

SUMMER, 1991

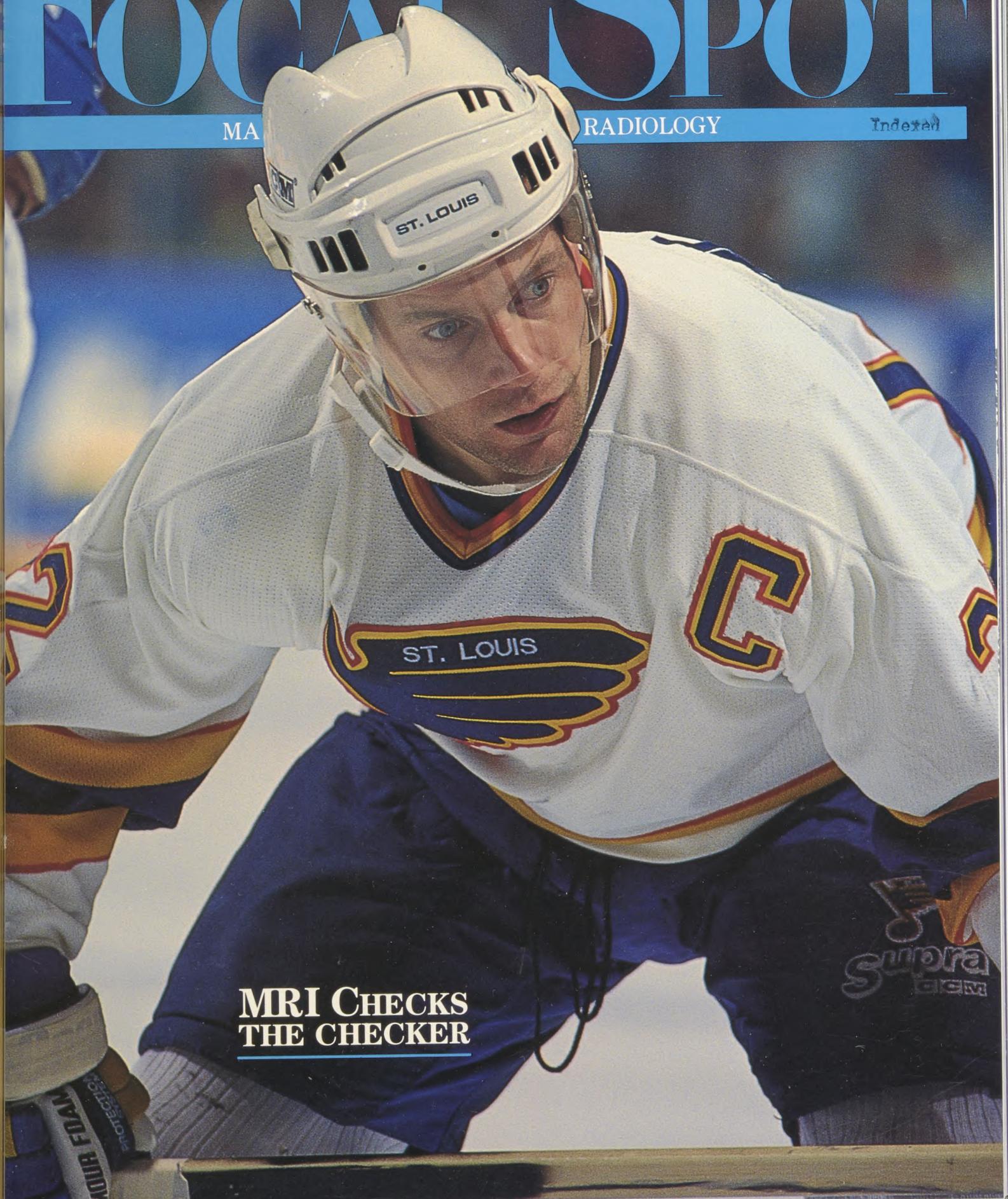
VOLUME 22, NUMBER 2

FOCAL SPOT

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RADIOLOGY

Indexed



**MRI CHECKS
THE CHECKER**

MIR

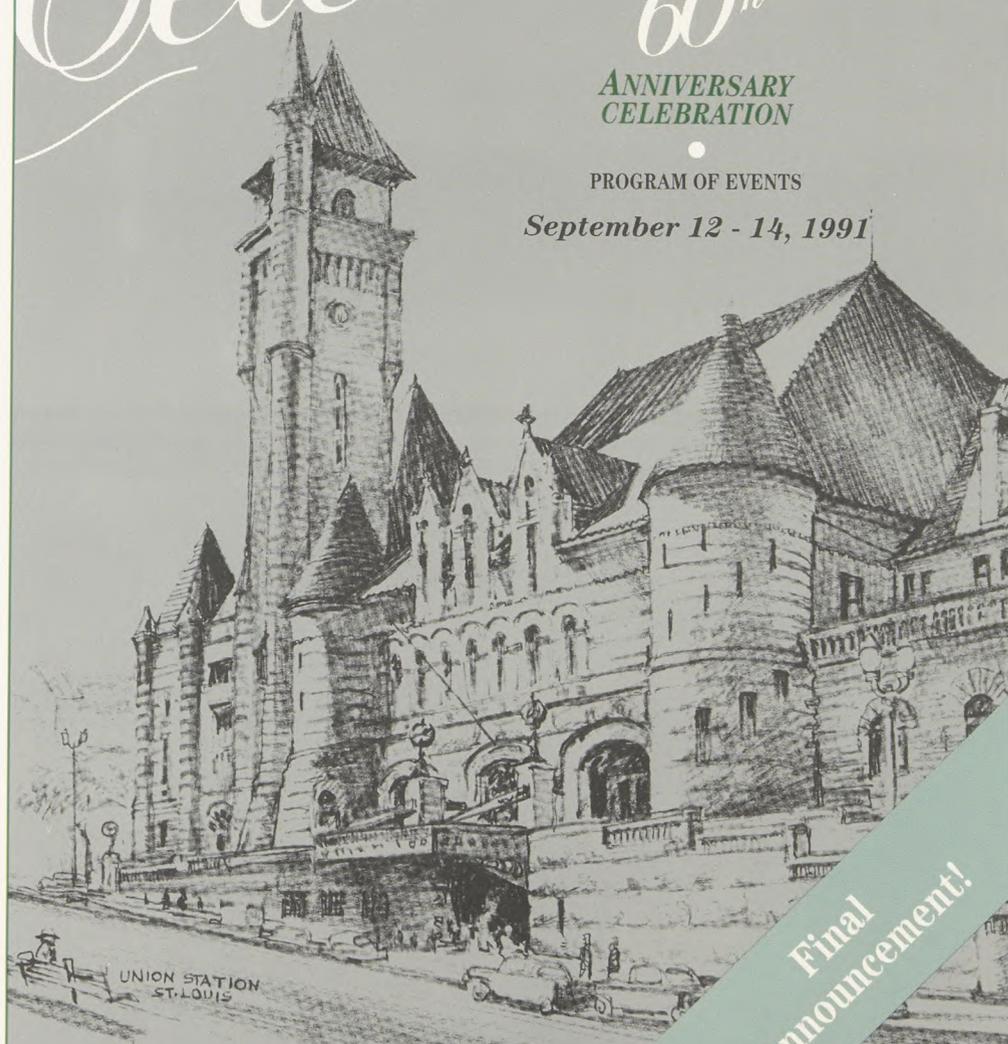
Celebration

60th

ANNIVERSARY
CELEBRATION

PROGRAM OF EVENTS

September 12 - 14, 1991



**Final
Announcement!**

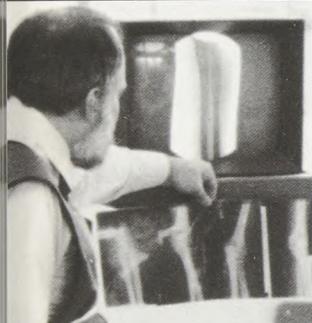
SPONSORED BY MALLINCKRODT INSTITUTE OF RADIOLOGY AT WASHINGTON UNIVERSITY MEDICAL CENTER

FOCAL SPOT

SUMMER, 1991

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MALLINCKRODT INSTITUTE OF RADIOLOGY



6 DOCTOR DETECTIVE

Criminals often dismember bodies to avoid detection. But William A. Murphy, Jr., M.D., a pioneer in modern forensic radiology and codirector of the musculoskeletal section at Mallinckrodt Institute, finds needed information to bring criminals to justice.



12 MRI CHECKS THE CHECKER

Rick Meagher of the St. Louis Blues suffered a knee injury at a crucial time — the peak of the 1990 hockey season and the twilight of his career. How serious was the injury and would it require surgery? Magnetic resonance imaging (MRI) provided the answers.



18 MASTER TEACHER

This year, Ron Evens celebrates his twentieth year as Mallinckrodt Institute's director. His talents as physician, businessman, and teacher manifest themselves in a leadership that has given him great renown. But nothing gives Ron Evens more satisfaction than his role as educator of more than 382 young residents.



