



Free Tuition? Don't Hold Your Breath

A long, long time ago, when the charter for the University of Minnesota was drawn up, the state instructed the University to eliminate tuition, as soon as income from University investments permitted.

Well, we're still waiting for that one. Instead, tuition costs have tended to represent 26.5 percent of instructional costs. In 1977, a resident student in the College of Liberal Arts pays \$221 for each quarter of attendance at the University, which suggests that the full cost of one quarter's education in CLA really costs about \$835.

At an annual inflation rate of only 5 percent, tuition in CLA in the year 2477 A.D. will be around \$55,250 per quarter. We know that sounds pretty bad, but it isn't really so bad when you consider that the *real* cost of educating that student for those 2½ months will be \$208,485.

That is, unless income from University investments suddenly—and substantially—picks up.



O. Meredith Wilson

Speculating about reality 500 years hence just doesn't come easily to me. Will increased carbon dioxide create a hothouse effect, raising the average temperature by 10 degrees; or will we be 300 years into an ice age? Will our numbers be increased by ten times; or will they be controlled by birth intervention measures and reduced by hunger, or by competition with insects immune to chemical pest controls? Will our population be predominantly 60 years and older; and who among the living will be productive? Will we have learned to live with our fellows of any race or persuasion; or will hate or suspicion have become a crippling canker?

I can speak better of the intervening years. If the University lives true to its tradition, keeping a proper balance between humane and technical disciplines, it will help each of the coming generations cope with its immediate problems. And it will keep Minnesotans in touch with what is good, true, and beautiful, so that the next following generation will still have the options that freedom provides as it confronts its own crises. Given continuous support, the University of Minnesota will help each succeeding generation succeed in its own time for long enough to make its present health important to us.

O. Meredith Wilson
Wilson was the ninth president (1960-1967) of the University of Minnesota.



Futurology in classical times comprised various techniques—for example, “incubation,” which was the practice of sleeping at a prophetic shrine, such as the temple of the healing god Asclepius at Epidaurus, for the purpose of receiving a dream vision. If it should be true, as some assert, that higher education has replaced religion as our highest spiritual value, incubation might be worth a try. On the other hand, perhaps the University as a whole should be compared with the famous oracle at Delphi, where predictive success seems to have depended in large part upon the efficient collection and use of information.

I do not propose to push a comparison of the University with Epidaurus or Delphi. Some state legislators think we are too “oracular” as it is, or at least that our budget predictions are. We try to make businesslike predictions, to project and create the future from lists, costs, ratios, and other figures. Although the political rationale may acquire a certain rhetoric of social accountability, we try not to rave like Cassandra, who used horrendous images of past sins to foretell future doom.

Nevertheless, despite our modern conviction that the future arrives with increased rapidity and despite our faith in progress, it is still possible to believe in curses. Thorstein Veblen’s *The Higher Learning in America* (1918) was a good (though somewhat oracular) description of a basic curse. It is also a manifestation of it, as symptomatic as it is analytical of our problems.

His thesis has become more and more familiar: the disintegrative

contradiction between the business principles and values according to which he believes a university is run and the disinterested advancement of knowledge (the higher learning) that is professed by that university to be its highest value and goal. Unless this curse is resolved, some of us will devise more and more businesslike methods of statistical presentation of our “output,” while others complain that the higher learning is not amenable to such (vulgar) treatment.

Thus the verbal manifestations of the curse will continue to be polarized. One pole will be practical, professional/vocational- and job-placement-oriented, accountable, and businesslike. The other will be scholarly and devoted to the disinterested accumulation of matter-of-fact knowledge.

But those who use this rhetoric without examining it will also be naively untroubled by inconsistency. Some of those who in the ‘60s were advocating “relevance” are now warning against “vocationalism.” They apparently do not see that both relevance and vocationalism are in conflict with the pure higher learning they are presumably advocating as the favored alternative.

The Veblenesque pattern could go on to the end of the world. In 500 years some may learn to be rhetorically consistent by claiming to oppose both relevance and vocationalism or the then equivalent catchwords, but the same will then turn around and devise and operate, for the approval and governance of academic programs, systems exhibiting businesslike features and performing businesslike actions that are based upon the

very principles to which their rhetoric, when examined, is opposed.

Hence, a nightmare vision of the future would have our academic decision-making councils behaving exactly as if the departments and schools of the University were competing department stores: three, four, or any number of University departments might do research and/or teaching in, say, statistics or Greek tragedy under rules against monopolies (competition on the sales level in research and teaching of the same subject packaged in different approaches will be viewed as productive, comparative data on student credit hours and national ratings as definitive). Approvals for undergraduate programs will be won through committees in charge of academic corners, pools, syndicates, trusts, and cartels.

