Welcome to the latest issue of Vibrations!

The academic year will be coming to a close soon, with fewer than two months until graduation (May 22). There is much to accomplish by both students and faculty as we near completion of the school year and watch another group of seniors [and graduate students] reach engineering maturity and head out into the world.

The seniors are working hard on their projects, whether it’s the Formula Vehicle, the explosion containment system for bomb-laden luggage carried on board a commercial airliner, the ergonomic improvement of an assembly-line-type of work station, or the system to test for damage caused by full-sized forklifts colliding with plastic pallets for large/heavy merchandise transport. Graduate students are completing their research with biomechanical knee simulators, intelligently designed/controlled robots, fundamental finite element code development, and space thermal systems. These soon-to-be-graduates are preparing to leave and tackle new challenges.

Or, whether it’s one of our student athletes such as Lindsey Morris from the volleyball team, Chris Veit who is one the students who “sports” the Jayhawk mascot outfit at various sporting/KU events, Kelly Warrick who plays trombone for the pep band, Kelley Briant who will be enrolling in law school, James Winblad who’s going to medical school, or a number of other students who will be taking positions with Ford, Black & Veatch, Boeing, Whirlpool, the armed services, business schools, educational institutions, or graduate schools - - we will surely miss them. But we also know that there’s another group of bright, ambitious, hard-working students following behind, who’ll be the seniors and leaders for next year. So, we salute those who are finishing and wish all of them the very best as they embark on the next phase of their careers.

Thanks to all of you alumni for helping, through the encouraging words you’ve spoken to young people everywhere - - some of whom became mechanical engineering students at KU, and some of whom will be graduating this May. You’ve had an impact! Your enthusiastic promotion of KUME is greatly appreciated. Thus, we truly hope that you’ll be able to help us as we “send off” our graduates at this year’s Banquet on April 29 (refer to page 10 for details).

Drop us a line any time.
We’d love to hear from you!

PS: Our thanks again go to Advisory Board member LaRoux Gillespie and to student office assistant Megan Ochanpaugh for putting together a variety of articles - - providing a wide cross-section view of our current students and faculty, as well as our alumni and emeriti. By the way, this is Megan’s last semester with us, and we’ll miss her “Newsletter creativity”; but we also wish her the very best as her career begins in earnest.
Faculty Updates

Dr. Terry Faddis
The Intelligent Systems and Automation Laboratory has been working with Honeywell FM&T in Kansas City to develop automated interfaces between FBMach, a feature based process-planning system, Unigraphics and Solid Works. These interfaces will automate the manufacturing tool path planning and process drawing needs for a manufacturing organization. In addition, the laboratory has started a new research thrust in robotics with the Compliant Robotic Foot (CRF) project. The CRF project is taking a bottom up view of robotic walking by considering primarily the foot, ankle and lower leg in developing new systems. The CRF project may also have biomedical application in providing a better prosthesis for the lower leg.

Dr. Ken Fischer
Dr. Ken Fischer and his graduate students are hard at work developing a technique for MRI-based in-vivo joint contact mechanics. The goal of this research is to be able to accurately evaluate the contact mechanics using in-vivo imaging data (imaging data from living human subjects). The basic principles are simple. Dr. Fischer and his students collect an MRI image set of the joint of interest while the subject actively loads the joint. The subject is provided with a computer feedback display so that she/he knows the amount of load she/he is generating. This helps subjects maintain a known and constant load on the joint and a stable joint position. Then the subject relaxes and another MRI image set is acquired with the best possible combination of clarity and resolution. The relaxed image set is used to generate geometrically accurate models of the bones with cartilage. By analyzing the differences in the positions and orientations of the bones in the two image sets, the transformation from the unloaded state to the loaded state can be determined and applied to the bone models. Bone modeling is currently done only for surface contact data - contact area, contact pressure distribution, and contact force. Future modeling could include the use of finite element modeling to consider the stresses and strains in the tissues.