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MIR
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ON THE COVER:

Rick Meagher focuses on the puck before a face-off during the 1990 playoffs. Shortly thereafter, he suffered a season-ending knee injury.

SPOT NEWS



As part of the annual Probststein Oncology Lecture, Carlos A. Perez, M.D., director of the Radiation Oncology Center, honors Luther Brady, M.D., (left) for his meritorious contributions to clinical oncology. Brady's study has given new hope to brain-tumor patients.

Brady Discusses Brain Tumor Survival at Probststein Lecture

The picture was pretty bleak for patients with malignant brain tumors: treatment with surgery alone carries a low success rate; surgery combined with chemotherapy boosts the odds just a little. But a new treatment combining surgery, radiation therapy and an antibody has brought astounding results.

Previously, patients with malignant tumors that were hemorrhaging and increasing in size had a three to five percent survival rate at 18 months after surgery and radiation therapy. When the

antibody was added to the treatment, the survival rate jumped to 40 percent — an increase of more than 90 percent.

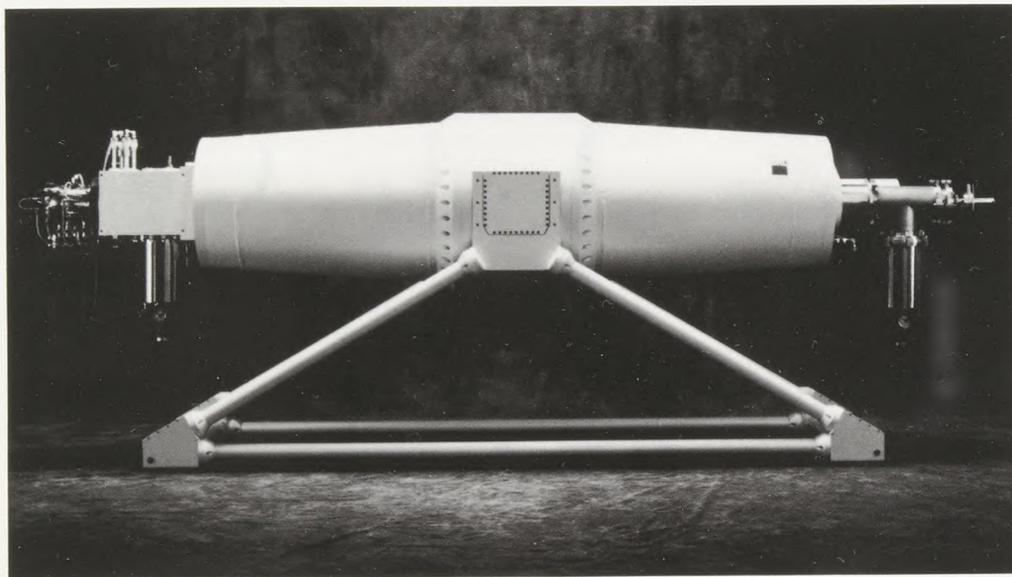
According to Luther W. Brady, M.D., chairman of the Department of Radiation Oncology at Philadelphia's Hahnemann University, the antibody used in the treatment plan latches onto the tumor cells and boosts the dose of radiation and, thus, the effectiveness of the treatment. In his presentation on "Innovations to Improve Local Control in the Treatment of Primary Malignant Brain Tumors," Brady, the guest speaker for the annual Probststein Oncology Lecture, also pointed out that patients with potentially fatal but less aggressive brain tumors had a 20 to 25 percent 18-month survival rate with surgery and radiation therapy. The survival rate doubled after introducing the antibody.

Simpson Garners Wilson Award

The 1991 Hugh M. Wilson Award for Meritorious Work in Radiology was presented to Kurt R. Simpson, M.D., at commencement exercises on May 17. According to Fernando R. Gutierrez, M.D., associate professor of radiology, who heads up the Wilson Award Nominating Committee, "Kurt Simpson was highly recommended for his commitment to his work and for his exceptional sense of responsibility to the project. Over the last two years, Kurt certainly has demonstrated meritorious work in radiology and is most deserving of the award."

Simpson worked with Kondapuram Sampathkumar, M.S., research assistant professor of radiology in the Division of Nuclear Medicine, on the implementation of digital filtration of multiple cardiac images. Their combined efforts resulted in a substantial improvement in speed over conventional processing. Simpson also provided invaluable assistance to R. Gilbert Jost, M.D., chief of the Division of Diagnostic Radiology, and to Stuart S. Sagel, M.D., section chief of chest radiology and codirector of computed body tomography, in the digitization of chest radiographs.

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TCA Makes PET Less Costly, More Practical

A team of MIR researchers led by Michael J. Welch, Ph.D., director of the Division of Radiation Sciences, has collaborated with a team from Science Research Laboratories (SRL) in Somerville, Massachusetts, in the development of a Tandem Cascade Accelerator (TCA) and an automated chemistry system. Sponsored by the Strategic Defense Initiative Organization (SDIO) Office of Technological Applications, this new system for producing the radiopharmaceuticals used in positron emission tomography (PET) will make the procedure more accessible for a greater number of doctors and patients.

PET, developed in the early 1970s by Michel Ter-Pogossian, Ph.D., and a team of MIR researchers, uses radiopharmaceuticals to assess the patient's biochemical processes, producing images of function rather than form. These radiopharmaceuticals commonly are produced with a medical cyclotron, which costs around \$1.5 million and, weighing 30 tons or more, usually must be installed in the basement of a medical center. MIR was the first medical facility nationwide to house its own cyclotron.

The TCA provides the same capabilities as the conventional cyclotron at half the cost. Lightweight (around one ton), consuming less power, and requiring less air conditioning and water cooling than the cyclotron, TCA is considerably less expensive to install and operate, and produces radiopharmaceuticals equivalent to those provided by a cyclotron but with far less complexity.

The Tandem Cascade Accelerator is user-friendly, can be installed with few facility modifications, and costs about half the price of a conventional cyclotron.

MIR Featured in Award-winning TV Series

A five-part television series on mammography, featuring MIR's Breast Diagnostic Center as well as interviews with Judy M. Destouet, M.D., head of mammography at the Institute, was awarded the 1990 American College of Radiology (ACR) News Award in the broadcast media category. The series, which was the brainchild of John Schieszer, medical reporter for KPLR-TV, channel 11 in St. Louis, was chosen from more than 80 entries nationwide. The Radiology News Awards are sponsored by the ACR, the American Roentgen Ray Society, the American Society for Therapeutic Radiology and Oncology, and the Radiological Society of North America.

Vannier Appointed to NIH Committee

Michael W. Vannier, M.D., professor of radiology, director of the Division of Radiology Research, and head of the image processing laboratory, was appointed to a four-year term on the Biomedical Library Review Committee of the National Institutes of Health National Library of Medicine (NLM). The Committee is charged with determining the scientific merit of grant applications for medical library resources, integrated academic information management systems, training in medical library and other information sciences, research in medical informatics, and biomedical scientific publications. After careful scrutiny, the Committee submits selected projects to the NLM's Board of Regents, which makes the final decision for awarding grants. Periodically, Committee members make site visits in connection with the evaluation of specific applications.

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Library Fund Needs Your Support

The Edward Mallinckrodt Institute of Radiology Library has known several homes, moving from the Mills Room (now known as the Radiation Oncology conference room) on the first floor to MIR's eighth floor to its present abode on tenth floor, across the hall from the musculoskeletal section's administrative offices. Under the direction of William G. Totty, M.D., associate professor of radiology, the library now houses more than 3,000 printed volumes and 500 videotapes and is a valued resource for MIR's faculty and staff.

Your support of the Library Fund ensures that the quality of this resource will be maintained. Your contribution can be sent to the office of Ronald G. Evens, M.D., director of the Institute, 510 South Kingshighway Boulevard, St. Louis, Missouri 63110. A book tag recognizing your generosity will be placed in a selected volume in the library.

Two Presentations Receive High Honors

Scott A. Mirowitz, M.D., assistant professor of clinical radiology, received the *magna cum laude* award for his poster presentation "Dynamic Gadolinium Enhanced Rapid Acquisition Spin Echo MR Imaging of the Liver" at the annual meeting of the Society of Magnetic Resonance Imaging in Chicago, Illinois.

Mirowitz discussed the advantages of dynamic breath-hold imaging of the liver. Breath-holding while using magnetic resonance (MR) imaging eliminates breath artifacts and allows for rapid images that capture the effects of injected intravenous contrast agents. This method allows tumors and masses in the liver to be displayed.

Cum laude honors were garnered by Jeffrey J. Brown, M.D., assistant professor of radiology; Carol Wieggers, B.A., graduate student; Michael J. Welch, Ph.D., professor of radiology and director of the Division of Radiation Sciences; and Joseph K. T. Lee, M.D., professor of radiology, for the presentation of their pilot study at the Society of Computed Body Tomography Scientific Session in Washington, D.C.

