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Interdepartmental Feedlot Waste Study

The long term effects of feedlot wastes on soil, crops, and water resources will be the second phase of a joint project between KSU's agronomy, agricultural, and civil engineering departments and Pratt Feedlot, Inc.

The four-year project, funded through the Environmental Protection Agency (EPA), is attempting to determine the feasibility of disposing of feedlot wastes onto land at rates in excess of those necessary to meet fertility requirements of crops.

In the first phase of the study KSU researchers determined the quantity and composition of storm water runoff and manure generated in the feedlot, and studied the rate at which waste could be returned to the soil.

"We are attempting to discover the most economical means for disposing of feedlot wastes on land without damage to soil or water resources," Dr. Harry Manges, project director, said.

There is a danger of returning waste to the soil at too rapid a rate, Manges explained, which could result in an excess of nutrients in farm land. This overbalance of nutrients from feedlot wastes could affect crop growth and the quality of surface runoff and underground water.

In cooperation with Pratt Feedlot, Inc., the interdisciplinary KSU team is utilizing field plots for feedlot runoff and manure disposal to grow a corn crop.

"We are observing a series of plots to determine the rate at which we can apply wastes to the land and still keep it in agricultural production," Manges said. "We have found that the feedlot wastes return nutrients to the soil faster than plants can use them."

Now the group will observe the buildup of chemical elements in the soil and study how that buildup affects the quality of runoff water, he continued.

The feedlot runoff project is one of a nationwide series of EPA waste disposal studies. The KSU-Pratt Feedlot, Inc. project was recently awarded a grant by the EPA to continue its research of feedlot waste disposal.

Dr. Donald E. Rathbone New KS Engineering Dean

The new dean of engineering at K-State is Dr. Donald E. Rathbone, 44, until August chairman of the department of electrical engineering at the University of Idaho, Moscow.

In announcing Dean Rathbone's appointment, KSU President James A. McCain commented that "Kansas State University is fortunate to attract to the leadership of the College of Engineering a man of Dr. Rathbone's ability and experience.

"He has been instrumental in initiating a highly successful Ph.D. program at Idaho and in generating a substantial increase in outside funded research support."

McCain added that Rathbone's appointment was recommended strongly by the Search Committee, which was composed of eight faculty members and three students.

Rathbone succeeds Dr. Ralph G. Nevins, fellow at John B. Pierce Laboratories, New Haven, Conn., who served from September 1967 until this past June.

The new KSU engineering dean was top man in his graduating class at Purdue University in 1951. He was a teaching assistant at Northwestern University from 1951-1955 while completing work on his master's degree, and he then joined the University of Pittsburgh faculty as an assistant professor in 1955.

Rathbone was granted a Ph.D. degree at the University of Pittsburgh in 1962 and continued to serve on that institution's engineering faculty as an associate professor until he was named head of the department of electrical engineering at the University of Idaho in 1968.

Rathbone has had industrial experience as a project engineer and control engineer with Westinghouse Electric Corporation and he has been a consultant to Westinghouse and General Electric Company.

For several years he was a part-time consultant to the National Academy of Science and during the summer of 1967 was a full-time consultant to the Academy in Washington, D.C.

He is listed in Who's Who in America, American Men of Science, and Outstanding Educators of America, and is a member of such honorary and professional societies as Eta Kappa Nu, Tau Beta Pi, Sigma Xi, and Phi Kappa Phi.

Dr. Donald E. Rathbone

Dr. Rathbone is married and he and his wife have a five-year-old daughter.

Dr. Frederick H. Rohles New Institute Director

Dr. Frederick H. Rohles Jr., associate director of the K-State Institute for Environmental Research for the past 10 years, is its new director. His appointment was effective July 1.

Rohles succeeds Dr. Ralph G. Nevins who has become a fellow of the John B. Pierce Foundation Laboratories, New Haven, Conn.

The multi-disciplinary K-State institute, initiated in 1962, has 20 faculty associates from 12 departments in four colleges at KSU. The Kansas Engineering Society recognized the internationally-famed Institute in 1969 with a special award for achievements of its staff and contributions to the State of Kansas.

