ME Update

A publication of the Department of Mechanical Engineering/Iowa State University/Ames/Iowa

Vol. 1, No. 1 **November 1983**

James E. Bernard

Dear Alumni,

As a newcomer to this campus, I have been very impressed with the interest and involvement of you, our ME alumni. So I am happy to have the opportunity to communicate with you through this new forum, the *ME Update*. This issue, and those to follow, will help keep you informed about your department.

This issue highlights three important instances of alumni support. On this page, you will read about the generous gift of Mr. and Mrs. Engel. Page 3 explains how David Garfield and Lowell Lauver were instrumental in arranging the gift of two compressors which are slated for use in the new building. And on page 7, Henry Black presents some details of the Black-Hilstrom Fund. These gifts are helping the department to be exciting and vigorous enough to attract and retain excellent faculty in today's highly competitive marketplace.

ME Update will also enable us to let you know more about our faculty. This issue will introduce you to one new faculty member, Robert Brown, who joined us is September. Depending on your graduation date, you will also be either introduced or reacquainted with several others.

This is a time of change for us. Each day brings renewed interest and anticipation as we observe the rapid progress of the new building. This time also brings the opportunity to lay the foundation for an even better department. I believe that our faculty is ready for the challenge. I hope many of you will be able to help as we seek further private support in the months ahead.

If you can come to campus, please stop in to see the construction and visit with us. We feel that you are an important part of the ME department and we welcome your interest and your involvement.

James E. Bernard
Chairman

Major Gift Aids Department

A major contribution of $206,000 has been received by the department, a gift from Raymond A. Engel '29 and his wife, Kathryn. Explaining the thinking behind the gift, Engel says, "Kathryn and I believe that Iowa State has one of the best mechanical engineering departments in the country. I've hired a number of outstanding people from the department. The education I received at ISU served me well throughout my career and I feel that our son, who graduated with a B.S. in ME in 1960 and a Master's in 1963, received an education that was as good if not better than mine. I wanted to give something back to Iowa State to repay the institution for all that it's done for me.

"The State of Iowa does its part to support its public universities, but I firmly believe that it's going to take substantial private giving to guarantee the continuance of excellence in our Department of Mechanical Engineering. The department must be able to attract faculty and graduate students who are dedicated to teaching and who can also excel in research and scholarly pursuits. That means making the academic world as exciting as industry. It means having state-of-the art equipment, special research grants, contingency money to send people to conferences and seminars and to bring lecturers and business leaders to the campus. It means having scholarships available to attract outstanding undergraduates.

Ray and Kathryn Engel

"I find it rewarding and meaningful to be able to give support which can be used to make exciting things happen in the department and the university I care about."

—continued on page 2

Engel, a resident of Marshalltown, Iowa, now retired, was formerly a vice-president of Fisher Controls Company. He received Iowa State's Professional Achievement Citation in Engineering in 1969 and an Alumni Medal in 1983.

To Enhance or Not to Enhance . . .

What does a ME faculty member do with all his extra time when he retires simultaneously as Department Chairman (after 11 years), Chairman of the ASME Heat Transfer Division, U.S. (AIChE) Representative to the Assembly for International Heat Transfer Conferences, and Chairman of the Heat and Mass Transfer Group under the U.S./U.S.S.R. Agreement on Scientific and Technical Cooperation? Art Bergles faced this question on July 1 of this year as he became simply Professor of Mechanical Engineering (and Anson Marston Distinguished Professor of Engineering). Judging from his pace and cluttered office, however, it has been hard to discern that anything has changed. "But they have," he quips. "It is just that Parkinson's Law is in effect and new activities have moved in to fill the time available."