"Biodistribution, Relaxivity and Imaging Studies of New Lipophilic Contrast Agents for MR Imaging" discussed new contrast agents for MR imaging that could result in more effective imaging of the heart and liver. In the study, ligands, which bind certain metals, were compared with the currently used agent, Gadolinium DTPA.

In addition to the award, a \$3,000 stipend was provided to the Institute for further research in this area.



On June 14, recipients of the American Cancer Society (ACS) Oncology Fellowship were awarded certificates signifying the completion of their advanced cancer studies. Shown at the ceremony are (left to right) Virgil Loeb, M.D., past president of ACS; Perry Grigsby, M.D., clinical chief, Radiation Oncology, and a past recipient of an ACS fellowship; Martin Keisch, M.D., cochief resident, Radiation Oncology, and a 1991 ACS fellowship recipient; and Carlos Perez, M.D., director, Radiation Oncology Center. Other recipients, who were unable to attend the presentation, are Jeffrey Kovalic, M.D., chief resident, Radiation Oncology, and Donald Busiek, M.D., Radiation Oncology, Jewish Hospital.

Wasserman Named to Two Committees

Todd H. Wasserman, M.D., professor of radiation oncology, was appointed national chairman of the Radiation Therapy Oncology Group's (RTOG) newly formed Quality of Life Research Committee. The committee will apply new endpoints to clinical trials measuring benefits to patients' quality of life in addition to their survival or other traditional endpoints, such as tumor response. The committee's research will provide supplementary data for making decisions on therapy options. Wasserman's extensive work with RTOG includes acting as vice-chairman for new modality development, chairing the corporate relations committee, and representing the RTOG at the National Cancer Institute's national Conference on Quality of Life.

Wasserman also was appointed to the 1991-1992 Education Committee of the American Society of Clinical Oncology (ASCO), one of the world's largest oncology societies with more than

SPOT NEWS

8,400 members. He is the only radiation oncologist on the Committee. ASCO encourages communication among all cancer specialties with particular emphasis on human biology, diagnosis, and treatment as well as promoting extensive training in clinical research and the total care of cancer patients. The Education Committee is given the charge of providing to ASCO members all available clinical oncology information, reviewing external requests for cosponsored educational activities with other societies, and maintaining the necessary standards of those activities to obtain Continuing Medical Education credits.

According to James Ganterberg, executive director of ASCO, "The Education Committee is an important part of the Society, and we look forward to Doctor Wasserman's contributions."

Evens Delivers Hodes Lecture

According to Ronald G. Evens, M.D., director of the Institute, 11 percent of the U.S. Gross National Product (GNP) goes to health-care costs as compared to eight percent in other countries. And the U.S. percentage is rising - soon to be 12 percent.

As the Fourth Annual Philip J. Hodes Lecturer at Philadelphia's Thomas Jefferson University, Evens spoke on "The Federalization of Radiology - Technology Assessment and Fee

Schedules: Boon or Boondoggle?" He pointed out that the federalization of payment systems must include identification of chargeable services, capturing all charges, controlling expenses, and controlling the capital budget. Reducing health-care costs is the issue, not technology assessment, and that can be achieved through centralizing high technology, establishing requirements for quality and efficacy, setting standards, instilling patient reality, and eliminating self-referrals.

In conclusion, Evens said, "People are sick; they want our care. If we provide the proper approach, which must include consideration of cost, then we'll still be in business in the future."

MIR Exhibitors Corral ARRS Recognition

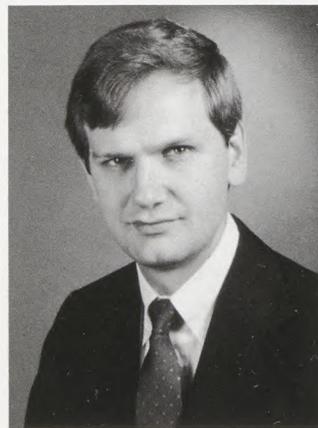
From more than 220 scientific exhibits displayed at the 91st Annual Meeting of the American Roentgen Ray Society, MIR faculty won three of the top awards.

William G. Horstman, M.D.; William D. Middleton, M.D.; and G. Leland Melson, M.D., were presented with a silver medal award for "Color Doppler Ultrasonography of the Scrotum." The exhibit addressed the evaluations of the different scrotal diseases that can be detected by color Doppler ultrasound.

Jamie T. Surratt, M.D., and Marilyn J. Siegel, M.D., brought home a bronze medal for "Imaging of Pediatric Ovarian Lesions." Their presentation gave an overview of the imaging of

ovarian masses in 86 pediatric cases, using a combination of computed tomography, ultrasonography, and magnetic resonance imaging.

Thomas M. Vesely, M.D.; Michael D. Darcy, M.D.; Marshall E. Hicks, M.D.; and Daniel Picus, M.D., earned an award of merit for "Technical Problems Associated with Bird's Nest Vena Cava Filter Placement." According to Vesely, the exhibit covered three areas: (1.) multiple problems that occur with Bird's Nest filter placements, (2.) solutions to those problems, and (3.) suggestions for maneuvers to prevent problems.



James R. Duncan, M.D.

First-time RSNA Research Resident Award Goes to Duncan

James R. Duncan, M.D., Ph. D., third-year resident in radiology, is one of three national recipients of a \$25,000 grant as part of the 1991 Radiological Society of North America (RSNA)

Research Resident Award. This is the first year for the award, which will be given annually.

This RSNA Award will support Duncan's research on magnetic resonance imaging (MRI) contrast agents. According to Duncan, "MRI yields a tremendous amount of information; contrast agents can potentially add a whole new dimension to MRI. I will be designing and investigating a contrast agent that can monitor cell metabolism. Such agents may allow a more precise radiologic diagnosis."

RSNA is the world's largest radiological organization dedicated to the advancement of science and education. By establishing the RSNA Research Resident Program, the Society hopes to encourage second- and third-year radiology residents to explore careers in academic radiology and research.



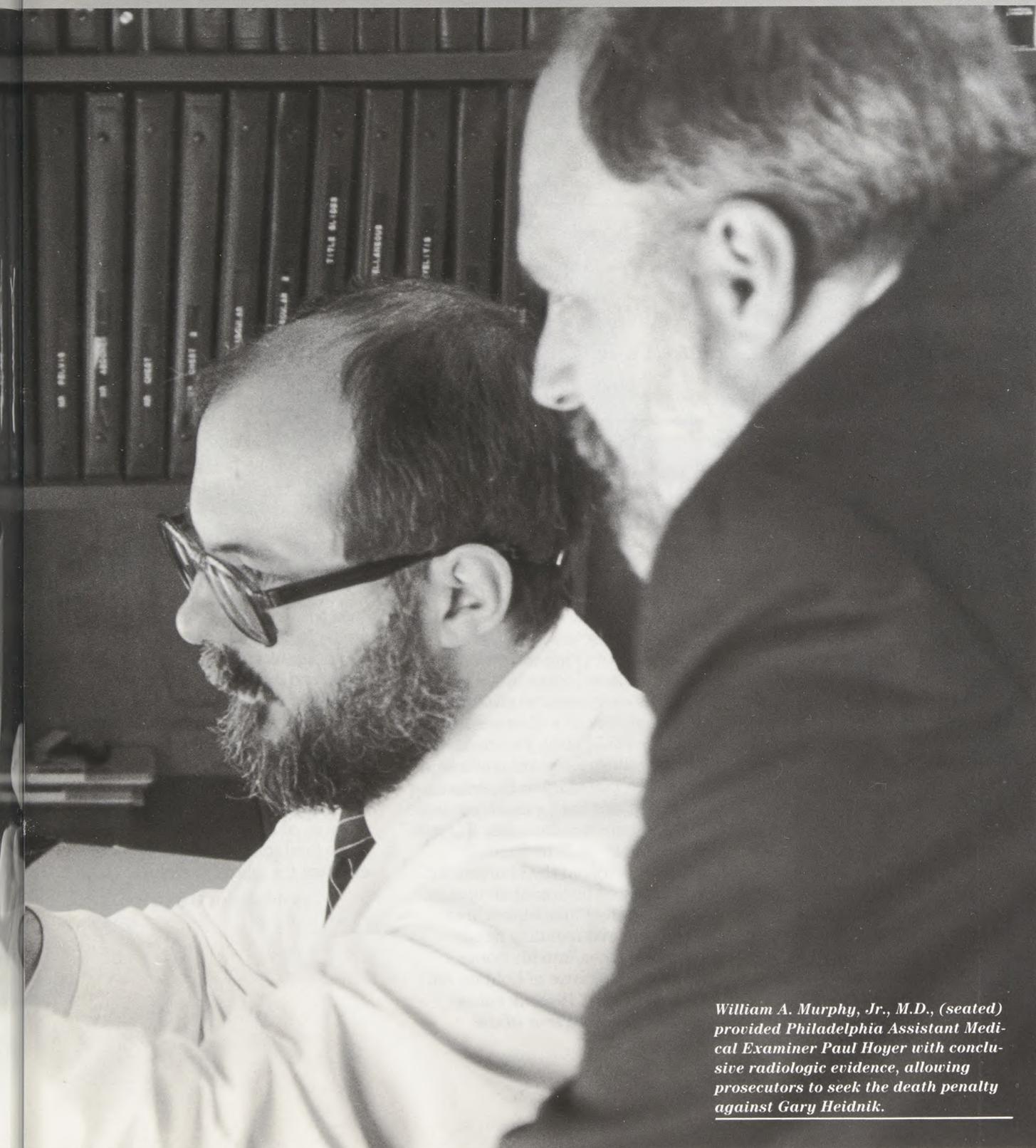
DOCTOR

The young woman had been abducted in the middle of the night and later died at the hands of her abductors. The murderers locked her body in a trunk and set fire to it, reducing the coffin and its contents to ashes. The final step in this crime was spreading the ashes over a field far out into the country. No body. No witnesses. The perfect crime.