Rohles, widely known for his contributions to the measurement of animal behavior during space flight, has been in charge of the behavioral sciences activities of IER.

"We are happy to announce the promotion of Dr. Rohles to director. He has reflected enormous credit upon this University and distinguished himself as an eminent teacher and investigator since joining our faculty 10 years ago," said Dr. James A. McCain, K-State president, in announcing Rohles' new position.

Dr. T.B. Swearingen In E.P.A. Position At Research Triangle

Dr. Thomas B. Swearingen, associate professor of mechanical engineering at K-State, has received a one-year appointment to the Pollutant Strategies Branch of the Environmental Protection Agency.

Swearingen is spending the 1973-1974 academic year at Research Triangle, N.C., to address the complex issue of energy, fuels, and the environment, and to help develop immediate and long range policies and strategies in this area.

His assignment focuses on 1) monitoring and evaluating the implementation of the EPA clean fuels policy and estimating the attainment of primary air quality standards in 1975-77, and 2) developing strategies for maintenance of ambient air quality standards in the post 1977 time period in view of the increasing demand for energy resources.

Dr. T. B. Swearingen

"The problem the EPA is looking at is cleaning up the air, and setting standards to make the air clean enough to live in," Swearingen said. "We will be finding out how to best accomplish these tasks with the energy crises we are presently facing," he added.

Swearingen has conducted research and published several technical reports on pollution control and energy resource conservation while at KSU. He has also done research in the area of fuel conservation in the dehydrating industry, receiving patents on his processing methods and equipment. His primary research has been with natural gas and coal.

KSU Glare Studies May Affect Roadway Lighting

A study of discomfort glare by the KSU industrial engineering department may have marked effect on innovations in roadway lighting.

During the past year several experiments have been completed, including a study by approximately 200 visitors to the 1972 engineering open house, Dr. Corwin Bennett, professor of industrial engineering and project director, explained.

"We recruited visitors during open house to make glare judgments by looking at a light that was steadily increased or decreased in brightness until each subject reached the borderline between comfort and discomfort," he said. "We then correlated our results with personal

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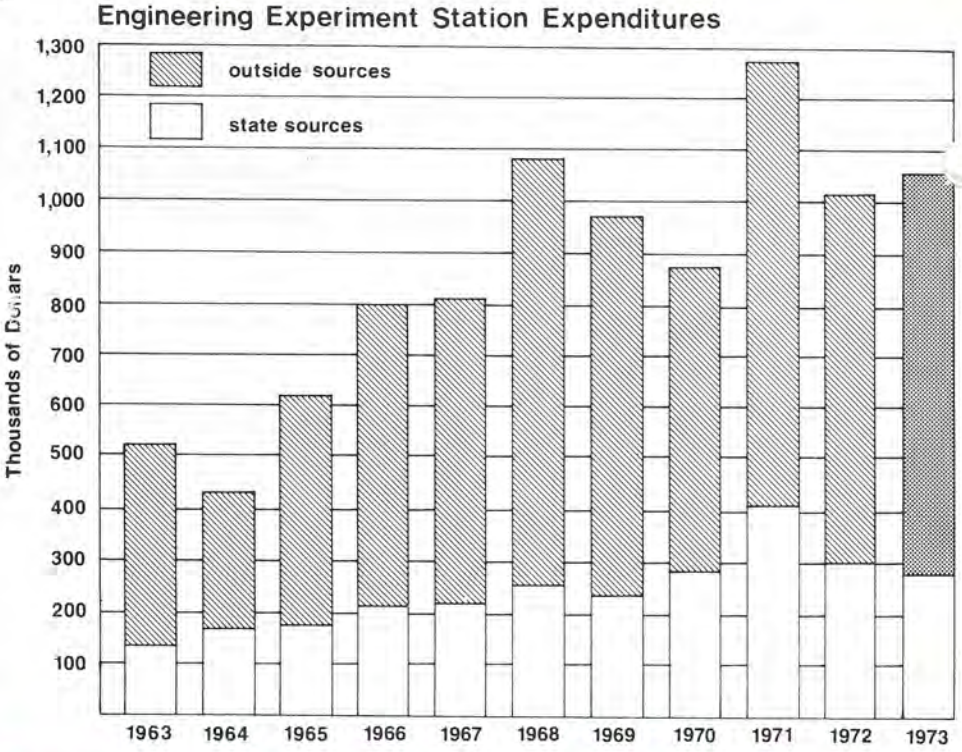