Dr. Sara Wilson
Some of you may remember fondly (or maybe not so fondly) your courses in Feedback and Control Systems. Did you know that the methods you learned in these courses are being used to improve understanding and prevention of low back injuries? It turns out that the muscles and reflexes act as Proportional-Derivative (PD) controllers to control and stabilize back motion. Dr. Wilson is using control system modeling to understand why truck drivers are so prone to low back pain. It turns out that the vibrations of the truck alter the sensors in the human control system, thus increasing the amount of motion required for these sensors to detect a change. This increased detection threshold acts as a delay in the feedback system pushing it toward larger deflection and instability. These changes do not bode well for our unfortunate truck driver. So what can be done? By allowing the drivers a 30-minute break between long drives and unloading the truck, these sensors can be allowed to recover before strenuous exertion. In addition, air-ride seating can be installed to filter out truck vibrations. This research has caught the interest of the National Institute of Occupational Safety and Health. The Institute is now funding the research of Dr. Wilson and several ME graduate students to understand and quantify these changes.
ME Spring 2004 Awards Banquet

Unfortunately, we did not have space for our 2004 Banquet Award/Scholarship recognition in the previous newsletter; so even though it’s a little late, we wanted to make sure you were able to see the names of those outstanding individuals. Provided below are the names of the outstanding (distinguished) students, faculty, staff and alumni:

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<th>Spring 2004 ΠΠΣ Initiates</th>
<th>Outstanding Senior Award</th>
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<td>Jack &amp; Ann Cramer Root Scholarship</td>
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<td>Logan Johnson</td>
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<td>Wesley G. Cramer Mechanical</td>
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<td>Engineering Faculty Award</td>
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<td>Sara Wilson</td>
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KUME Newsletter 3 March 2005
Leighton LaPierre
John McGary
Lindsey Morris
Mark Pacey
Paul Rankin
Marie Riley
Daniel Rutherford
Jared Silsby
Graduates
Scott Chapman
Chadd Clary
Kyung Pyo Kim
Graduating Seniors
Spring 2004
Jacob Albers
John Breidenthal
Joshua DeDonder
Thomas Denney
Matthew Donovan
Matthew Dunkin
Cassandra Eastridge
Brett Erickson
Thomas Frieze
Jared Gabel
Jaime Hiatt
Andrew Hillin
John Hulse
Graduating Masters 2004
Ghazi Abdulfattah
Srikanth Alu
Amanullah Mohammed
Shweta Bhole
Kedar Deshpande
Abhijit Dumbre
Monte Engelkemier
Priyank Gupta
Nicolas Jaumard
Joshua Katz
Imran Khadari
Pratyia Levan
Srinivasarao Madduri
Tejukiran Murthy
Amy Rajwani
Jun Yi Sun
Feng Zhang
Graduating PhD 2004
Antonis Styliano
Senior Design Teams for the 2003-2004 School Year

Boeing Boom Refueler
Andrew Hillin
John Hulse - leader
John McGary

Boeing Water Jet Team
Joshua DeDonder
Robert Lewis - leader
Kyle Schaferman
Taylor Yoest

Center for Aging Team
Nathaniel Lenz - leader
Casey Lauer
Josu Galdos

Fore Entertainment
Jacob Albers
Patrick Laufenburger
John McAdoo
Christopher Reischman - leader

Formula SAE Team
Matthew Donovan - Captain
Cassandra Eastridge - Co-Captain

Chassis Team
Jarrod Foster - leader
Jaime Hiatt
Andy Lockwood

Drivetrain Team
Mike Zimmers - leader
John Breidenthal
Ryan Terry

Engine Team
Brett Erickson - leader
Garrett Wilson

Suspension Team
Zachary Kellogg - leader
Cassandra Eastridge
Curtis Eichman

Grundfoss Pump Team
Thomas Denney - co-leader
Thomas Frieze
Jared Gabel
Edward Mohan
Aaron Robbins - co-leader
Andrew Voth

Hallmark Ribbon Quench Team
Ryan Camber - leader
Jon Chychota
Nicholas Vaughan

Hallmark Die Stamp Team
Neil Hughes - leader
Hector Marin
Clinton Rahjes

A Special “Thank You” to Our Supporters and Donors
We want to express our sincere appreciation to all individuals and organizations [listed on the next page] who contributed to the ME Department during the 2003-2004 school year. Your thoughtful donations have had an incredible impact on the quality of education made available for the students and on the faculty’s ability to pursue the Mission and Goals of the Department. Without your conscientious dedication and enthusiasm, the Department wouldn’t be as successful.