But the murderers made two mistakes. One of the participants confided the details to an acquaintance who, in turn, notified the police. And, none of the criminals counted on Dr. William A. Murphy's ability to identify the young woman from two minuscule pieces of bone remaining in the ashes.



DETECTIVE



William A. Murphy, Jr., M.D., (seated) provided Philadelphia Assistant Medical Examiner Paul Hoyer with conclusive radiologic evidence, allowing prosecutors to seek the death penalty against Gary Heidnik.

DOCTOR DETECTIVE



Murphy is a professor of radiology and codirector of the musculoskeletal section at Washington University's Mallinckrodt Institute of Radiology and, since 1975, a consultant for the offices of the medical examiner in St. Louis City and County. He is known nationwide as a pioneer in modern forensic radiology, a science that assists in legal problems through the application of facts obtained by X rays.

Forensic radiology is, in most instances, an indispensable tool and is used increasingly in forensic medicine for the scientific evaluation of an unknown body that lacks identification following decomposition, mutilation, incineration, or skeletonization and for individual personal identification of the remains of single bodies or of many bodies in mass disasters. In instances of gunshot wounds, explosions, obscure wounds, fractures, penetrating wounds, conditions resulting from surgical or medical treatment, strangulation, and child abuse, the eyes of the radiologist can unearth clues that an untrained eye would miss. The radiologist is an important member of a team that can include a trained death investigator, forensic pathologist, chemical toxicologist, forensic dentist, and, occasionally, forensic anthropologist.

In 1895, Wilhelm Conrad Roentgen, a German physicist, produced the first human X-ray image — of his wife's hand. Little more than a year later, X rays were used as decisive evidence in litigations in England in a negligence case; in Canada, a malpractice suit; in France, a case concerning a gun-

shot wound; and in the United States, a workmen's compensation action. Also, at about that same time, a landmark civil case in Denver, Colorado, involving a malpractice suit for failure to diagnose a fracture in a patient, established the accuracy and importance of the X ray within the courtroom.

The bones found in the freezer were the only evidence the police had to identify the woman.

Murphy's interest in forensic radiology goes back to his days as a medical student at Pennsylvania State University and The Milton S. Hershey Medical Center. On an externship away from the Hershey Medical Center, Murphy worked as a forensic pathology fellow and assisted in cases with the Philadelphia Office of the Medical Examiner.

This early collaboration would be repeated nearly 20 years later when in 1987 Paul J. Hoyer, M.D., Philadelphia's assistant medical examiner, called upon Murphy to identify a victim in a much publicized torture/murder case. Tagged by the media as "The Heidnik Case," it involved the charismatic, self-ordained bishop of an upstart church in the Philadelphia area who had lured mentally handicapped women into his home under the pretense of holding religious services. Heidnik subsequently enslaved four of the

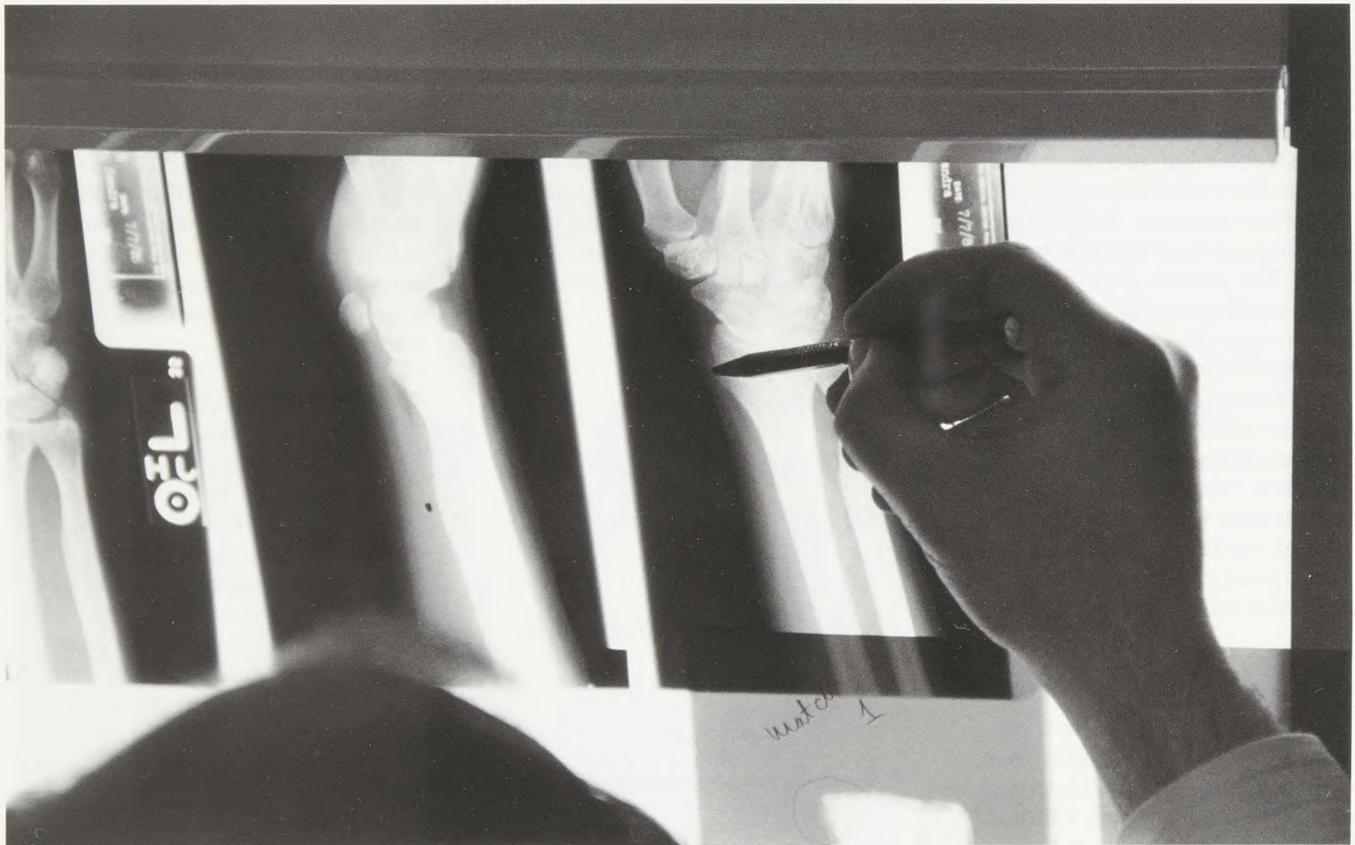
women, holding them captive in the dungeon-like basement of his church/home. The torture of one woman resulted in her death. After dismembering the body, Heidnik disposed of most of the body but stored the remaining parts in his deep freeze.

One woman miraculously escaped from her nightmare prison and contacted the police. A raid on the house of horrors turned up three barely alive women and three frozen limbs in the freezer, as well as pieces of bone in the kitchen. The bones found in the freezer were the only evidence the police had to identify a woman whom the surviving captives claimed Heidnik had murdered. Hoyer contacted Murphy.

"I was told that after medical school Murphy had gone on to refine a very special expertise in matching unique characteristics of bone tissue by studying X rays taken before and after a victim's death," says Hoyer.

Murphy's assistance in this case was especially valuable since all the usual elements for positive identification of a body (face, skull, and hands) were missing. Murphy's corroboration that the limbs did indeed belong to the victim could be admissible as evidence in court against Heidnik.

Information resulting from radiologic investigations of body parts is, of course, necessarily more limited and, therefore, different than for whole skeletons.



Primary sites of comparison were the sharp, needle-like areas where the spongy tissue forms a meshwork of spaces filled with bone marrow. The outer layer (cortical) of the bone also was identical in the pre- and post-mortem X rays.

However, the forensic radiologist can confirm or establish whether a bone is human or nonhuman and at times, make an estimation of sex, age, stature, and past medical history. In forensic matters, the ultimate goal is to establish identity.

“**W**hen Paul asked me to work on this case, I instructed him to keep the limbs frozen so the tissue wouldn’t begin to deteriorate and to fly the evidence to me here in St. Louis,” says Murphy. “I can only imagine the surprise the airport attendants had when they passed that container through the security scanner.”