Engineering Research Funding Sustained at High Level

College of Engineering research funding at a level in excess of one million dollars annually was assured for the third consecutive year as n[e]w grants and contracts amounting to $650,000 were awarded from outside sources through the Engineering Experiment Station during the past fiscal year. Carry-over grants, additional short term support and State funded research support will make up the balance of the million dollar total. This will be only the fourth time since its establishment in the early 1900's that such a funding level has been achieved.

As in the past, the studies to be undertaken during the 1973-74 fiscal year will cover a wide variety of subjects for a diverse group of sponsors.

For example, the National Science Foundation is supporting a theoretical and experimental investigation of beams with web openings in the interest of achieving economies in high rise steel frame buildings. There has been considerable interest in penetrating the webs of floor girders and floor beams to permit the passage of utility ducts and pipes and thereby reduce the height of each story of the building. It is anticipated that the design recommendations will be formulated from the results of these investigations.

Electronic humidity sensors are being developed to maintain moisture content in the sub-base of highways and in grain bins. These could be read remotely or monitored continuously although the devices would be physically inaccessible. In addition, the final designs must be both rugged and inexpensive.

As might be expected, a number of grants and contracts attack problems of environmental degradation and the crucial areas of air and water pollution, solid waste, the energy crisis, and new sources of food and fuel.

Because the largest single concentration of research grants is in the Institute for Environmental Research the fields of human comfort conditioning and bioengineering will play an important part in next year's research, approximately 40 percent of new funds during the year came through the Institute. Included in the current research are investigations for a major auto manufacturer to determine optimum placement of air outlets in their automobiles. The Institute receives no support from State tax sources.

Another 20 percent of the research volume is generated by the department of civil engineering where interest includes transportation and waste treatment in addition to the structural engineering problem outlined earlier.

Significant contributions to new research funds were also made by the departments of nuclear engineering (14 percent) and chemical engineering (10 percent).

In all, 35 new grants and contracts were received from 21 different agencies.

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Biomechanic Tinsnips Saves Hand Muscles

If you have ever tried to cut thin sheet metal with a relatively inexpensive pair of tinsnips, you might appreciate an invention by a senior in industrial engineering at K-State.

Phillip B. Plant, 26, a Vietnam veteran whose parents live in Benecia, Calif., has designed a prototype pair of biomechanic tinsnips.

Finger and hand muscles are not designed to reopen the tinsnips once a cutting motion has been made through metal. As a result, these muscles become fatigued.

Plant's biomechanic tinsnips apparently have remedied this.

His tinsnips reopen automatically thus saving the fatigue often experienced in using tinsnips or in using scissors for cutting heavy cloth, paper or metal.

Another important feature, says Dr. Stephan Konz, K-State professor of industrial engineering who advised Plant in the development of the biomechanic tinsnips, is that his pair "can be used by either hand.

"Typical scissors or tinsnips cannot be used by either hand. Phil has developed his tinsnips so it is possible to switch hands when one hand gets tired," Konz said.

The K-State professor also points out that "if you design a right-handed tool, 10 percent of the population is out of luck. It is also possible to use both hands at the same time which is necessary with thicker metals."

A safety feature of the tinsnips is that the hand is always above the metal. The hand is always in a normal position. There is no twisting of the arm. The hand has no contact with the sharp edges of metal which have been cut already.

"Because the hand grip is nine inches from the pivot, you have a very good lever arm. Thus the metal cuts easier and it is possible to use a hand tool instead of a power tool. Thus the metal cuts easier," said Konz.