These new activities relate primarily to the study of enhanced heat transfer, a subject that has occupied his attention for the past 20 years. Energy and material savings considerations, as well as economic incentives, have led to recent expansion of efforts worldwide to produce more efficient heat exchange equipment. These efforts center on increased convective heat transfer coefficients and are referred to as heat transfer enhancement. The ISU Heat Transfer Laboratory, established by Bergles in 1972, is an international documentation center for research work in this area. Nearly 4000 technical papers, reports, patents, and manufacturers' publications, dating from 1861, are filed in the lab. But the heart of the lab's efforts in this area focuses on a dozen M.S. and Ph.D. research students who are answering fundamental questions about many of the 14 basic enhancement techniques. A partner in the lab from the beginning, Professor George Junkhan, conducts his own studies of enhancement and is the lab data acquisition system specialist.

A typical research project is that just undertaken by Bergles, Asst. Prof. Mike Pate, and Graduate Assistant Jatin Khanpara. Arco Metals is sponsoring a study of enhanced tubing for refrigerant condensers and evaporators used in air conditioning systems. Their objective is to produce an inside surface configuration that will have thermal performance and cost effectiveness superior to not only the conventional plain tubing but also to the sophisticated surfaces now appearing in Japan.

Mike Pate joined the department in 1982 after a stint in General Electric's Advanced Reactor Systems Department in Sunnyvale, CA. He received his Ph.D. from Purdue, M.S. from Arkansas, and B.S. from the U.S. Naval Academy. Prior to undertaking his graduate studies, he served for 5 years as Engineering Officer on a U.S. Naval Nuclear Submarine. His dissertation was on heat transfer in refrigeration systems, so it was natural that he joined forces with Bergles as part of his research development efforts. The boxscore for their combined efforts stands at one proposal rejected, one pending, and one accepted—the Arco job. Bergles and Pate are now seen regularly in the lab with Khanpara scrounging components for a new apparatus which will hopefully be on line in time to meet the sponsor's schedule. Pate was overheard to remark that he hoped the pending proposal isn't successful. Bergles, on the other hand, mused that when it comes to contract research, there is no steady rain, it's downpour or drought. He does stress the difficulty of getting started in research, due to the increasing competition for funding. He noted recently, "To me, seeing young faculty getting established in research is more important than personally educating more Ph.D.'s."

But what about the rest of that time freed up from academic and heat transfer administration? There are a few things left, admits Bergles, such as ASME Vice President for Professional Development, Steering Committee for the new NSF Thermal Sciences Program, and lectures on nuclear reactor heat transfer in Argentina. "Above all," he said, "I want to finish the book on enhanced heat transfer, as the accumulated understanding is just about to the point where we can advise whether to enhance or not to enhance."

Student Engineers Design Mini Baja Buggy

One of the most enjoyable projects ME students tackled last year was the designing and building of a dune buggy which was entered in the Society of Automotive Engineers Mini Baja competition.

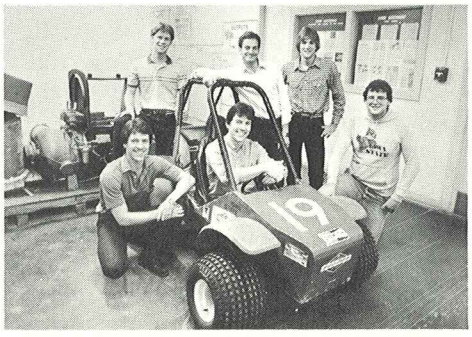
"We were one of 20 schools to enter the contest," says Jim Heise '85. "We had a great deal of fun putting the machine together and then racing it at Lake Mills, Wisconsin, where the Midwest Mini Baja Contest was held. Our machine came in 12th."

The project began when Briggs and Stratton gave the students an engine. The students had to come up with the body of the buggy and all other parts. This involved raising support to carry on the project.

Says Heise, "Our machine was judged on design, safety, performance, cost and endurance. We had to build the buggy in such a way that it could be mass produced and so that it would endure a two hour long race on the Lake Mills motocross track. The experience we gained in this, our first year of competition, will serve us well in the future."