KUME Newsletter
March 2005
2005 Distinguished Alumni to Be Honored

Two alumni have been selected as this years Distinguished Alumni Awardees. Dr. Frank E. Gordon and Dr. Kenneth Razak have had outstanding careers which demonstrate the variety of KUME alumni accomplishments. They will join a prestigious group of ME Distinguished Alumni (since award inception in the spring of 2002), and will be honored through an official recognition ceremony at the April 29th Spring Banquet (see page 10 for details.) This page and the next provide an overview of their achievements.

Dr. Frank E. Gordon, a native Kansan, received his B.S. degree in Mechanical Engineering from the University of Kansas in 1967, and a Doctor of Engineering degree from the University of Kansas in 1971, with the support of a fellowship from the National Aeronautics and Space Administration.

Dr. Gordon began his federal service as a Mechanical Engineer at the Naval Undersea Center in 1971. In 1974, he was selected to head the Test Division, supervising approximately 100 engineers and technicians responsible for conducting test and evaluation operations on a number of Naval weapons systems, including the Encapsulated Harpoon, Trident D-5 submarine missile launch system, submarine launched Tomahawk missile, and the MK 46 and MK 50 torpedoes. He served on the source-selection board for the Tomahawk and the Antisubmarine Warfare Stand-Off Weapons, he participated in the development of the test procedures for the Surface Ship Radiated Noise Measurement Range, and he managed a project to provide underwater test ranges and facilities for the Republic of Korea. In 1979, Dr. Gordon was appointed the Navy's strategist for Undersea Warfare Weaponry. In this assignment, he led a team in developing technological strategy covering torpedo guidance and control, torpedo propulsion, mines, warheads, fire control, countermeasures systems and underwater explosive effects.

From 1982 to 1986, Dr. Gordon headed a department of consolidated staff and support functions including finance and accounting, security, mail and files, travel, and internal review. In this position, he also served as a member of the Center's Advisory Board that was responsible for resource allocation including space, overhead, billet ceilings, and facilities. In addition, he was a member of the Competition Review Board and all of the Center’s top management boards.

In 1986, Dr. Gordon was selected as the Head of the laboratory’s Anti-Submarine Warfare (ASW) Department. In this position, he supervised approximately 400 scientists and engineers in the research, development and testing of major ASW weapons systems, including the MK 46 and MK 50 torpedoes, the Vertical Launch Anti-Submarine Rocket (ASROC), and the MK 116 Surface Ship ASW Control Systems. In March of 1987, he was selected as a member of the Senior Executive Service (SES) and is currently an SES-4. SES is the highest level for civilian employees in the federal government.

In May of 1992, Dr. Gordon became the Executive Director of the Naval Command, Control and Ocean Surveillance Center, In-Service Engineering West Coast Center (NISE West), a new command headquartered in San Diego with detachments and facilities in San Diego and Vallejo, CA, Hawai, Guam, Japan, and the Philippines. NISE West employed over 900 employees and was responsible for in-service engineering for command, control and communications systems. Leadership areas included communications systems, command and control systems, air traffic control and navigation, security systems, ocean surveillance, automated systems testing, and information technology.

As a result of the 1995 Base Realignment and Closure act of 1995, NISE West was merged with another San Diego based laboratory to form the Space and Naval Warfare Systems Center; and Dr. Gordon became the head of the Navigation & Applied Sciences Department. In this position he supervises approximately 500 civilian employees and seven military positions in seven divisions geographically dispersed among Los Angeles, CA; Warner Robins AFB, GA; and San Diego, CA. Leadership areas include Global Positioning Systems, Marine Navigation, Airspace Systems, Mobile Tactical Systems, Biosciences (Marine Mammals), Environmental Sciences and Advanced Systems, and Interactive ASW training and tactical decision aids. Many of these systems are directly involved and deployed in Operation Iraqi Freedom including GPS systems, mobile air traffic control systems, several marine mammal systems (dolphin and sea lions for mine hunting systems as featured on several national TV programs), and other classified capabilities. In addition, he has personally assembled a group of research scientists who are leading the development of applications that use nonlinear dynamics and chaos to significantly improve performance of many systems. This effort includes international collaborators and is beginning to show impressive results, receiving considerable recognition within the Navy and Department of Defense including visits by Newt Gingrich, the Secretary of Defense, Donald Rumsfeld, and the Chief of Naval Operations, Admiral Vern Clark.