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Dean of the College
Dr. Donald E. Rathbone

Director
Engineering Experiment Station
Prof. D. A. Nesmith

IMPACT Editor
Tom Gerdis

BIOMECHANIC TINSNIPS CUT DOWN FATIGUE—A pair of biomechanic tinsnips invented by Phillip B. Plant (left), senior in industrial engineering at KSU, reopen automatically when cutting heavy material. This saves on hand and finger muscle fatigue, says Dr. Stephan A. Konz (right), K-State industrial engineering professor. Konz says hand and finger muscles are not designed to reopen tinsnips and scissors when cutting through heavy material such as thick sheet metal.

Concepts Course Yields Many Intangible Benefits

"Getting acquainted" takes on a dual dimension for KSU freshmen engineering students. They are not only given an introduction to professional aspects of engineering, but also encouraged to get to know each other by name in the first-year course, "Engineering Concepts."

At K-State, only the most talented engineering professors are assigned to teach Engineering Concepts.

Dr. Doug Wallace, a bright, civil engineering educator and researcher in his mid-30's, teaches a section of the course. Wallace was the 1972-1973 "Outstanding Young Engineer" in Kansas as designated by the Kansas Engineering Society.

Wallace described the "intangible benefits" to new K-State engineering students as a result of taking this first-year course.

"I want to give the students a sense of feeling a part of a community," he said. "So often, students in freshman courses sit in a class all semester and never get to know their classmates' names.

"But in 'Concepts,' they all know each other by their first name. Now when they see that guy or gal in their chemistry or physics class, they can say: 'Hey, that's a fellow civil engineering student.' "

A small class size, introductory name tags, and encouraging the freshmen to work with junior and senior majors on plans for the spring Engineering Open House, help to accomplish this goal, he added.

The 50th annual KSU Engineering Open House is set for Friday evening and during the day Saturday, March 29-30, in Manhattan.

Promoting a sense of belonging early is especially important for engineering students. Most will not take an actual engineering course until their junior and senior years. During their first two years at K-State, they concentrate in preparatory subjects that include chemistry, physics, and calculus.

"Our purpose is to retain their interest in civil engineering so they don't become discouraged in those first two years," Wallace said.

Dr. Robert R. Snell, professor and head of civil engineering at K-State, taught the class in spring 1972. He echoed his colleague's observation.

"During those first two years, the students may get the feeling that engineering is just calculus, physics, and chemistry. Those subjects can give them a pretty rough going over and they may get discouraged."

One thing Wallace emphasizes in his class is how "civil engineers utilize these subjects as tools for solving problems in the world."

Dr. Dale E. Kaufman New KP&L Professor

Dr. Dale E. Kaufman, for seven years a member of the electrical engineering faculty at K-State, has been designated the Kansas Power and Light Company Professor in Electrical Engineering at K-State effective August 15.

The appointment of Kaufman, an associate professor in the K-State College of Engineering, has been approved by the Kansas Board of Regents and was announced June 26 by Dr. James A. McCain, KSU president.

Dr. Dale E. Kaufman

Balfour S. Jeffrey, president of KP&L, said, "Of course, we at KP&L are pleased to provide this unique designated professorship to a highly qualified engineering educator at K-State. This will continue our special support to education at K-State."

Previous holders of the KP&L professorship: Dr. Ralph G. Nevins, former KSU dean of engineering; Dr. L. T. Fan, head of chemical engineering at KSU.

Kaufman's salary is being supplemented for the next three years from funds contributed by KP&L to the University.

Under the professorship, Kaufman is surveying current scientific, engineering and business publications to gather information required to make an "intelligent prediction" of what course energy generation and consumption is likely to take during the next 50 years.

He is particularly interested in:

- Searching for the ultimate energy source with minimal pollution.
- Education for the general public on energy and non-renewable resource problems.
- Establishing compatibility between power production and environmental protection.