Helping Heise with Iowa State's first entry in the Mini Baja was Jim Miller '84, Dave Harms '83, Kevin Shepherd '83, Phil Schlotfeldt '84 and Don Morrison '86. This year an enthusiastic group will be putting another buggy together. Included on the Mini Baja team are John Heise '85, Phil Schlotfeldt, Eric Drobny '85, Jeff Klocke '83, Don Morrison and Jim Heise.

This year's contest will be held at the Transportation Research Center in Dayton, Ohio, on June 2 and 3. Any ME alums in the area are welcome to come to the event and to give a good cheer for Iowa State's MEs.



John Heise '85, Phil Schlotfeldt, '84, Eric Drobny '85, Jeff Klocke '83, Don Morrison '86, Jim Heise '85.

Ingersoll-Rand Gives Gift of State-of-the-Art Equipment

A company that has demonstrated a continuing interest in our department over the years is Ingersoll-Rand. The company recently presented Iowa State with two state-of-the-art compressors for the new ME/ESM building: a centrifugal compressor which will be used for teaching and research and a reciprocating compressor primarily intended for undergraduate laboratory instruction.

The gift, worth $152,000, was made possible through the efforts of two Iowa Staters at Ingersoll-Rand: David Garfield '50, president of the company, and Lowell L. Lauver '35, vice president, now retired.

Says Garfield, "It is a pleasure to be able to do something for Iowa State. Our company recognizes that ISU's Department of Mechanical Engineering is one of the best in the country. We want to be able to recruit at Iowa State and we know it's in our best interest to help make sure the department thrives and continues to be outstanding."

The compressors are fully instrumented and include component options selected to make them most useful to students. Says Professor Ted Okiishi, who is working with Ingersoll-Rand sales and service representatives, "Ingersoll-Rand is clearly going all out to give us special care. The support services (component selections advice, equipment inspection and installation supervision, etc.) we continue to receive from them are impressive. The equipment will be a great help to us in both teaching and research."

Faculty Profiles . . .

Robert C. Fellinger . . . professor. About half of you reading this newsletter probably had Bob Fellinger for thermodynamics either at the graduate or undergraduate level. "I came to Iowa State as a Westinghouse Fellow in 1947 and liked the place so much I stayed," he says.

Fellinger has received a number of awards throughout his years in the department. The first time ME students gave a Professor of the Year Award, Fellinger was the recipient. He's also received an Iowa State Alumni Association Faculty Citation and the AMOCO Foundation Outstanding Teacher Award. In the 1960s he was named ALCOA Professor of Engineering and he is a fellow in the American Society of Mechanical Engineers. His honorary and professional affiliations could fill a page.

This year, Fellinger will publish a new book with Professor William J. Cook. Entitled "Introduction to Engineering Thermodynamics." It will be his third book and one of many publications.

Always active in campus and departmental activities, Fellinger is a division leader for the Thermodynamics and Energy Utilization group and he is the department's coordinator for the new ME building.

Before coming to Iowa State, Fellinger worked on the Manhattan Project at the University of Chicago and at M.I.T. and over the years he and his students have produced papers that range in topic from "An Investigation of the Use of a Hot-Wire Anemometer in a Shock Tube" to "Thermodynamic Properties of Gases from Speed and Sound Measurement" to "Natural Gas Usage in the State of Iowa."

For relaxation, Fellinger and his wife, Lee, play golf. When asked what he does in winter, he says with characteristic sense of humor, "I scream." Here's hoping that winter won't be too long this year so that the Fellingers can relax on the golf course long into the fall and early in the spring.

Gerald M. Colver, William W. Bathie, Robert C. Fellinger, Robert C. Brown.