Hoyer also brought some old X rays of the victim, which were provided by her parents. Since most people have had some type of X ray made in previous years, a positive identification can be made by comparing pre- and postmortem films. This method has been used since 1927; the first case involved X rays of frontal sinus cavities. Just as no two persons have the same set of fingerprints, no two persons have the same frontal sinus outlines or identical patterns of any skeletal structure.

The medical X-ray method of identification is used especially in cases where the body has endured extensive damage to the tissues, thereby making visual or finger-

DOCTOR DETECTIVE



print identification impossible; many bones often are preserved even if a large percentage of the body is destroyed. Unique identifying features are found in patterns of the trabecular (meshwork of spaces filled with bone marrow) or cancellous (spongy, lattice-like, bony tissue) bone anywhere in the body. The pattern of ossification in the cartilage connecting a rib to the sternum also is useful. Positive identification can be made from films showing departures from the normal, such as old fractures, metal prostheses, cysts, abnormal calcifications and normal variants like sesamoid bones (a small nodular bone in the tendon or joint capsule), or variations in the size and shape of certain bones.

Identification by bone fragments is possible because each person's skeleton is unique. But, according to Murphy, identifying a person by reading X-ray films of bones is difficult because bone tissue patterns are quite complex. Comparison of pre- and post-mortem X rays requires assurance that the technical aspect of the X-ray studies are very similar. And that is where Murphy's expertise comes to the forefront.

In the Heidnik case, Murphy used fluoroscopy and high-detail film to produce X rays of the three frozen limbs, now identified as the victim's right forearm (made up of the radius and ulna bones), the right humerus (the bone that extends from the shoulder to the elbow), and the left forearm. For the next two hours, he compared the old and new film. His diligence paid off.

"There were multiple sites of match, and four of those sites were fully developed — two sites in the distal radius, one in the proximal ulna, and one in the proximal radius," Murphy summarized in his radiologic consultation report. "Additionally, in each of the sites, there were multiple points of identical comparison and no sites of discordance."

"Imagine their surprise when the airport attendants passed that container through the security scanner."

"There was a thin, curved line in the postmortem bone of a very precise length and unique curvature that also was visible in the premortem films. Using all available data, I was able to make a positive identification," he explains.

Over the years, Murphy has worked on hundreds of cases. The investigations have been as diverse as a human hand that was discovered on top of a commercial building and later was surmised to be one of several hands stolen from a gross anatomy lab to the most recent case involving the badly decomposed body of a 12-year-old boy who was found in a kitchen closet in a vacant building. In most of the cases, Murphy was called upon to do the seemingly impossible task of solving a puzzle that had a lot of missing pieces. Unlike the popular

1970s television series *Quincy*, starring actor Jack Klugman as a medical pathologist who always solved each case, Murphy says that is not quite true in real life. Although the number of solved cases far outweighs the number of unsolved, there are instances (as in the hand found on top of the building) where there simply are not enough clues to successfully complete the puzzle.

Murphy's skill in deciphering X-ray clues is so developed that he is considered one of the nation's foremost experts in forensic radiology. He is on call, donating his consultations to what he terms "my chance to give back something to our community." As evidence of Murphy's expertise in the field of radiology, he recently was asked to present the 18th Annual Benjamin Felson Lecture, one of the most prestigious radiology lectures in the United States. Among his speech topics was radiology's role in death investigation.

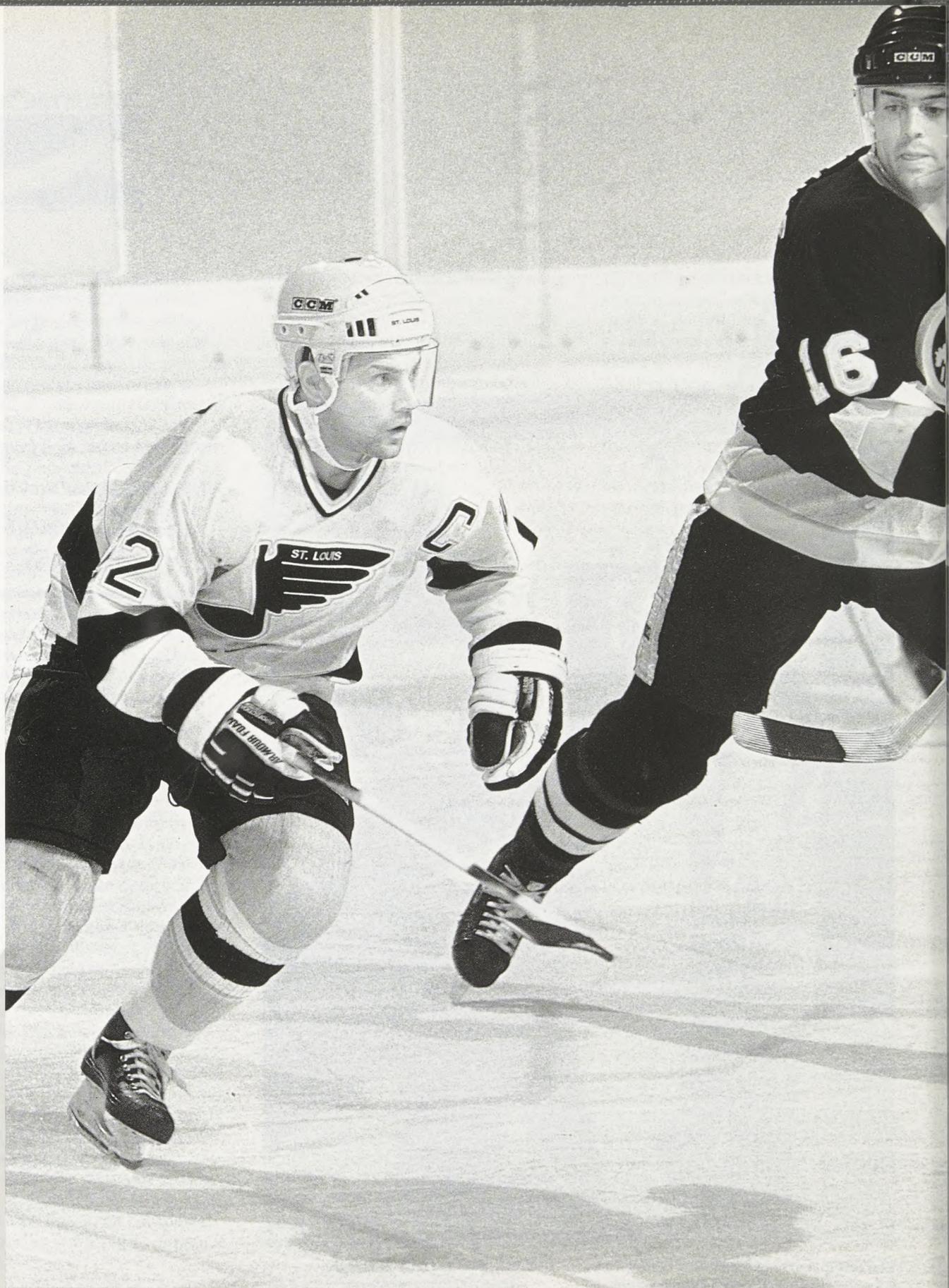
Three times a year, during a one-week course at St. Louis University, Murphy teaches one of the few formal courses in the United States on forensic radiology. "There's not enough documented material for a full-fledged college or medical school course. The best approach is through journals and short programs," says Murphy. "Radiologists don't need special training for forensics, just an interest and a willingness."

Murphy's forensic work is not glamorous. In fact, some would call it macabre. But without forensic radiologists, many cases would go unsolved. □

Without forensic radiologists, many crimes would go unsolved.



The left forearm of Heidnik's victim was radiographed using fluoroscopy and high-detail film. The right humerus and the right forearm were individually radiographed.



Demonstrating the great strength and flexibility he has always had in his knees and legs, Rick Meagher skates against Pat LaFontaine of the New York Islanders during the 1989-90 season.

MRI
CHECKS
THE CHECKER

by Joe Mueller

Rick Meagher's

eyes focused on his teammates as he glided along the ice. As he tried to avoid an opponent, the blade of his right skate slid into a groove in the ice. Meagher's torso and shoulders rolled backward, twisting his right knee. He felt it pop. Then it became numb.

As he fell to the ice, he sensed the 1990 National Hockey League playoffs were ending early for him.

In the following days, several decisions concerning treatment of the injury would be made with the help of vital information gained from magnetic resonance imaging (MRI) at Mallinckrodt Institute of Radiology. MRI has become the diagnostic imaging method of choice for injuries of the knee joint, due in large part to the development of the technology at Mallinckrodt Institute.

MRI CHECKS THE CHECKER

As Meagher left the ice that April night, he knew it was not the time to be injured. This was the 1990 Stanley Cup Playoffs, the apex of the season. Meagher, the 37-year-old team captain, was leading the Blues against the Chicago Blackhawks in the third game of the best-of-seven Norris Division finals. A crowd of more than 17,000 people at The Arena in St. Louis and a television audience of millions watched Meagher's fall.