In summer 1974 he plans to prepare a report summarizing the present state-of-the-art in new energy sources and environmental protection procedures, and discuss possible future trends in these areas. "I plan to write a report from utility and general public standpoints," he explained.

The 43-year-old engineering educator was a staff member at the Los Alamos (N.M.) Scientific Laboratory from 1959 to

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New Human Comfort Meter Developed in KSU Institute

Though a comfortable environment seems as easy to obtain as adjusting the room temperature, studies completed by the K-State department of mechanical engineering reveal a complex set of variables are involved in achieving "comfort."

Harry P. Guy, **Chanute, Kan.**, a former graduate student in mechanical engineering, worked on a human comfort meter which will compile data and rate environments as acceptable or unacceptable.

The instrument will combine a comfort standard already formulated by the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) and a model developed previously at K-State which determines under what conditions most people are comfortable.

"Though many people don't realize it, there is a lot more involved in determining thermal comfort than air temperature," Guy said. "The instrument we now have in the planning stages would utilize four sensors to determine air comfort: temperature, velocity, humidity, and radiation (amount of heat generated from room walls or windows)."

This device makes it easier to determine optimum comfort—the point where most people are satisfied with environmental conditions.

"One can place this instrument in a room and soon determine whether comfort can be improved by dropping the air temperature, for example, or by increasing the air velocity," Guy explained. "Though it seems an unimportant difference, energy may be conserved by turning on a fan to increase air velocity rather than increasing the output of air conditioning."

"As energy costs continue to go up, a small conservation of energy in each room of a large office building could result in substantial savings."

However, this application of the "human comfort meter" is far in the future, Guy reminds. A more immediate use would be to determine whether air conditioning equipment is adequate for a certain structure, he says.

Harry P. Guy

"When the comfort meter goes on the market, it could be placed in homes or office buildings, to determine whether the heating and cooling systems are adequate," Guy continues. "As it is, the owner of a home has to take the contractor's word that it's okay."

Guy worked on the human comfort meter as part of his master's thesis. He is now in the Air Force working with an environmental group in the San Francisco area.

James C. Richards, ChE '34, Elected to Alumni Presidency

James C. Richards, a 1934 K-State chemical engineering graduate, has been elected president of the KSU Alumni Association. He is a retired president of the B.F. Goodrich Industrial Products Co.

Richards retired last year from Goodrich in a position he had held since 1962. He is now a rancher in Emmett, Kan.

In 1962, he received a Distinguished Service Award in engineering from K-State. He serves on the KSU Engineering Advisory Council.

High Research Funding Sustained in 1972-73

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Seventeen grants accounting for 64 percent of the total funding come from federal agencies; five grants and 17 percent of the accounting for 10 percent of total dollars came through State agencies, generally as part of federally funded programs administered by those agencies; and the remaining six grants and seven percent of the money came from industry.

The real significance of these figures lies in the fact that the funds are virtually spent twice. In addition to providing new knowledge and understanding, these funds provide an equal benefit to KSU and thereby to the State and its citizens by (1) maintaining the academic excellence of the faculty, (2) providing real problems for the learning experience of both graduate and undergraduate students, (3) providing support for such students, allowing them to continue their education, and (4) providing funds for facilities and equipment for instruction which are not available through traditional tax support.

The new fiscal year is off to an excellent start. In the month of July, new grants or contracts were approved amounting to more than $213,000, indicating the continued growth of engineering research at K-State.—**Dwight A. Nesmith.**

UNIQUE TENT DESIGNED BY KSU ENGINEERS—A "Tent-Backpack" designed by three freshman engineering majors last year at KSU (l. to r.)—Andy Glatt, Salina; Walter Endecott, Drexel, Mo.; and Mark Alft, Lindsborg—was judged best in a student competition at K-State conducted by Dr. Kenneth K. Gowdy (right), an associate professor of mechanical engineering and assistant engineering dean at K-State. So well conceived was the student design that a Kansas camping products firm is "interested in it."