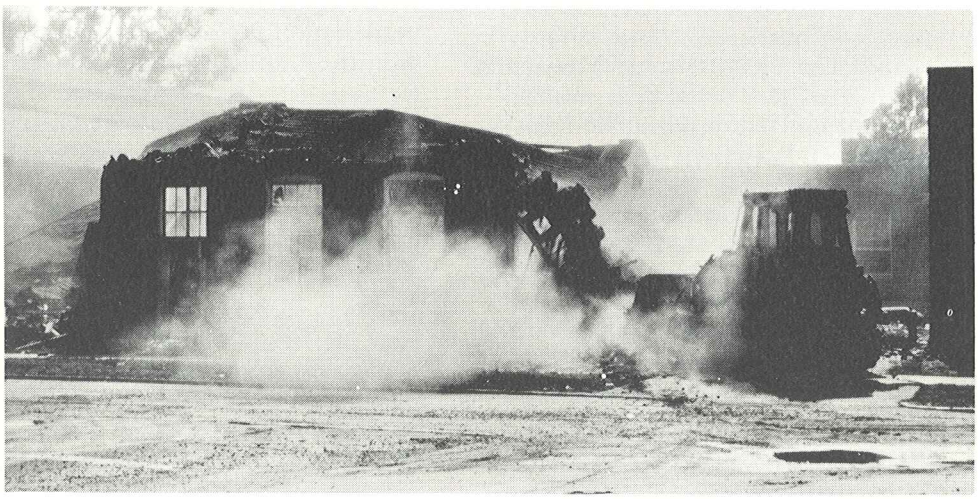
Robert C. Brown . . . assistant professor. "After a few years in industry, I decided that I wanted more freedom to define my research problems. I think that an academic career is the answer. I'm very excited to be at Iowa State in a department that provides its faculty members with the opportunity to pursue research."

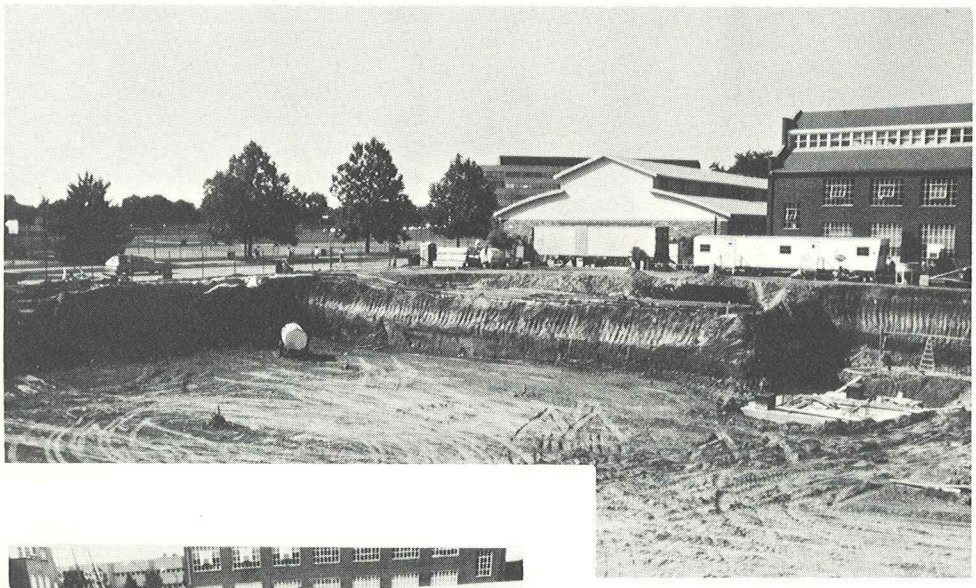
Receiving his Ph.D. from Michigan State University in 1980, Brown, a native of St. Louis, worked for General Dynamics in Fort Worth, Texas, for three years before coming to Iowa State. His industrial experience included a number of problems in thermodynamics as it relates to the aerospace industry. He is teaching thermodynamics at Iowa State.

During his years at Michigan State, Brown studied chemical kinetics of hydrogen fluoride lasers, a process which converts chemical energy into optical radiation. At Iowa State, he would like to apply his background to problems in combustion and energy conversion. Says Brown, "Much of the knowledge gained in understanding chemical lasers is finding application in more conventional engineering problems. For example, I am interested in photolytic initiation of combustion reactions, which basically turns the chemical laser problem around and examines the effect of radiation on chemical reactions."