"I watched the replay once and that's the last time I looked at it," Meagher says. "I just saw my knee go. It turned my stomach."

As a forward on the checking line, Meagher had delivered and absorbed thousands of hits during his college and professional career. He had been cut from high sticks and flying pucks and endured the subsequent stitches. But a simple bump from Chicago's Wayne Presley caused something much more serious.

"He just brushed up against me," Meagher says. "In no way was it a late hit or a dirty hit from behind or anything like that. I just tried to avoid him."

"Our knees and our legs are our livelihood and that was the first time something major had happened to me," he adds. "I knew I couldn't play any more that night. I would put some pressure on it and it would give out."

Several questions needed to be answered: Was the injury serious enough to require surgery? Was it a minor injury that might heal quickly enough for Meagher to return for the next round of the playoffs? Was the injury career-threatening?

Jerome Gilden, M.D., chief of orthopedic surgery at Jewish Hospital and the Blues' physician for 24 years, examined Meagher and diagnosed a torn anterior cruciate

*"A simple bump
from Chicago's
Wayne Presley
caused something
very serious."*

ligament. This ligament normally prevents front-to-back movement between the bones of the thigh and leg while allowing the knee to bend. Gilden believed surgery would be necessary, but he scheduled Meagher for an MRI at Mallinckrodt Institute to confirm the diagnosis and aid in further treatment. MRI can provide images of cruciate ligament tears and cartilage abnormalities as well as subtle fractures, other ligament tears, fluid accumulation, or bone bruises.

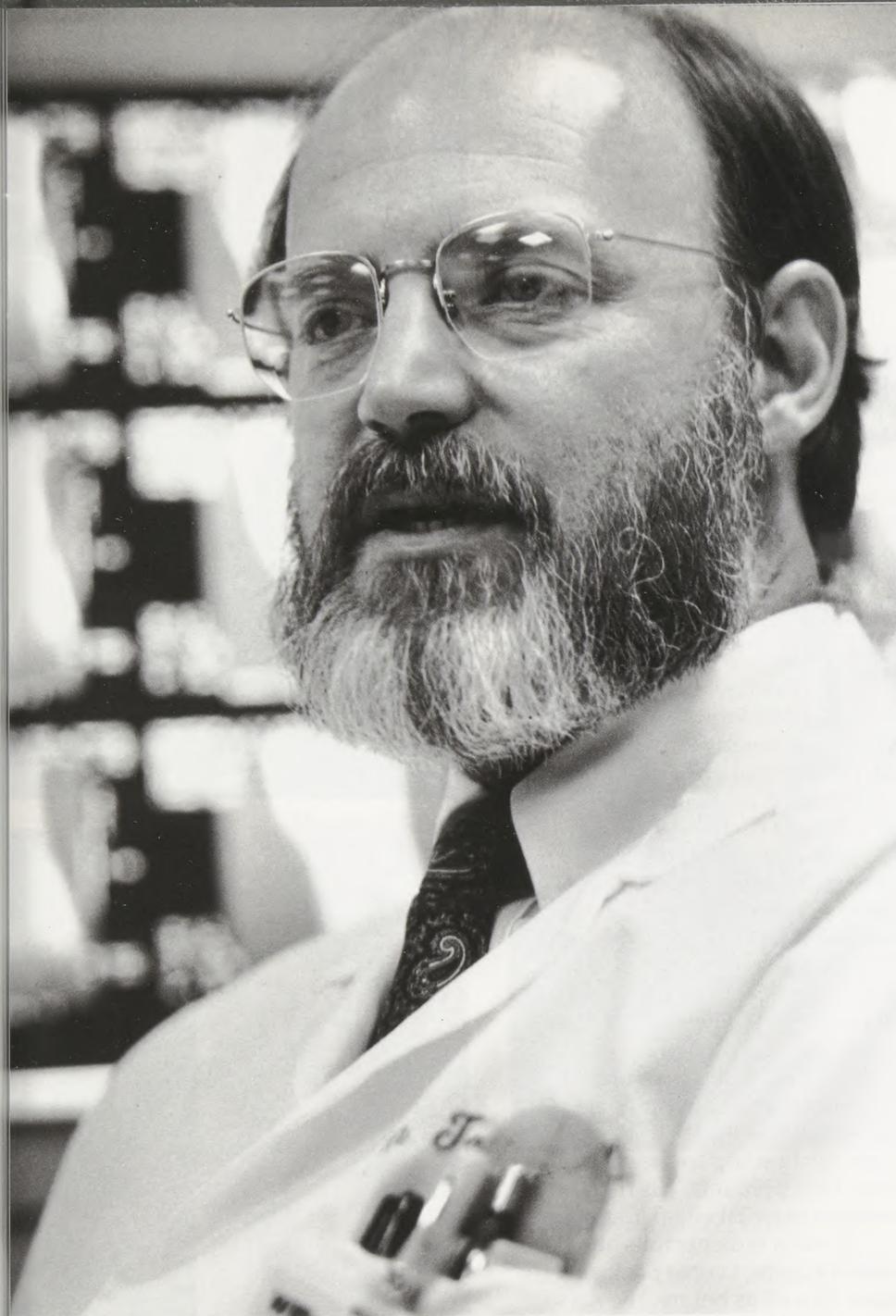
Mallinckrodt Institute's physicians have contributed to the research and development of MRI and have acquired special expertise in the field. According to Jeffrey J. Brown, M.D., acting director of MRI at Mallinckrodt Institute, "A lot of other health-care providers

have general radiologists working with MRI. Other groups may perform a large number of MRIs, but the physicians aren't as highly trained in the modality."

When millions of dollars in salaries, ticket sales, and television revenue are riding on a professional athlete's knees, physicians gather as much information as possible before making treatment decisions. Physicians around the United States are increasingly using MRI to diagnose or confirm diagnosis of athletic injuries. William G. Totty, M.D., associate professor of radiology in the Institute's musculoskeletal section, says MRI can give orthopedic surgeons objective information.

"Before telling a player he has a bad and possibly career-ending injury that has to be repaired, the doctor wants to be sure about it," Totty says. "This was Doctor Gilden's method of confirmation more than anything else. With professional athletes, that's especially important. And that's a legitimate use of MRI. Avoiding an expense of two thousand to three thousand dollars for an operation is valuable — even for a normal guy, the non-professional athlete."

Meagher wanted to return to the rink as quickly as possible. However, as he looked at the years remaining in his career, he also wanted to heal properly. He had seen many athletes limping and in pain long after their playing days had ended.



William G. Totty, M.D.: "If a knee does need to be repaired, MRI can tell surgeons the degree of injury and whether it's going to take a half-hour operation or a four-hour operation."

to produce energy during the scan. The transmitter emits radio-frequency energy that is transferred to the protons in the body. The protons return the energy, which is retrieved by the receiver and processed with computers. A scan takes approximately 30 minutes.

A special coil is used to obtain a clear signal and high resolution. The function of the coil is comparable to an antenna on a radio. The coil is made to fit the part of the body being imaged, such as the ankle, knee, shoulder, wrist, or head.

MRI uses no ionizing radiation, benefitting patients who require multiple or frequent scans. There are few restrictions on who can undergo an MRI but because of its magnetic field and its effects on metal, patients with pacemakers or those who have undergone certain types of vascular surgery cannot be scanned. Patients with skull plates, middle-ear prostheses, aneurysm clips in the brain, or metal fragments in or about the eyes also cannot be scanned. Patients who are claustrophobic also may not wish to be scanned because of the close quarters.

"I remember a guy in high school who tore a ligament, and he had a scar from his thigh to his shin from the surgery," Meagher says. "That's what I was most scared of. More than anything else, I wanted to make sure my knee would work. I didn't know how many more years I had to play. Whether I played hockey or not, I just wanted to make sure I could walk."

MRI can reveal a variety of injuries that can occur in the knee. Totty has seen cases in which unsuspected fractures have

appeared on MRI scans that did not appear on radiographs.

MRI uses a powerful magnet to look deep within the body. The magnet surrounds the patient lying in the MRI scanner's cylindrical chamber and interacts with atoms in the body to produce an image. A transmitter and a receiver, similar to an ordinary radio, are used

MRI CHECKS THE CHECKER

Meagher was calm as he was positioned on the examining table by the technologist. After about 15 minutes in the scanner, Meagher was so comfortable he fell asleep. "I guess I had a dream and started twitching because they had to start the exam all over again," Meagher says. "I almost had to fight to stay awake. The only bad part about an MRI is that it's too comfortable."

MRI has virtually replaced arthrography because of its ability to differentiate among soft tissues and to show the morphology of bone. "It lets you see the internal characteristics as well," Totty says. "We can see the inside of the bone and the bone marrow."

An arthrogram shows only an outline of the knee and obvious tears in the anterior cruciate ligament. Tears or injuries of other ligaments may not be seen on an arthrogram. During an arthrogram, dye and air are injected through a needle into the already painful joint. The joint must then be manipulated to circulate the dye.