Firm Gets Patent Rights To Student Defrost Design

A team of K-State mechanical engineering students were given a design problem by Whirlpool Corporation in the fall of 1970. At the end of the semester, a four-man task force came up with a design solution that the firm feels is good enough to patent.

Whirlpool contracted with the KSU department of mechanical engineering for the patent rights to the invention.

Members of the team, all since graduated from KSU: Ralph Gwinn, **Midland, Mich.**, Bryan Jones, **Stillwater, Okla.**, Philip Strauss, **Norwood, Mass.**, and Rolland Jennison, **Wichita.**

Dr. Clarence Bell, now at Texas Tech, **Lubbock**, was faculty adviser to the team.

Their project was the design of a demand defrost system. This system will permit refrigerators to defrost on a schedule keyed to the amount of frost build-up. A conventional refrigerator defrosts every 12 hours, "whether it needs it or not," noted Dr. John C. Lindholm, associate professor of mechanical engineering. The students' design would allow for lower refrigerator operating costs by reducing electricity expenditures.

Lindholm, along with Dr. F. C. Appl and Dr. Ralph O. Turnquist, directs the mechanical engineering design course, a combined effort of industry and K-State which allows students practical experience in their major field.

Each semester several industrial firms from around the nation and Kansas provide projects for use in the course. Teams of three or four students select one of them to work on. Last spring students were involved with nine projects for eight different companies.

The only stipulation on the nature of the projects, Lindholm said, "is that they have not already been solved by company engineers."

This way students have an opportunity for a realistic preview of a professional mechanical engineer's job.

"It's their baby entirely," Lindholm emphasized, "because that's the way it is out in industry."

At the end of the semester, the teams visit their respective companies' plants and present their solutions to company representatives. The firms pay for the costs of the project and travel expenses.

Lindholm reported that this is the second time that Wildcat mechanical engineering students in this course have produced a patentable idea. Industrial funding from these university-industry arrangements is used by the mechanical engineering department to purchase equipment, reference materials, and other items which will further the department's design educational work.

KS Discomfort Glare Study Shows Marked Tolerance Levels

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aspects, such as whether the person worked indoors or outdoors, and his age."

The study showed no difference between subjects who worked indoors or outdoors, but revealed a marked difference in tolerance levels for old and young.

"There is a tendency for younger people, say under 30, to tolerate higher luminance than those over 30," Bennett said. "Why this is so is not exactly clear. It could be physiological, or perhaps the result of conditioning."

Though this study was directed toward evaluating indoor lighting, recent studies have shifted to evaluating roadside lighting.

Bennett is now utilizing a booth with fluorescent lights and a dome for experimentation. The subject sits under the dome and adjusts the brightness of the lights to his comfort evel.

Bennett added that technical committees for roadway lighting will use this information to correct specifications for lighting fixtures to minimize glare problems.

The Illuminating Engineering Research Institute recently renewed a $13,000 grant to the industrial engineering department to continue its research on discomfort glare.

K-State Engineering Educator Appointed KP&L Professor

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1962 after receiving his B.S. in electrical engineering from K-State.

He resigned his position at Los Alamos to return to his alma mater to seek an M.S. degree in electrical engineering. He completed that goal in June 1963.

The following fall he was awarded a National Science Foundation doctoral fellowship to study toward his Ph.D. in electrical engineering at K-State. He was appointed an instructor in that department in 1966-1967.

Upon receiving his Ph.D in June 1967, he was promoted to assistant professor. He was elevated to associate professor last August.

In the past seven years, Kaufman has worked extensively in the design of microwave devices and development of nano-second sampling circuits. In addition, he has been updating and revising the electrical engineering undergraduate laboratories. He also has assisted in th development of the computer engineering curriculum.

NEWSWORTHY NOTES

A $1,000 grant by Dow Chemical Co., Midland, Mich., has been received by the KSU department of chemical engineering. The funds are being used to support undergraduate scholarships.

A paper co-authored by three KSU faculty members—**Teddy Hodges, Do Sup Chung** and **Harry H. Converse**—and a former graduate student—**Duane L. Keller**—has been chosen for one of eight 1973 national awards by the American Society of Agricultural Engineers.