At no time, especially in humanistic departments, will faculty colleagues collaborate



Robert Sonkowsky

except as motivated by these managing committees or their principles. Academic specialties may be perfectly well understood to have common interests, but they will be encased in a governance structure that bases division of labor on sound business principles that recognize not scholarly interdependence but the exigencies of the academic market. Undergraduate education will continue to be a large and active consumer market, but one manipulated most efficiently by pools of professional school faculty in IT, in Pharmacy, in the School of Theology, etc. Graduate education will be totally and grimly banalistic.

The entire University, and especially its “great men,” will, in the words of Cardinal Newman, “insist that Education should be confined to some particular and narrow end, and should issue in some definite work, which can be weighed and measured . . . as if everything, as well as every person, had its price; and that where there has been a great outlay, they have a right to expect a return in kind.”

Veblen put forward his solution to this sort of curse only “speculatively,” and, as was consistent with his side of the issue, “not seriously as a practical measure”: it was to abolish the presidency and board of regents, thereby both removing the appearance and popular appeal of a business corporation and causing the several schools and departments to revert to their pristine “small-scale parcelment and personal communion between teacher and student.” This is similar to the proposal in the ‘60s by one of the members of my

department that the chairmanship be abolished in order, he said, to confuse the administration.

The vision of the acephalous university or department rising up out of some Sleepy Hollow is suggestive, even archetypal: decapitation is revolution. What future will it produce? The professional schools will go their own way, wretched in banalistic isolation, their professors weeping on their computerized paycheck stubs.

The emphasis on the symbolism of cephalotomy, however, might in 500 years help to bring about a new CLA, devoted to pure liberal arts and called PLA. It will have three departments: Music, Mathematics, and Chess. It will, of course, have no heads, no plumbing, no money, no applied or clinical faculty (they will be in the professional schools or playing in the police band; former literature professors will be doing such things as coining sales terminology for Medtronics), and no undergraduate students whatever.

We will then in PLA have come home to that earlier paradise of “personal communion between teacher and student” mentioned by Veblen. For reasons of prestige and morale, honorary membership in PLA will be bestowed upon all professional school faculty except those from the Institute of Ecology, who will prefer not to have its bucolic purity adulterated or to leave its Eden even if it should need mowing.

Robert P. Sonkowsky
Sonkowsky is a professor in the Department of Classics.

As we approach the educational institution known as the University of Minnesota, we see a large transparent dome covering the institution, with a great many protruding aeri-als and telecommunications devices in evidence. It appears much smaller in size than the descriptions we've read lead us to expect.

Amazing, but the records indicate that the University, with its six domed satellite centers, serves the entire population of the state of Minnkotin in one way or another. It is interesting to note that some 50 years ago the boundaries of the states in the north-central area were changed so that Minnkotin includes the original state of Minnesota, parts of the original state of Wisconsin, and half of the original states of North and South Dakota. The government had become much too large and cumbersome for the population served, and the parliament of the United States had made the



Stanley Sahlstrom

decision to combine the populations of the smaller states. There are now only 20 such universities in the entire United States of America.

As we go through the airlock doors, we're impressed with the beauty of the landscaping and architecture of the University. With the entire University inside the dome, a standard temperature and atmosphere can be maintained and the architecture can be most unique. We are informed by President Verygood that very few formal classes are held on the campus. With the new developments in telecommunications, students are reached throughout the state in small groups in their respective localities and come to the University centers or to the Twin Cities campus only on rare occasions.

We're pleased to see a number of new disciplines combining studies that were previously separated. The dean of the College of Social Biology informs us that his college will be

disbanded this year, but that the courses will be included in offerings of the College of Psychobehavioral Biology and of the School of Human Studies within the College of Human Services. Programmed learning prevails in all disciplines, and diagnostic laboratories are used to determine levels of performance for entry into the various modules.

A great deal of learning is done through the concept of reaching the subconscious mind. A sample of students are housed in live-in centers where they have special learning caps that are put on every evening prior to retiring; these caps with their many microscopic components feed learning into the mind. The caps also can be put on at any time during the day for additional inputs to the mind. There has been such an accumulation of knowledge that without this new approach to learning the students would find it impossible to acquire the depth of knowledge necessary in their disciplines.

A visit with Dr. Huegson of the Institute of Natural Resources leads to a fascinating exposition on research in the new foods and fibers now being developed. In his usual flamboyant fashion, Dr. Huegson extols the virtues of the new varieties of seed plants and aquaculture and of sea farms producing on the ocean floor. He informs me that the new developments in hybrid soyalfa crops are extremely promising for meeting the protein needs of the human body. The experimental mines on the moon are yielding good results in terms of fertilizer supplies. There is some animal protein available through swine production, but most protein needs are met through plants. The old DNA experiments have substantially shortened the time for developing new varieties.