Brown points out that his industrial experience made him aware of problems that interest industry. "I feel that industry, as well as government, will be looking to universities for the basic research that we can do for them. I think that there are good opportunities for the university researcher who can fill the technical gaps in industry's knowledge."

Brown belongs to the American Society of Mechanical Engineers and the American Institute of Aeronautics and Astronautics. In his spare time he enjoys reading, running and assisting his wife, Carolyn, who is a wood-carver. "Carolyn provides the artistic talents; I simply cut the wood down to size for her," he says, "I suspect that Iowa winters will provide plenty of time for woodworking." The Browns have one son, Tristan, age five months.

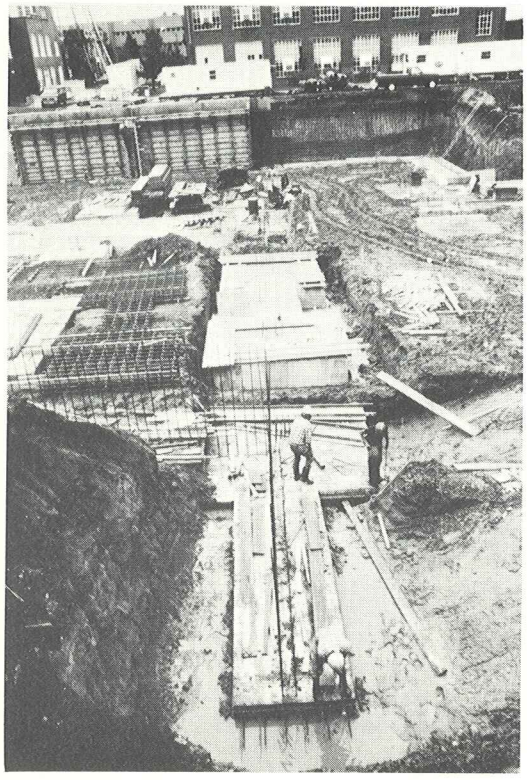


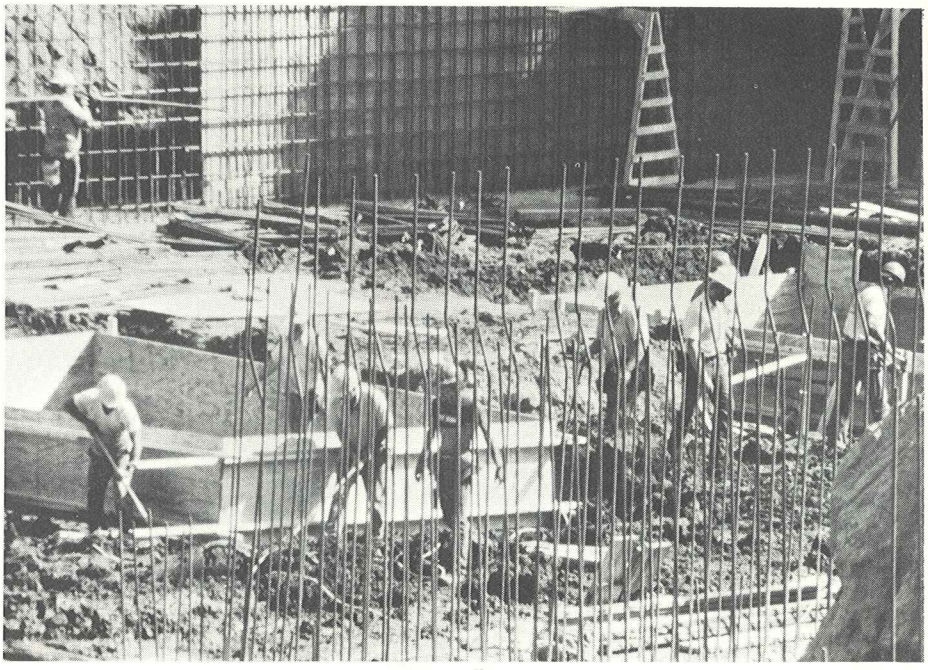


New Building Underway

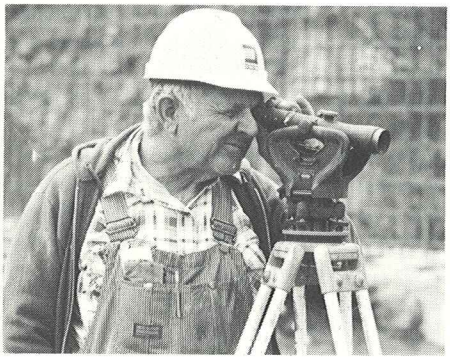
Construction of the new building for the ME and ESM departments began in early July. Demolition of Building B and the NROTC Building was completed well ahead of schedule. As this is being written excavation has been completed for Phase I—the north part of the building. Footings and forms for lower level walls are progressing ahead of schedule.

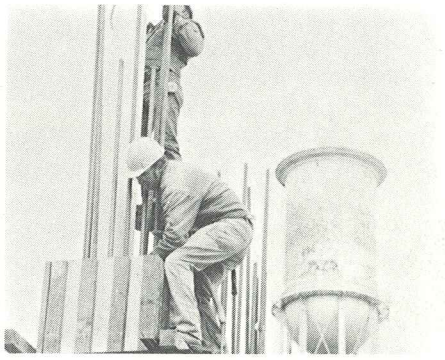