Dr. **Stuart E. Swartz,** associate professor of civil engineering, is 1973-1974 chairman of the Kansas section, Society for Experimental Stress Analysis.

Dr. **Jason C. Annis,** assistant professor of mechanical engineering, has been elected to the executive board of the midwest section, Air Pollution Control Association. Annis is an associate of the K-State Institute for Environmental Research.

The 1973-1974 New Engineering Education delegate from K-State to the American Society for Engineering Education is Dr. **Charles K. Spillman,** assistant professor of agricultural engineering.

A 21-year-old senior in agricultural engineering from Garden City, Kan., **Mike Ramsey,** has been elected president of the K-State Engineering Student Council for this academic year.

Robert D. Paris, 20, senior in electrical engineering from Kansas City, Kan., was the recipient of the 1972-1973 Chemical Rubber Company (CRC) Engineering Science Achievement Award at K-State.

Alan D. Jackson, 21, Valley Center, Kan., was selected the outstanding senior in mechanical engineering at K-State by faculty in the department.

Ronald D. Wilson, 21, May 1973 mechanical engineering graduate from Wichita, was the 1973 recipient of the **Mac Short** Memorial Award at K-State. The award, an inscribed wristwatch, is given annually to an outstanding senior interested in aerospace engineering and honors the memory of Short who had an important role in World War II naval aircraft production.

The fourth annual Cummins Award, given to an outstanding junior in mechanical engineering at K-State, has been presented to **Donald J. Glaser,** 21, Emporia, Kan. The awards includes a $100 check and a personal plaque.

The department of chemical engineering has received a $10,000 contribution through the charitable trust fund of Koch Industries, Wichita chemical engineering process equipment and construction firm.

KSU Shares Its Reactor With Many Institutions

KSU is sharing its sophisticated nuclear engineering devices and "know-how" with an increasing number of midwestern universities, colleges and even junior colleges.

This cooperation is important, for KSU has one of the few reactors in the midlands at a time when knowledge of nuclear energy and radioactive materials is increasingly important.

The KSU "sharing" ranges all the way from hosting visiting science classes on Saturdays to actually permitting advanced graduate and postgraduate students from other universities to train and conduct their own research on K-State's TRIGA Mark II teaching and research reactor.

The KSU reactor facilities have been used by such visiting scientists as:

- Zoologists who had tiny bits of metal made radioactive so that, when the metal pieces were imbedded in reptiles, the researchers could keep track of their specimens.
- Geologists determining the age of rocks.
- Foresters studying cottonwood tree seeds to determine why some trees grow faster than others.

The primary use of the TRIGA Mark II reactor within the K-State department of nuclear engineering is for laboratory exercises and graduate research. The reactor also is available, as time can be arranged, for K-State researchers in departments across the campus. This "sharing" usually is reimbursed through research funds.

The "sharing" with other colleges and universities has been without expense to these institutions, although the Atomic Energy Commission does provide nominal support annually to encourage institutions with reactors, such as KSU, to make their facilities available to others.

"Essentially, we're providing a service," says Prof. Robert Clack, director of the KSU reactor facility. "This is important for our public relations, but we feel, too, an obligation to share our facilities with institutions not so fortunate as we. This sharing is subject only to working out administrative details as to when we can free the reactor facilities for use by others."

Recently a class in health physics from Oklahoma State University spent a couple of days on the K-State campus to observe first-hand the operations of a reactor and how personnel are protected from radiation.

An increasing number of instructors at other colleges are having samples radiated in K-State's reactor so that students in physics and chemistry classes can study such things as "half life" and ionic changes, and use artificial radioisotopes for tracer studies and neutron activation analysis.

Institutions other than OSU which have "shared" in the use of K-State's nuclear facilities include the University of Nebraska, University of Kansas, Wichita State University, College of Emporia, Benedictine College, Bethel College, Marymount College, Fort Hays Kansas State College, and Cowley County Junior College.