The director of plant services, Mr. Sodenstrom, informs us of the special material in the dome that screens out ultraviolet rays and other possibly dangerous radiation. A unique machine for communicating with other planets has just been developed in the communications laboratory of the Technical Engineering College. In addition, this college takes credit for the development of the new capsule for individual travel from place to place. The capsule travels at approximately the speed of light.

Constant communication takes place with other universities, both in the United States and abroad. However, the philosophy governing University activities emphasizes service to the people of the state, and research, teaching, and service are always the guiding principles.

Stanley D. Sahlstrom
Sahlstrom is provost of the University of Minnesota Technical College, Crookston.

Since the designation of the University of Minnesota as a National University by the federal government in the 21st century, profound changes have occurred. The National University of the 25th century has become part of the National and International Repository of Information and a Center for Research and Technology with a special regional role in the creative arts.

The University budget is the largest in the University's long history, yet its human resources are fewer than at any other time in the last 200 years. It has been 500 years since the Twin Cities campus of the U of M was the largest single campus in America.

As the faculty has been reduced in number, likewise have student numbers been reduced. All students are accepted by invitation only from national and international lists and serve as assistants, associates, and interns; they receive total government support. Additional students of all ages are associated with the University through direct access to informational services from small centers throughout the nation. The awarding of degrees that characterized the early centuries of the University has been replaced with achievement-oriented competency levels.

The faculty, with years of apprenticeship training, have been selected from throughout the world, and the academic organization of the University represents major scientific research and creative arts centers, each associated with the



Rodney Briggs

National Repository. The major on-campus instructional role is in the creative arts, including the art of information transferral and storage. Faculty appointments are by invitation and are rotated among the various National Universities, with 10 years as the maximum limit for service to any one institution.



Man of Steel Or Dated Hack?

Superman's exotic powers have not stood the test of time. Since the Man of Steel's creation in the '30s, ordinary people have come into their own share of powers. At University Hospitals, X-ray scanning machines have rendered obsolete the old-fashioned X-ray machines for use in brain and body scanning, and Superman's vaunted X-ray vision as well.

Mass spectrometers manufactured at the University under the guidance of their inventor, A. O. C. Nier, made the first tests in the Viking probe's Mars landing.

The University's 60-inch infrared telescope at Mt. Lemmon, Ariz., can pierce through the blackness of outer space, to Krypton and beyond.

The University, with national and regional responsibilities for medicine, engineering, agriculture, business, and the creative arts, provides services for all professions by channeling directly into the updated informational repository. Hence diagnostic information for medicine, case information for lawyers, planning information for businessmen, and seasonal environmental information for food producers is available.

The University of the 25th century has become a center for

research—the expansion of knowledge and the creative arts—yet it fulfills its long-term mission of service, research, and instruction.

Rodney A. Briggs
Briggs, formerly provost of the University of Minnesota, Morris, has been president of Eastern Oregon State College in La Grande for the past few years.

WHAT CAN YOU DO FOR MINNESOTA?

Your friends or relatives could be among those listed below who have been lost in the University of Minnesota's official alumni records. They are individuals who have been unable to maintain those special contacts with classmates and collegiate faculty who have touched their lives and careers.

If you can help us find them, both your friends and the University of

Minnesota will benefit. And you will have the satisfaction of knowing that you have helped the University of Minnesota expand its outreach to maintain that margin of excellence that enables the University to stand tall today.

Please fill in the coupon accompanying these listings if you can help. Our lost alumni and our University thank you.



1920

- Aalbue, Rev. J. P. (SLA)
- Aass, Mr. B. (Dent)
- Abramson, Miss V. V. (HEC)
- Adam, Mr. R. E. (Ag)
- Altman, Mr. G. T. (SLA)
- Appleby, Dr. John I. (Med)
- Aske, Irving E. (IT)
- Barr, Miss G. E. (UMD)
- Bean, Mrs. T. S. (SLA)
- Broughton, Ms. P. F. (SLA)
- Burnham, Mrs. H. A. (Ed)
- Daniels, Dr. Harry A. (Med)
- Dvorak, Mr. A. (Ed)
- Epple, Mr. W. J. (SLA)
- Fitzgerald, Mr. W. J. (IT)
- Foss, Dr. Allen R. (Med)
- Griffith, Mrs. C. E. (Ed)
- Gunine, Mrs. M. (HEC)
- Harris, Mr. H. H. (Law)
- Hesnault, Mr. W. J. (SLA)
- Humes, Miss R. (SLA)
- Isaac, Leo A. (Ag)
- Kellogg, Mrs. Rhoda B. (SLA)
- Kinsman, Dr. Frank C. (Med)
- Knowles, Mr. E. H. (IT)
- Langhoff, Dr. Arthur H. (Med)
- Leins, Herbert (SLA)
- Leisen, Mr. R. J. (Law)
- McNally, Miles H. (SLA)
- Mossiner, Mrs. M. M. (SLA)
- Muller, Dr. Rudolph T. (Med)
- Peterson, Mr. C. D. (IT)
- Rich, Miss N. M. (UMD)
- Robinson, Mrs. G. M. (SLA)
- Salisbury, Dr. J. A. (Dent)
- Shepard, Dr. William P.
- Slater, Mrs. F. M. (SLA)
- Stanford, Mrs. L. F. (SLA)
- Styles, Mr. W. V. (Bus)
- Sullivan, Dr. R. M. (Med)
- Taylor, Dr. P. S. (Dent)
- Thompson, Miss A. (SLA)
- Uppgren, Mrs. Marion A. (SLA)
- Vallacher, Mr. T. L. (IT)
- Wallin, Mr. S. A. (Ag)
- Weber, Jr, Mr. L. J. (IT)
- Westberg, Miss A. E. (Ed)