Contractors for the project are PCL Construction Ltd. from Minneapolis (general) and Sweeney-Manning-Seivert (electrical and mechanical). Charles Herbert and Associates are the architects and Stanley Consultants the engineers for the project.

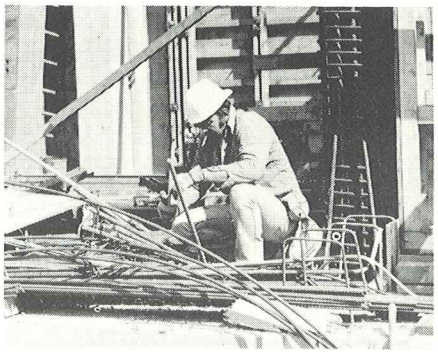


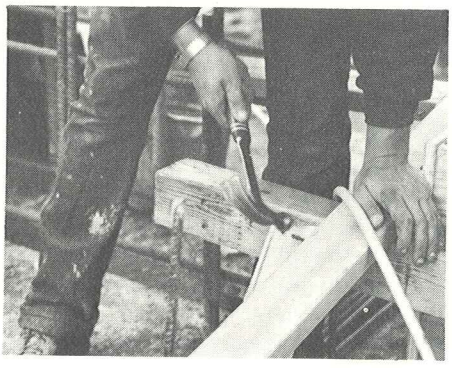


The project schedule calls for completion of Phase I in July 1984. The first phase contains offices, classrooms and teaching laboratories for the two departments. Following the move into Phase I, demolition of the west wing of the old ME Building will start Phase II. This part of the new building will house research laboratories including the heat transfer, turbomachinery, water tunnel and shock tube labs. Scheduled completion of Phase II is February 1985. Following this the remainder of the old ME Building will be demolished. Site work, including landscaping, is scheduled for completion in May 1985. All scheduled completion dates are, of course, subject to the vagaries of Iowa weather.









Faculty Profiles, cont'd from pg. 3

Gerald M. Colver . . . associate professor. Gerald Colver took his undergraduate degree at Bradley University in 1962 and his graduate work at the University of Illinois. In 1969-70, he did a post doctoral study at Imperial College in London.

Colver has taught at Rensselaer Polytechnic Institute, has consulted for such companies as 3M, Caterpillar Tractor and Midrex Corporation and has been a summer employee of Allis Chalmers and Illinois Power.