Dr. Gordon maintains a hands-on interest in science and research and as a sideline effort, has been involved in studying the phenomenon known as “cold fusion”. A story in The Sunday Times of London in July 2002 and an article in the March 29, 2003 edition of the New Scientist magazine document these efforts.

Dr. Gordon is married to the former Lynda Haynes from Kansas City, and they have two grown children. He has authored and co-authored a number of publications and holds four patents jointly with other co-inventors. He has been a member of the KU Mechanical Engineering Advisory Board for several years.

Clearly his leadership in naval defense efforts makes him a distinguished KUME Alumnus.
Dr. Kenneth Razak completed his BSME from the University of Kansas in 1939 and stayed for graduate work, from which he graduated in 1942. For the summer of 1937, between his sophomore and junior years at KU, he was a draftsman for the Stearman Aircraft Company. This was before Boeing absorbed Stearman.

Dr. Razak was the coordinator of KU’s Civilian Pilot Training program and an instructor. This program was directed at expanding college student’s flight abilities. KU was one of 13 schools selected for this program - - it was later expanded to many others, including Wichita State University. Dr. Razak met Roy Elliott, the coordinator at WSU, during a 1942 meeting, and this led to hiring him as the developer of Wichita’s Aeronautical Engineering department.

Dr. Razak’s first task in Wichita was building the 7’x10’ wind tunnel. This was the 200-mph machine that set WSU on a national path. It used two 1000-horsepower Allison engines to provide the needed air flow. In 1953, Dr. Razak became Dean of the Engineering School. All the while, he was heavily involved in local and national society aerospace and aircraft activities and research. He was part of the US Institute of Aeronautical Sciences Council along with General James H. Doolittle, Lawrence Bell of Bell Aircraft, Leroy Grumman of Grumman Aircraft, and L.B. Richardson, VP of Curtiss-Wright. He worked with the Office of Naval Research and with NACA, the predecessor to NASA.

His personal interest in engineering education was engineering design. One student noted that even in those early years, many schools taught analysis, as opposed to design. Design was his strength. He was a consultant to Cessna for his entire 21-year tenure at WSU and worked with many other companies and government agencies. One of the projects for Cessna was an extensive study of aerial application of agricultural materials. This led him to the invention, and patenting, of a new type of agricultural airplane.

He served as Acting Dean of the College of Business Administration and Industry for two years, was Director of the Department of Engineering or Dean of the School of Engineering for 14 years, and was Director of Engineering Research for 14 years. He taught an airplane design class that focused on a midget racing plane. Dr. Razak left WSU in 1964 to build the experimental prototype of this airplane and to move out of engineering education. It was built and flown in the Goodyear trophy races.

In 1966, Dr. Razak joined Kansas State University as Professor of Engineering and Director of the Kansas Industrial Extension Service. This was a project to “extend the resources of the colleges and universities of Kansas to business and industry,” in an attempt to emulate Agricultural Extension. Under the State Technical Services Act, this was a nation-wide effort that lasted 4 years, but achieved small success, even on a nation-wide basis.

In 1970, he became a full-time expert witness in accident and product liability litigation. Dr. Razak had been doing this on a part-time basis since 1953, but it quickly became full time and he testified in courts throughout the U.S. He gradually phased this out in 1995-97, after working on over 8,000 cases - - primarily for the railroads. Literally, he had gone from a high-octane aluminum industry to a diesel oil cast iron industry. In later years, he gave national seminars to attorneys on how to handle technical related cases and more specifically how to use animation to reconstruct accident details. He operated this as a business for about seven years.

Today, at age 84, he is involved in his fourth and fifth careers. One is knowledge management and the other is airplane design. His knowledge management efforts include a simple online method with which individuals can describe themselves in terms of the knowledge and what they can do. It’s an effort to develop a credentialing system for persons without any, or only some, college work, and it’s a tool to help individualized learning be used to document a person’s knowledge. It’s more detailed than a resume and allows users and employers to understand the areas of study and application that an individual brings to a given operation.