1921

- Anderson, Carl R. (Law)
- Anderson, Ms. E. A. (Grad)
- Belley, Mrs. L. L. (SLA)
- Bozer, Dr. H. E. (Med)
- Bray, Mr. C. W. (Ag)
- Cannon, Mrs. H. S. (SLA)
- Comartin, Dr. E. E. (Dent)
- Davies, Herman F. (IT)
- Dimond, Dr. D. S. (Med)
- Gilman, Dr. Gertrude M. (Bus)
- Hauge, Mr. V. R. (SLA)
- Haupt, Rev. David R. (Ed)
- Hill, Mrs. H. H. (HEC)
- Horeus, Albert C. (MortSci)
- Jefferson, Mrs. H. (Ed)
- Matsner, Dr. Eric M. (Med)

- McLean, Milton D. (IT)
- Murphy, Dr. Edward J. (Dent)
- Murphy, Miss E. C. (SLA)
- Neal, Mrs. N. (HEC)
- O'Keefe, Mr. T. (Ed)
- Prentice, Dr. John W. (Med)
- Robinson, Dr. Byron L. (Med)
- Rogers, Dr. Richard S. (Med)
- Sansby, Dr. J. Martin (Med)
- Sebenius, Carl H. (IT)
- Strong, Dr. George F. (Med)
- Taylor, Mr. A. H. (Phm)
- Wills, Mr. A. D. (IT)

1922

- Abrahams, Mrs. O. H. (SLA)
- Babcock, Loren C. (Law)
- Berkman, Mrs. J. (SLA)
- Carleton, Mrs. H. (Ed)
- Chambers, Mrs. J. B. (Nurs)
- Chang, Mr. C. P. (IT)
- Chernus, Mr. M. C. (IT)
- Colberg, Dr. A. J. (Med)
- Crim, Dr. Eleanor (Med)
- Doolittle, Mrs. C. W. (Bus)
- Dresser, Claude O. (MortSci)
- Dunn, Dr. Halbert L. (Med)
- Dwyer, Mrs. J. D. (SLA)
- Farley, Mr. M. F. (Grad)
- Gilbert, Dr. Harry (Med)
- Grettum, Mrs. L. A. (SLA)
- Hansel, Dr. French K. (Med)
- Hanson, Dr. C. W. (Dent)
- Hassett, Dr. Roger G. (Med)
- Heckler, Dr. H. G. (Dent)
- Hendrickson, Mr. A. B. (IT)
- Jessup, Mr. L. A. (Grad)
- Johnson, Ms. R. E. (Ed)
- Kumm, Mr. A. W. (IT)
- Lin, Mr. Sze C. (IT)
- McMillen, James S. (IT)
- Onkka, Mrs. G. (SLA)
- Parks, Dr. D. M. (Dent)
- Ransom, Mr. G. (IT)
- Rollins, Miss Ruth (HEC)
- Rotnem, Victor (SLA)
- Sirich, Mrs. E. H. (SLA)
- Swennes, Mrs. H. (Ed)
- Thayer, Mr. B. W. (For)
- Von Eschen, Leonard A. (SLA)
- Weinert, Mr. A. J. (Dent)
- Wilkur, Ms. Dorothy (SLA)

1923

- Aaser, Mrs. H. H. (Grad)
- Aasland, Arne E. (IT)
- Barich, Dr. F. T. (Dent)
- Barich, Mrs. F. T. (HEC)
- Bartlett, Mr. V. L. (Bus)
- Brown, Mrs. Loretta P. (SLA)
- Brown, Mrs. P. (Ed)
- Burton, Mrs. Eloise (HEC)
- Carlson, Jr., Carlyle R. (Ag)
- Cooke, Dr. Harry H. (Med)
- Copeland, Mr. F. E. (IT)
- Crawford, Dr. William H. (Dent)
- Cullen, Dr. V. R. (Dent)