Talking about his research, Colver says, "My interests include combustion, particulate flow, fluidized beds and electrostatic phenomena in powders."

Colver and his students have pioneered work on the influence of high voltage applied electric fields on powder dynamics. Says Colver, "We've demonstrated that with the application of alternating electric fields, bubble formation can be controlled in fluidized beds, a desirable effect for controlling bed mixing and for studying therma-physical phenomena such as heat transfer and particle diffusion."

Another project that particularly intrigues Colver is his research with electro-particle phenomena. In this project, Colver uses high voltage dc fields to suspend clouds of particles, "electric suspensions," such as copper and glass microspheres for subsequent pneumatic transport in horizontal ducts. This demonstrates that particles could be made to flow below the usual saltation velocity for particle fallout.

With his graduate student, Dr. Tae-U Yu, Colver recently developed a unique device for studying spark breakdown, ignition and flame propagation phenomena in clouds of particles. This work is relevant to the explosion hazards of dusts such as aluminum, magnesium and grain.

Talking about ME research in the 1980s, Colver says that researchers in fine particle technology will be looking at electrical properties of particulate matter because of the significant effects they have on cohesion and adhesion which influences their flow and handling characteristics.

In addition to his work in the department, Colver is working with the Ames Lab to develop a fluidized bed combustor which is located in the ME building. Possible experiements using this equipment include studying heat transfer, chemically treated coal for capture of sulfur dioxide, and application of a catalytic converter to fluidized bed combustors.

Colver is a member of ASME, the Combustion Institute, the Electrostatics Society of America and the Fine Particle Society.

He and his family live on a four acre farm where they raise chickens, ducks and a couple of sheep. Says Colver, "My hobbies include mechanics, electronics, and drawing, but most of all, I enjoy being with my boys. They give me perspective and keep me from becoming too self-absorbed."

William W. Bathie . . . associate professor. A Nebraskan who has taught mechanical engineering at Iowa State for 25 years, Bill Bathie maintains a close contact with ME students through his undergraduate administrative duties. He comments, "I'd say I now devote about a third or half of my time helping students get settled into the mechanical engineering routine. One program I've particularly enjoyed is advising co-op students for the College of Engineering." This is a special program through which students take four years of classes and spend 15 months in industry getting hands-on experience.

Bathie has taught a variety of courses including fluid mechanics, heat transfer, thermodynamics and laboratory courses. Most recently, he initiated a course on gas turbines.

One project Bathie particularly enjoyed was working with other ISU professors to create a series of 20 tapes that review the fundamentals of engineering for college graduates who wish to take an exam to become registered professional engineers. These tapes have been used extensively within the State of Iowa as well as throughout the country.

Bathie's research interests include a study for an Iowa Highway Commission comparison of leaded and non-leaded gasoline as used in the Iowa State Highway Commission vehicles, and he has helped with a study of the Ames Solid Waste system. He has spent several summers working with industry including Pratt and Whitney Aircraft, Lennox Industries and Procter and Gamble.

Active in ASME since his student days at Iowa State where he received his ME degrees, Bathie has served as faculty advisor for the organization and has held all the offices in the organization's Central Iowa Section. Also busy with sectional and regional activities, he was a member of the ASME Task Force on Energy Conversion Research Committee and is a member of the Educational Committee of the Gas Turbine Division.

Bathie and his wife, Shirley, have traveled extensively throughout the U.S. "I've got great pictures to show anyone who has the patience to view them," he says.

The Bathies also enjoy jazz and musicals here in Ames and are avid football fans.

Jim Bernard Takes the Helm

Directing the course of action in the department this fall is James E. Bernard, a new chairman for the 44 member departmental staff. Bernard was most recently director of Michigan State University's Case Center for Computer-Aided Design, a facility which applies interactive computer graphics to engineering problems. The center is used in the instruction of several hundred students each year and supports several research projects for government and industry including Chrysler, Ford, General Motors, and General Dynamics.