His fifth career is designing a delivery airplane. He is associated with a small company in Wichita that is using a new approach to airplane manufacture in order to hold down first costs and to develop a niche product. This airplane will evolve into a Power-Wing airplane which is an outgrowth of work that he did at WSU in the mid-50s. His firm hopes to have a prototype of this airplane flying in about 2 years.

Dr. Razak was part of the barnstorming era in aircraft design and growth. He trained several of the leaders. As a result of all of his flying, he has a pilot’s license that includes 40 hours of aerobatic training and 55 years of flight.

He worked with Stearman, Culver Aircraft, Beech, Boeing, and Cessna during some of their largest growth years. It was an era of biplanes moving to single wing aircraft. Crude flight simulators and centrifuges provided realism in training to complement hands on and class work. He was a part of the growth of the town of Wichita by virtue of its aeronautical prowess, its impact on thousands of lives and an entire industry.

As a teacher, an educational administrator, and a hands-on aircraft designer, Dr. Kenneth Razak is clearly a distinguished Mechanical Engineering alumnus.

KUME NEWSLETTER 7 MARCH 2005
Pictures from the 2005 Engineering Expo

Engineering Expo (February 25 & 26) was again a huge success this year, with a large number of junior high and high school students from the surrounding area finding out what engineering is all about. Current KUME students spent much effort and time setting up exhibits and displays to show our K-12 visitors various aspects of mechanical engineering - - from heat transfer to robots to automobiles to duct tape (ok, that’s mostly for fun) to biomechanics.

Mechanical Engineering senior Aaron Weigel explains heat transfer by cooking pancakes for Expo students.

Mech. Eng. graduate student Feiqi Zhang talks to students in the robotics lab.

An Expo attendee gets duct taped to a wall in Learned Hall!

The Formula Cars from years past were on display at Engineering Expo.

Engineering Expo attendees learned a lot about ME’s biomechanics studies.
Another professor from years past. Can you remember who he is?

In 1947, this mystery professor came to the University of Kansas from the University of Oklahoma to become Professor and Chair of Metallurgical Engineering, where he stayed for 20 years. In 1961, mining enrollment dropped so low that the separate degree was no longer offered, and the department was re-named Metallurgy and Materials Engineering. Even with the difference in direction, enrollment continued to drop; and, in 1968, the department merged with Mechanical Engineering.

This professor served as Acting Associate Vice Chancellor for International Affairs for one year and Associate Dean of Engineering for six years.

He was born in Hackney, near Winfield, Kansas, and later moved with his family to Winfield. Next, he moved to Blackwell, Oklahoma, near the Kansas-Oklahoma border. In 1933 he enrolled at Southwestern College in Winfield and studied chemistry for two years. Then, with a scholarship from Colorado School of Mines, he studied metallurgy and extractive metallurgy.

After graduation, he worked for Caterpillar. He was only one of two graduates to get a job. A year-and-a-half later, he moved to Buffalo, New York to work in aircraft plants teaching engineering to workers who were preparing for the coming war.

Then, he followed his mentor from Colorado School of Mines to Cornell for his master’s degree. When he finished in 1943, he went to Battelle Memorial Institute in Columbus, Ohio to work on precision investment castings for jet engines. He helped make assessments of what materials other countries were short of during the war.

In 1946, he went to teach at OU, and then came to KU in 1947. Our mystery professor retired in 1984, after teaching at KU for 37 years.

He received an NSF grant to develop a program for growing crystals so that a microscope could project them on a screen. His “Crystal Gazing” was shown at least 200 times to various students and organizations. In 1960, he received a Fulbright Scholarship and moved to Peru where he taught at the National Engineering University in Lima. In 1965, he went back to teach in Lima on a Ford Foundation Grant. While helping identify professors who could come to the US for advanced education so they could teach advanced courses in Lima, he also was able to study the metallic artifacts in the Museum of Anthropology.

Later he returned to the University of Lima on an NSF grant to develop a program in mining and metallurgy. He also returned under the sponsorship of the Organization of American States to teach a course in corrosion. Later he went to Venezuela for more teaching of corrosion to petroleum engineers.