- Dahlstrom, Mrs. A. (Ed)
- Fredrickson, Dr. Clyde H. (Med)
- Fuller, Mr. A. (Law)
- Goldstein, Mr. D. A. (SLA)
- Gronvall, Dr. Paul R. (Med)
- Gupte, Dr. Vasaut S. (Med)
- Gydesen, Dr. Carl S. (Med)
- Hager, Dr. N. S. (Dent)
- Haglund, Mr. A. N. (SLA)
- Heimark, Miss E. S. (Ed)
- Herman, Mr. N. G. (Bus)
- Hilger, Sister M. (SLA)
- Hoffman, Mrs. Beatrice (HEC)
- Jacoby, Dr. Lionel A. (Med)
- Johnson, Mr. H. L. (Ag)
- Johnson, Mrs. Helen J. (HEC)
- Lewis, Dr. D. J. (Med)
- Lewis, Dr. Joseph L. (Med)
- Lobenstein, Mrs. Edna M. (HEC)
- Loenholdt, Mrs. F. (Ed)
- Loughin, Charles A. (Law)
- Lundberg, Mrs. A. (UMD)
- Matheis, Miss Helen H. (HEC)
- McKenzie, Mrs. Eleanor M. (SLA)
- McManus, Mrs. F. J. (SLA)
- Mead, Mrs. C. H. (UMD)
- Murphy, Mrs. C. Eveline (Ed)
- Nicholas, Mrs. J. H. (UMD)
- O'Hara, Mrs. R. M. (SLA)
- Patterson, Mrs. J. P. (Ed)
- Pedersen, Miss B.G. (Ed)
- Peterson, Ms. G. M. (Ed)
- Peterson, Mr. C. E. (IT)
- Reuter, Mrs. Dorothy (HEC)
- Sandstrom, Dr. R. O. (Dent)
- Shepard, Dr. C. E. (Med)
- Swift, Mrs. Edith M. (HEC)
- Talbot, Dr. C. H. (Dent)
- Thiele, Mrs. Jeannette (SLA)
- Trafzer, Miss R. E. (Ed)
- Trask, Mr. A. M. (IT)
- Westberg, Miss A. M. (UMD)
- Williams, Roy N. (IT)

1924

- Aarseth, Mr. E. J. (Ag)
- Aaser, Mr. H. H. (Dent)
- Anderson, Miss E. M. (Ed)
- Anderson, Mr. C. J. (Ed)
- Anderson, Mrs. Harriet D. (SLA)
- Bailey, Dr. D. L. (Grad)
- Bigelow, Mr. A. E. (SLA)
- Blien, Phillip J. (Bus)
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- Chapman, Mr. D. V. (Bus)
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- Daggett, Mrs. E. (SLA)
- Eberson, Dr. Frederick (Med)
- Fischer, Dr. Mario M. (Med)
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- Font, Dr. P. S. (Dent)
- Garvey, Mrs. A. L. (Ed)
- Goldstein, Mrs. D. A. (SLA)
- Grummann, Mr. H. R. (Grad)
- Hankins, Mr. N. R. (IT)
- Haugen, Mrs. Clara (HEC)
- Hayden, Mr. C. E. (IT)
- Heaton, Mr. P. C. (SLA)
- Herberg, Mr. E. C. (Bus)

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- Kinter, Mrs. G. A. (Nurs)
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- Larson, Mrs. W. W. (Nurs)
- Liegl, Mrs. E. (Ed)
- Lobeck, Mr. T. E. (IT)
- MacMillan, Miss K. V. (Ed)
- Magoon, Mr. H. A. (IT)
- Marshman, Mr. I. H. (IT)
- Marshman, Mrs. I. H. (Ed)
- McGregor, Mr. F. A. (IT)
- Mesker, Mrs. D. L. (Nurs)
- Mills, Dr. James T. (Med)
- Nelson, Albin C. (For)
- Peckham, Mr. E. L. (Bus)
- Phelan, Jr., Mrs. J. A. (Ed)
- Polzak, Dr. Jacob A. (Med)
- Schild, Dr. Emmett L. (Med)
- Schutz, Dr. J. J. (Med)
- Shoemaker, Miss M.S. (Nurs)
- Sorenson, Herbert F. (Ed)
- Thomas, Mr. W. A. (IT)
- Thomey, Ms. P. N. (HEC)
- Torell, Miss I. M. (UMD)
- Tuttle, Mr. S. B. (IT)
- Wenger, Jr., Mrs. J. (DentHyg)
- Wilson, Miss R. H. (HEC)