Bernard, who was a professor of mechanical engineering at Michigan State, received his undergraduate and graduate education at the University of Michigan. Before going to Michigan State, he worked at General Motors research laboratories and later was an associate research scientist for the University of Michigan's Highway Safety Research Institute. His current research interests include the use of interactive computer graphics for design purposes and the development of analytic tools to select improved structural designs.

A member of the American Society of Mechanical Engineers and the Society of Automotive Engineers, Bernard was selected eminent engineer by the Michigan State Chapter of Tau Beta Pi. He also received the SAE Ralph R. Teetor Award for significant contributions to teaching, research and student development, and was awarded Michigan State University's Teacher Scholar Award for his "devotion to and skill in undergraduate teaching."

He has done extensive consulting on vehicle dynamics for government and industry and has taught several short courses for industry including courses on modal analysis and on the measurement and prediction of motor vehicle performance.

Bernard and his wife, Mary, have four children and enjoy family cross-country skiing, softball and other sports events.

A Brief Review of An Important Fund

By Henry Black, professor emeritus

The Black-Hilstrom Fund, which is a significant factor in the development of the ME staff, had a modest beginning more than 20 years ago. Hollis "Pete" Hilstrom '34 established an ISU Achievement Foundation fund to be spent at the discretion of the head of mechanical engineering. Pete wanted the department to draw outstanding faculty to Iowa State and he gave generously to help provide support which could be used to attract good people by making money available for such things as travel support and research grants.

Three years ago, Pete and I made plans to ask other alumni to give to the fund. Since then, the Black-Hilstrom endowment has grown to more than $138,000. More than 500 of you, our ME graduates, have contributed to the fund and we've seen more than $20,000 worth of interest income made available to the department's chairman.

As for the uses of the fund, much has been spent on travel expenses for faculty attending professional meetings and seminars or for honorariums and travel support for industrial and academic speakers who came to the campus to conduct seminars or lectures. Other expenditures include registration fees for people attending conferences, recruiting expenses and temporary housing for new faculty members and purchases of special books such as transactions of meetings for the ME library. Were it not for many of you and your generous giving, many of these important extras would not have been available.

Although this fund is a source of support, it does not provide for all the professional development activities of all the staff. It is a valuable supplement to the state's appropriations and to faculty member's research grants and contracts. Younger members of the department are the principal beneficiaries.

I think it's vital for all of you to know that the Black-Hilstrom Fund is especially important today because the department has an unusually high enrollment and it is becoming increasingly difficult to attract young MEs to careers in academe. The fund helps us compete with industry and other universities to get good people to come to Ames. For example, when the department recruits faculty candidates, it's particularly helpful to be able to offer travel grants, special start-up research support or even equipment grants. The Black-Hilstrom Fund is designed to provide these extras.

All of you who have given to the Black-Hilstrom Fund should feel a great deal of satisfaction. You have helped the department make a teaching career at ISU more exciting and rewarding. You have helped us attract some outstanding people to the department. In essence, you have given something back to your alma mater and started a giving trend that is very special here at Iowa State.

Knowing where our alumni are is important if we hope to maintain communications. The ISU Alumni Office has good records, but we'd like to update the information on our mechanical engineering graduates. Below is a form for you to fill out and return to us in the attached envelope. This will allow us to keep you more informed about the department and will help us know which companies employ our graduates.

Name _____ Year of Graduation _____

ISU Degrees _____ (1), _____ (2), _____ (3)

Other Degrees _____

Home Address _____

City _____ State _____ Zip _____

Home Phone _____

* * * * *

Company _____

Type of business _____

City _____ State _____ Zip _____

Business phone _____

* * * * *

Retired _____ (date) from _____ (company)

Last position held _____

* * * * *

Would you be willing to help organize an ISU ME alumni group in your area? ☐ Yes ☐ No

Alumni Suite
Memorial Union
Iowa State University
Ames, Iowa 50011

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