When he returned to KU in 1968, it was clear that metallurgy did not have a sufficient base to continue. NASA had just awarded KU a grant to develop new kinds of master’s and doctor’s degrees in engineering, which were directed towards application rather than research. He became the Associate Dean of Engineering. He later became the Associate Dean of Graduate Studies in Engineering.

In his later years in mechanical engineering, he taught materials processing, manufacturing and corrosion. One of the labs was named in his honor after he left.

Along with Dr. Bob Zerwech, he taught a course on jewelry and silversmithing based on the science and processing steps. In 1983, he received the KU Chancellor’s Club Career Teaching Award, becoming the third recipient in the School’s history. Students also voted him the Gould Award for excellence in teaching.

Who is this well-known teacher and administrator? He is Dr. Kenneth E. Rose. For more on his life, read the oral history manuscript he left with the archivist of Spencer Library. Ken Rose died on October 2, 1994.

KUME NEWSLETTER 9 MARCH 2005
You are cordially invited to:

The University of Kansas
Mechanical Engineering
2005 Awards Banquet

Alvamar Country Club
1809 Crossgate Drive
Lawrence, Kansas  66047

6:30 - 8:30 p.m.
April 29, 2005

(The cost is $20 per person and $35 per couple.)

For more information, please contact
Carol Gonce
at
cgonce@ku.edu  or (785) 864-3181
Alumni Updates

Cassandra Eastridge, 2004
Design Engineer, Honda Performance Development (CA)
What she’s up to: “FSAE Alumni…For the last six months I have been working as a Design Engineer for Honda’s Indy Racing program designing engine parts. Brett Erickson (from my FSAE team) also works for the company as a Race Engineer.”

Richard Kown, 1969
Retired President, Arkon Enterprises, Inc.
What he’s up to: “Retired from business, not life! Remarried (8/24/04) to a lovely Canadian Real Estate Lawyer. Living and enjoying each other and the weather in Palm Desert, California.”

James Reimbold, 1960
Retired VP of Engineering, Broderson Mfg. Corp.
What he’s up to: “I’ve been retired for four years after working in ME for 40 years, 34 of which were in mobile hydraulic equipment. The last 12 years before retirement, I was VP of Engineering for Broderson Mfg. Corp., which is a manufacturer of mobile cranes in Lenexa, Kansas. I live in Stillwell, Kansas with my wife and have a number of hobbies including travel - - both U.S. and international.”

Let us know what’s going on in your life!
Send us an email or use the form on the next page.

School Alumni Awards

L. Joseph Bauman, 1961
Chairman and CEO of Cardinal Brands, Inc.
Lawrence, KS

Award Announcement: On May 12, 2005, Joe Bauman will officially receive a Distinguished Engineering Service Award (DESA) from the University of Kansas School of Engineering. Each year, the School selects recipients of the Distinguished Engineering Service Award. The winners -- who are successful KU alumni, or engineers who play close, supportive roles with KU -- are chosen for their achievements, leadership and service to the profession and to the School of Engineering. Honorees receive a unique statue at the annual awards banquet. Recipients are chosen by a committee which is formed by the School of Engineering’s Advisory Board, a group of the School's alumni and friends who meet regularly to suggest ways to improve the School and keep it at peak performance. Joe Bauman’s outstanding career demonstrates that he is most deserving. You can read more about his career and accomplishments in the September 2004 KUME Newsletter, which describes why he was recognized with the 2004 Mechanical Engineering Distinguished Alumnus Award [and thus the DESA].

Congratulations Joe!
Alumni Update

In order for us to know what you are doing and inform others in future newsletters, please drop us a note or fill in this form and return it to: ME Vibrations newsletter, University of Kansas, Mechanical Engineering Department, 1530 W. 15th, 3138 Learned Hall, Lawrence, KS 66045. Or, send an email to kume@ku.edu; and visit our website at http://www.engr.ku.edu/me/.

Name_____________________________________________________
Class______________________________________________________
Address_____________________________________________________________________
Company_________________________________________________ Title_____________________________________________
News about yourself, your family, and/or your job: ____________________________________________
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