1925

- Abrahamson, Mr. O. M. (Ag)
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- Baumont, John H. (Ag)
- Becker, Mrs. L. A. (Ed)
- Bersuch, Mrs. O. (UMD)
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- Bracher, Richard G. (Bus)
- Brown, Ronald L. (SLA)
- Buchta, Dr. William (Grad)
- Bustamente, Mrs. Alice May (HEC)
- Cragie, John H. (Ag)
- Delougherty, Dr. Joseph T. (Med)
- Delury, Mr. J. S. (IT)
- Fahland, Earl S. (Ed)
- Fetter, Dr. Mary (Med)
- Glyer, Mrs. E. A. (UMD)
- Gratzek, Dr. Frank R. (Med)
- Grinnell, Dr. John E. (Grad)
- Grogan, Mrs. Harriet K. (HEC)
- Gruetzmacher, Mrs. Lucy (HEC)
- Grundemeir, Mr. E. F. (SLA)
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- Johnson, Mrs. Henrietta (HEC)
- Krumwiede, Mrs. Faith G. (Ed)
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- Landy, Meyer E. (Law)
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- Lowe, Dr. Maurice A. (Dent)
- McDonald, Dr. Robert E. (Med)
- Nelson, Mr. Linnette I. (Ag)
- Nelson, Ms. Matilda (HEC)
- Nichol, Frank E. (IT)
- Nordin, Leonard A. (Bus)
- O'Brien, Miss E. (UMD)

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- Peltier, Miss E. E. (UMD)
- Perry, Dr. Oliver H. (Med)
- Peterson, Ms. Genevieve A. (HEC)
- Radder, Ms. Elsie Fjelstad (HEC)
- Raymond, Mrs. J. T. (Ed)
- Rose, Mrs. Helen W. (UMD)
- Schenckloth, Mr. H. (IT)
- Seitz, Mr. R. G. (Bus)
- Sherwood, Dr. Kenneth K. (Med)
- Sodoma, Joseph (IT)
- Styer, Mrs. Dorothy P. (HEC)
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- Tallon, Mrs. Elizabeth M. (HEC)
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- Warhol, Mrs. Martha C. (HEC)
- Whiting, Mrs. Florence M. (HEC)
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- Wolf, Milton C. (IT)
- Youngquist, Eder B. (IT)

1926

- Berg, Mrs. L. A. (SLA)
- Bigler, Dr. Mary F. (Med)
- Campbell, Mrs. O. J. (Nurs)
- Cole, Ernest C. (IT)
- Deinard, Mrs. B. S. (Grad)
- Dennis, Mrs. Jeannette E. (HEC)
- Dixon, Charles F. (Med)
- Gilderhus, Mrs. W. H. (Ed)
- Hanson, Mrs. Gordon G. (Nurs)
- Hartnett, Mrs. L. F. (Ed)
- Hawley, Mrs. J. M. (Ed)
- Heiam, Dr. William C. (Med)
- Hilgedick, William C. (IT)
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- Johnson, Edward W. (Bus)
- Johnson, Mrs. Edward W. (Bus)
- Johnston, Dr. Russell D. (Dent)
- Katz, Gerald D. (SLA)
- Kelley, Mrs. S. R. (Ed)
- Kobe, Dr. Kenneth A. (IT)
- Lamb, Mrs. W. (Ed)
- Lostrom, Herbert W. (IT)
- Mahoney, Mrs. R. E. (SLA)
- Makens, Royal F. (Ed)
- Masters, Dr. Elson J. (Med)
- McLaughlin, Mrs. J. (Nurs)
- Mirviss, Jacob (Ed)
- Norman, Russell A. (Bus)
- Ochsner, Mrs. Julia C. (SLA)
- Olsgard, Mrs. Clarence E. (Ed)
- Olson, Mrs. William H. (HEC)
- Olson, William H. (Ag)
- Peterson, Henry A. (Ed)
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- Pierce, Walter H. (IT)
- Polski, Mrs. A. (UMD)
- Reeves, Dr. Harold B. (Dent)
- Rigor, Dr. Tomas V. (Ag)
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- Snow, Phillip C. (Ed)
- Sundheim, Mrs. Marcus G. (Ed)
- Trytten, Mrs. E. G. (UMD)
- Wentz, Edward C. (IT)
- Williams, William R. (IT)

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 Ayers, Mrs. R. (Ed)
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 Blanding, Miss Ruth J. (Nurs)
 Britts, Charles W. (SLA)
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 Peterson, Mrs. E. (UMD)
 Peterson, Mrs. I. Emerick (SLA)
 Pierce, Mrs. W. H. (Bus)
 Prince, Mrs. M. H. (Ed)
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 Spencer, Miss Ruth L. (Ed)
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 Wilson, Eghert C. (IT)

1928

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 Crandell, Mrs. A. (Ed)

Dahlen, Dr. P. G. (Dent)
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 Delong, Walter A. (Grad)
 Donnelly, William D. (Law)
 Drake, Richard M. (Ed)
 Edelmann, Arnold M. (Law)
 Ekman, Harold (IT)
 Emerson, Miss Lucile L. (Grad)
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 Olund, Dr. Earl R. (Dent)
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 Thoen, Miss T. E. (Nurs)
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1929

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 Foss, Arbie (IT)
 Grant, John W. (IT)
 Harcey, Sister Y. (Grad)
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 Henderson, Mrs. Severa B. (Nurs)
 Hersh, Dr. Saul T. (Med)
 Hoel, Dr. Paul G. (Ed)
 Hoel, Mrs. Hazel (SLA)
 Hoeper, Dr. Philip G. (Med)
 Howerton, Mrs. Jean (SLA)
 Jorris, Dr. E. Hall (Med)
 Katter, Mrs. Lincoln F. (Grad)
 Kingston, Mrs. S. Paul (Ed)
 Knutson, Mrs. Kermit (Ed)
 Larson, Mrs. Nellie G. (SLA)



Lindquist, Miss L. M. (UMD)
 Lindsey, Mrs. Douglas W. (HEC)
 Loenholdt, Fritz (Ag)
 Mass, Dr. Max (Med)
 McCann, Mr. J. C. (Grad)
 McGregor, Mr. W. G. (Grad)
 Moberg, Cornell (Phm)
 Morgan, Russell C. (Ag)
 Morse, Hayes L. (Law)
 Nemeroff, Mrs. Celia S. (HEC)
 Owens, Mrs. Clarence G. (Nurs)
 Roach, Miss Mary M. (Ed)
 Rollin, Vern G. (IT)
 Santo, Louis W. (IT)
 Schmitz, Sister R. E. (Grad)
 Schochet, Nahman (Law)
 Silker, Dr. Harold G. (Dent)
 Sorenson, Mrs. Herbert F. (HEC)
 Strand, Dr. Leif R. (Dent)
 Sutherland, Mrs. Edwin H.
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 Waisanen, Miss J. S. (UMD)
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 Wilson, Mrs. Kentner L. (Ed)
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 Yohe, Robert V. (Grad)

1930

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 Bracher, Mrs. Richard G. (IT)
 Brekke, Dr. Harvey J. (Med)
 Brown, Dr. Donald H. (Dent)
 Burke, Dr. C. F. (Med)
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 Luther, Mrs. R. H. (HEC)
 Mason, Dr. J. B. (Med)
 McQuoid, Donald T. (For)
 Mears, Mrs. Ann W. (SLA)

1931

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 Bingham, Erwin W. (IT)
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 Campbell, Mrs. K. S. (Bus)
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 Crosby, Robert B. (SLA)
 Danchertsen, Ms. J. D. (DentHyg)
 Edwards, Joseph (Grad)
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 Hasler, Jr., Mrs. W. T. (Nurs)
 Houpt, Mrs. Donald T. (Ed)
 Huchthausen, Paul A. (Grad)
 Hunt, Rokley W. (For)
 Jennings, Gordon J. (IT)
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 Kamish, Miss Mayme C. (Nurs)
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 Kerlan, Dr. Irvin
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1932

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 Beach, William E. (IT)
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 Burgdorf, Ms. Arlene (Ed)
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 Byrne, John P. (IT)
 Carpio, Jose Pulido (Bus)
 Carpio, Simplicio D. (Law)
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 Griffith, Mrs. F. S. (MedTech)
 Hanson, Gordon G. (Law)
 Henry, Dr. Clarence J. (Med)
 Hicks, Harold S. (IT)
 Hirst, Mrs. Ardath E. (HEC)
 Hoeft, Mrs. William F. (MedTech)
 Hoeft, William F. (SLA)
 Jeffrey, Mrs. Mildred M. (SLA)
 Johnson, Ben C. (Phm)
 Kiesner, Mrs. W. F. (SLA)
 Kincaid, A. Douglas (UMD)
 Klapotz, Mrs. C. C. (Nurs)
 Laufer, Sister T. (MedTech)
 Lieberman, Dr. Nolton S. (Med)
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 Lund, A. Frances (Bus)
 Lundell, Wilbur H. (Ed)



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 Lynn, Robert L. (SLA)
 Manning, Mrs. Moira C. (MortSci)
 Matheson, Archie F. (IT)
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 McGhee, Kenneth M. (Bus)
 Miller, Mrs. Robert E. (SLA)
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 Raymond, Dr. John H. (Med)
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 Wilkinson, Miss Marguerite E. (Ed)

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 Baumann, Fred W. (IT)
 Boland, Mrs. Rachel (Nurs)
 Bradbury, W. Edward (IT)
 Bregman, Mrs. Minnie (MedTech)
 Brimhall, George B. (IT)
 Bruntlett, Robert E. (IT)
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 Campbell, Dr. O. J. (Med)
 Carlsen, Mr. H.S. (IT)
 Chaput, Mrs. J. W. (MedTech)
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 Dahl, Wallace M. (Bus)
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 DeLong, Dr. Everett W. (Med)
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 Falchero, Sister M. L. (SLA)
 Fawcett, William L. (IT)
 Gilstad, Mrs. L. (SLA)
 Goldblum, Kenneth B. (IT)
 Gustafson, Walter (IT)
 Hanson, Dr. Warren J. (Med)
 Hanson, Mr. Marlys (Law)
 Harris, J. Arthur (SLA)
 Haven, Ross W. (For)

Havstad, Zena H. (IT)
 Haxby, Robert O. (IT)
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Northmen Not Lazy

I would like to correct a glaring error and mention one omission in Ronale Sayre's review of *Sweden: The Nation's History*, by Franklin Scott.

First, the Swedish Northmen, or Vikings (Swedish *Viks* or *fjords*???) had little or nothing to do with the Viking invasion of western Europe. The Danes' major effort was against England, the Norwegians concentrated on Scotland, Ireland, and other islands (the Orkneys, Shetlands, Iceland, Greenland). Both invaded France, Spain, and Sicily, causing the prayer of the faithful: "From the fury of the Norse, O Lord deliver us."

Also, France gave Normandy to an army of mixed Danish and Norwegian Vikings headed by Gange Rolf, or Rollo the Walker, who was so nimble he got his kicks by walking on the oars of his Viking ships while in use, without a miss. He was an ancestor of William the Conqueror.

Now: were the Swedish Northmen of that time resting on their oars? Not at all! Debouching out from their Baltic homeland, they invaded European Russia and with a succession of leaders—Rus (Rurik), Oleg (Helgi), Igor (Mgvar), and others—established the first stable government for 300 years in that troubled land, with headquarters in Novgorod and Kiev. There, restless, they became explorers, traders, and merchants and opened the first trade routes from the Baltic to what is now Istanbul—the Miklagard or Byzantium, later Constantinople.

How? By sailing their long ships from the Baltic up the north-flowing Dvina River to near the mouth of the Dnieper (south-flowing) River and rolling their ships on logs between the two rivers. Then they sailed to the Black Sea, from whence they sailed to Miklagard. This route has



attributed to Carr are false, or overblown.

In a publication existing to raise funds for a respectable University, such an article has no place. Accordingly, I am ceasing my contributions to the U of M Foundation.

Christian S. Rondestvedt, Jr.
Wilmington, Del.

More of the Same

A graduate of the Missouri University School of Journalism had better not write such a piece of lousy journalism or I'll withdraw all my alumni payments!!!

Glenn Hensley
Editor, *Farm Power & Equipment Magazine*
St. Louis, Mo.

Get Well

I am writing to see if you know Christian Barnard's address. I read

are controlled by the same people. Communism and Socialism are simply cheap labor schemes on the part of multinational corporations and the financial elite of the world.

I wonder if you have the guts to let me know your true beliefs with regard to our Constitution and system, so that I can determine if you are a dupe, misinformed, or part of a conspiracy to destroy our Constitution. Let me know.

Doug Parsons
Bellevue, Wash.

No Complaints

Thanks for bringing us a terrific paper with good editing and a good format—and good reading. During the past few years, my husband and I have moved three times, and each time *Update* has gone with us. We've become exceedingly proud to be alumni along with all those fantastic people you write about.

We love the paper!

Donna Salmon Borski, '61
Newton Center, Mass.

Thanks! If other people are having trouble getting their copies, or would like to get *Update* free, use one of the coupons in this issue.

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been known in history as *Sustvegr* or *Oestvegr* ("The Eastern Way"), and it was exclusively a Swedish development.

So while I fault Ms. Sayre or Mr. Scott in talking about Swedes going west to Greenland (and presumably points in between), kudos are theirs for an equally important expedition on "The Eastern Way."

Haakon B. Groseth
Sarasota, Fla.

Living in the Ozone

I was very much distressed by the intemperate article by Michael Finley. He is being sensational, rather than factual. He—or Prof. Carr—is prejudging a scientific controversy where all the evidence is not in. Many of the quotations

in the *Star* that he has arthritis bad and has to retire soon. I feel sorry for the poor man. He has done so much for the people. I have a book on arthritis and rheumatism which has cured me. I want to send it to him. Please send me his address so I can.

Pauline Dehart
Crete, Neb.

Nature of the Conspiracy

The cartoon on the back page [Summer 1977] is an atrocity, and makes me wonder how you expect to promote the University when you are obviously promoting Socialist artists. Let's call [Fort] Velona what he really is—a Communist. Communism is simply a cheap labor scheme, and of course Fascism is the same thing. As an editor you should know that Communism and Fascism

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