"If arthrography is done by someone who is very skilled, it's not awfully unpleasant," Totty says. "If it's done by someone who's not as skilled at it, it's somewhat akin to medieval torture. It can be quite uncomfortable for both the examiner and the patient."

MRI confirmed that Meagher had a torn anterior cruciate ligament. It also revealed some minor degenerative damage to the meniscus, which is soft tissue between bones in the knee. Gilden referred

Meagher to Jordan H. Ginsburg, M.D., assistant professor of clinical surgery at Washington University Medical School, for arthroscopic surgery. The middle third of the patella tendon was harvested and grafted onto the anterior cruciate ligament. The meniscus was repaired by removing the loose tissue as well as other torn cartilage.

"This has become a standard or classical operation for this type of knee injury," Gilden says. "With any active athlete at any age, we make a move to fix it. And you need the MRI to have that confirmation."

Less than a month after the surgery, Meagher attended the National Hockey League awards banquet in Toronto, approximately 50 miles from his hometown of Belleville, Ontario. He was able to climb the steps and walk to the podium to receive the Frank J. Selke Award, given to the best defensive forward in the NHL.

Three months later, Meagher made his first trip to the ice rink since the operation. His fingers fumbled as he laced up his skates.

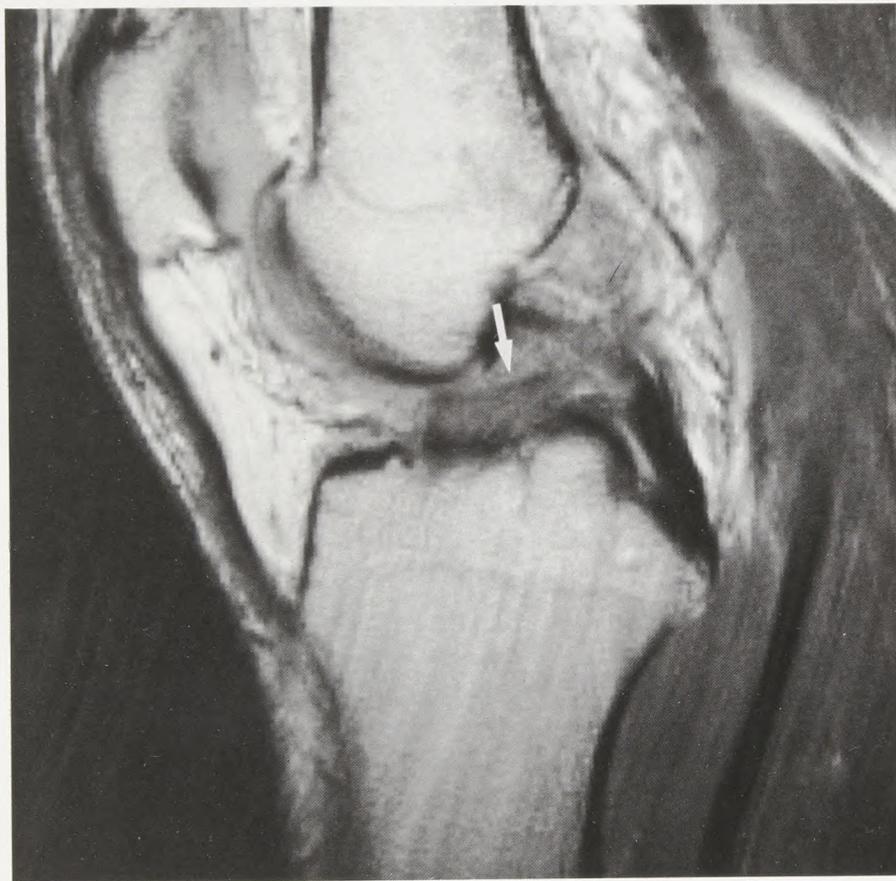
"I was a little nervous about whether I could come back and skate as well as before," he says. "But during that first day out on the ice, I skated for forty-five minutes and I knew I was as well as before. There was no pain. That felt so great." □



Above: On this MRI scan, the normal anterior cruciate ligament is seen as a low-signal band (arrows) within the notch of the knee.

Right and far right: When torn, no normal anterior cruciate ligament is identifiable. In its place are several short, low-signal lines representing torn fragments of the ligament (arrows).





When millions of dollars are riding on a professional athlete's knees, physicians gather as much information as possible.

■ ■ ■

·M·A·S·T·E·R· *Teacher*

by Michaele Gold

*T*his year of 1991 marks Ronald G. Evens' twentieth year as chairman of the department of radiology and director of Mallinckrodt Institute of Radiology at Washington University. Due in large part to the work accomplished under his leadership, these 20 years have seen extraordinary growth in the field of radiology and at the Institute.

Last May the Washington University Medical Center Alumni Association recognized Evens' accomplishments with the 1991 Alumni Achievement Award, which said:

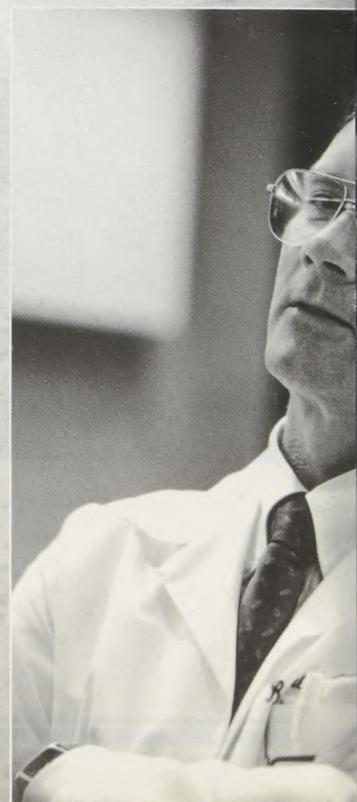
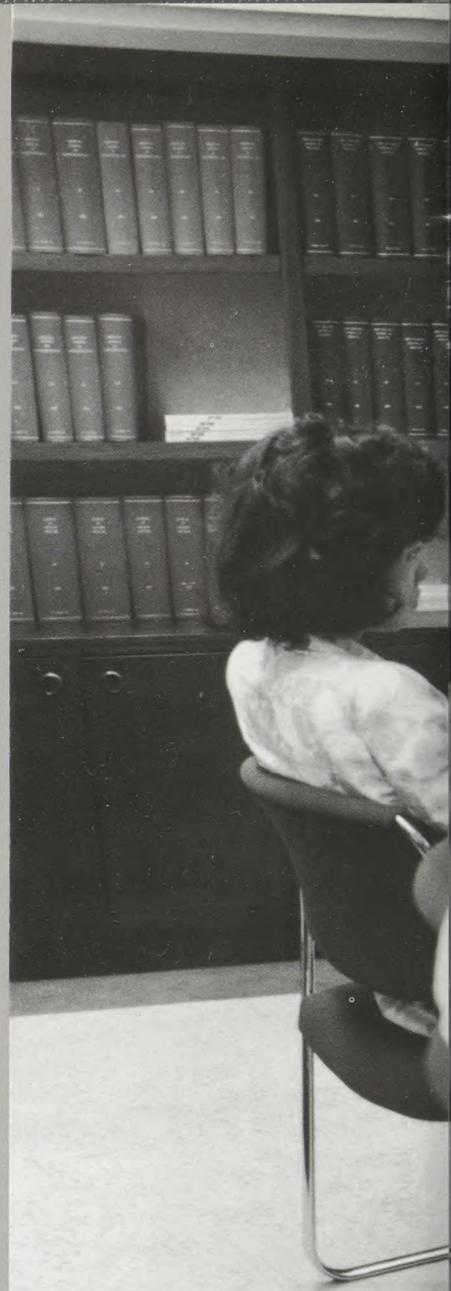
"Ronald G. Evens, M.D.:

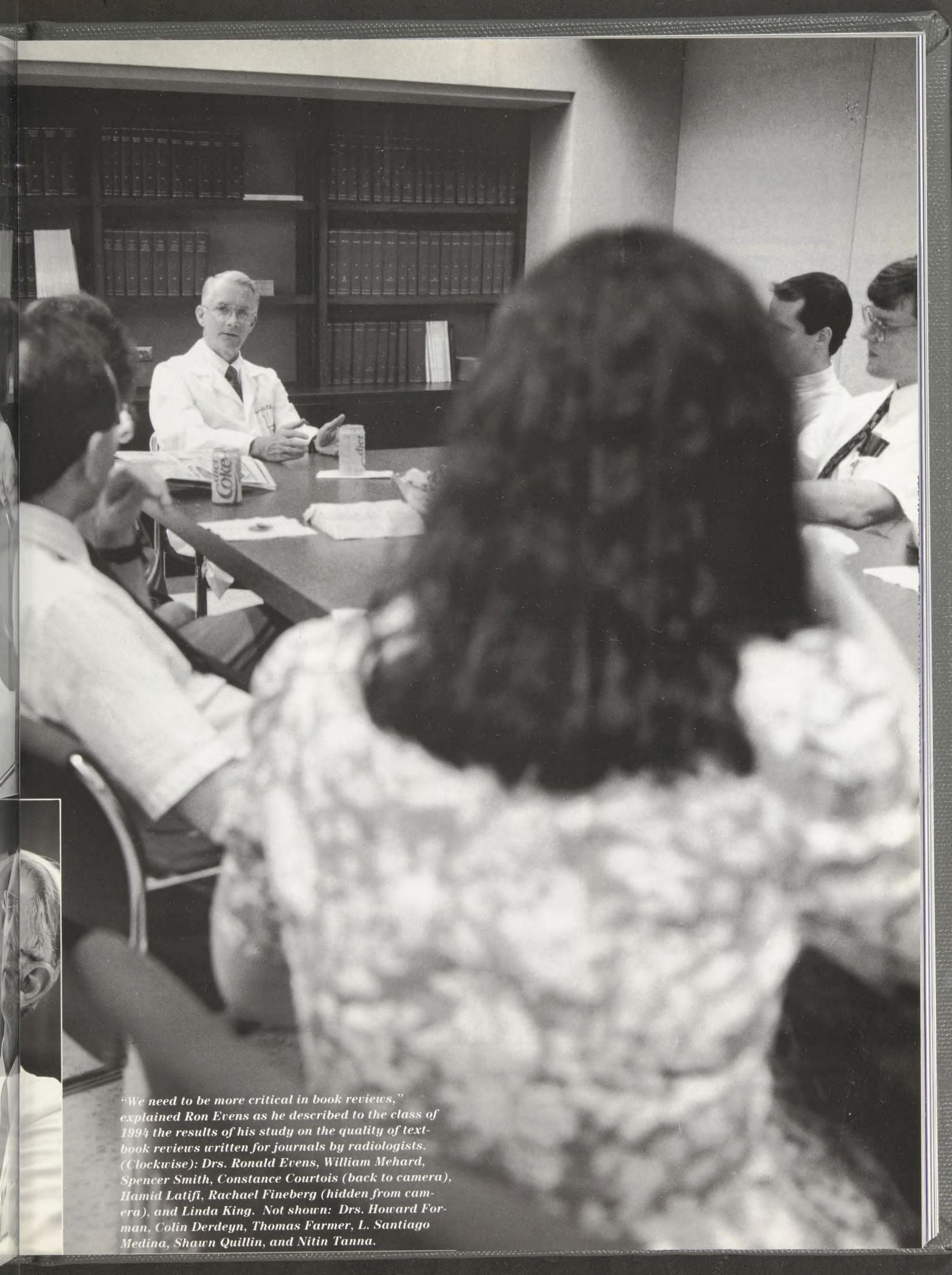
Brilliant administrator, professor and radiologist, he possesses a rare combination of medical, academic and business expertise that has brought him prominence throughout the country in industry and government, as well as in medicine.

He is an energetic leader and spokesman in community and alumni affairs as well as in his profession.

Washington University proudly recognizes his outstanding achievements."

But to Ron Evens, among his greatest accomplishments and one of his most personally rewarding is his role in the training of young radiology residents. Three hundred eighty-two-plus radiologists, who are practicing in 40 states and Washington, D.C., three Canadian provinces, and 14 foreign countries, have trained under Evens since 1971. In Missouri alone, there are 126 radiologists who trained under Evens at Mallinckrodt Institute.





"We need to be more critical in book reviews," explained Ron Evens as he described to the class of 1994 the results of his study on the quality of text-book reviews written for journals by radiologists. (Clockwise): Drs. Ronald Evens, William Mehard, Spencer Smith, Constance Courtois (back to camera), Hamid Latifi, Rachael Fineberg (hidden from camera), and Linda King. Not shown: Drs. Howard Forman, Colin Derdeyn, Thomas Farmer, L. Santiago Medina, Shawn Quillin, and Nitin Tanna.

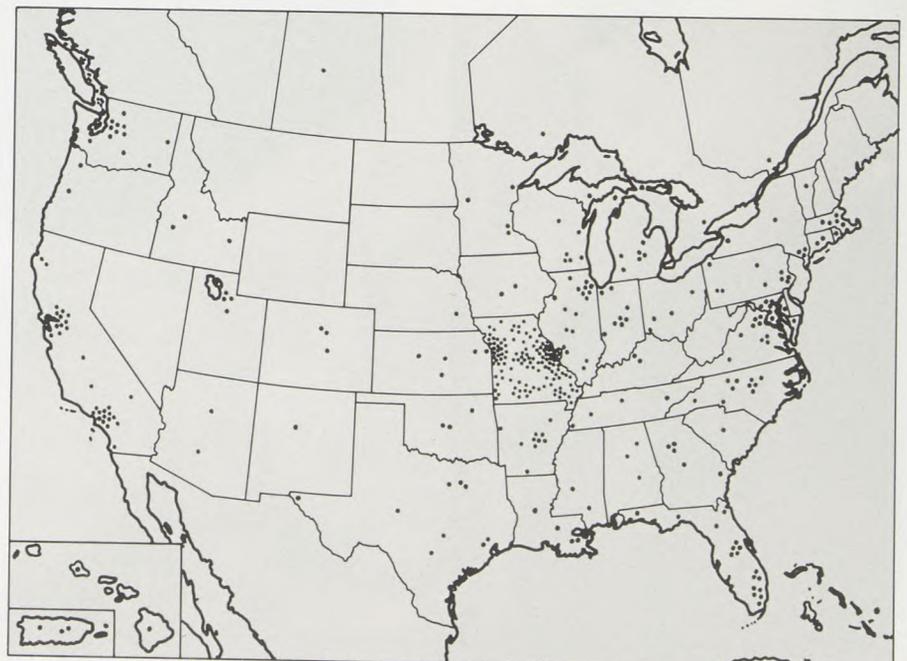
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Shown at the 1991 Residents' Farewell Dinner are (left to right) Robert Hartland, general manager and vice president, U.S. Marketing, Eastman Kodak Company (foreground); William Horstman, M.D., cochief resident, Diagnostic Radiology; Edith Kang, M.D., chief resident, Diagnostic Radiology; R. Gilbert Jost, M.D., chief, Division of Diagnostic Radiology; and Ronald Evens, M.D., director of the Institute.

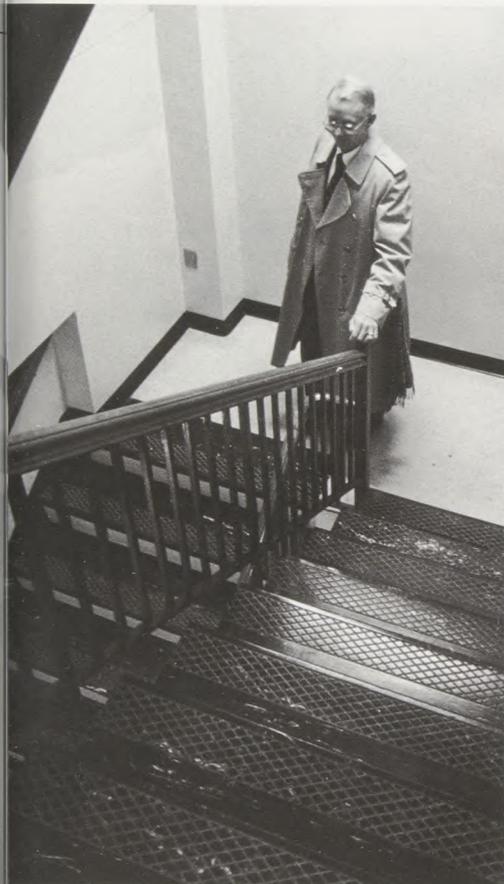
William G. Horstman, M.D., class of 1992 and cochief resident in Diagnostic Radiology, says, "Before I came here, my wife was doing research for her master's thesis in information systems and artificial intelligence in medicine. And in the course of her reading, Ron Evens' name appeared prominently in articles on economics and the business of medicine, especially socioeconomics and the medical uses of CT scanning. It showed me that his influence extended beyond medicine and that influenced my decision to come here and work in his department."

More than 350 radiologists have trained under Ron Evens' leadership from Canada, Puerto Rico, and 40 U.S. states, including Alabama - 4; Arkansas - 10; Arizona - 2; California - 30; Colorado - 3; Connecticut - 2; District of Columbia - 1; Florida - 17;



Georgia - 5; Hawaii - 2; Iowa - 2; Idaho - 3; Illinois - 18; Indiana - 8; Kansas - 5; Kentucky - 2; Louisiana - 4; Massachusetts - 5; Maryland - 8; Michigan - 7; Minnesota - 4; Missouri - 126; Mississippi - 2; North Carolina - 10; Nebraska - 1; New Mexico - 1; New York - 5; Ohio - 4;

Oklahoma - 3; Oregon - 2; Pennsylvania - 9; Puerto Rico - 3; Rhode Island - 1; South Carolina - 1; Tennessee - 4; Texas - 9; Utah - 4; Virginia - 9; Vermont - 1; Washington - 12; Wisconsin - 6; Canada - 4.



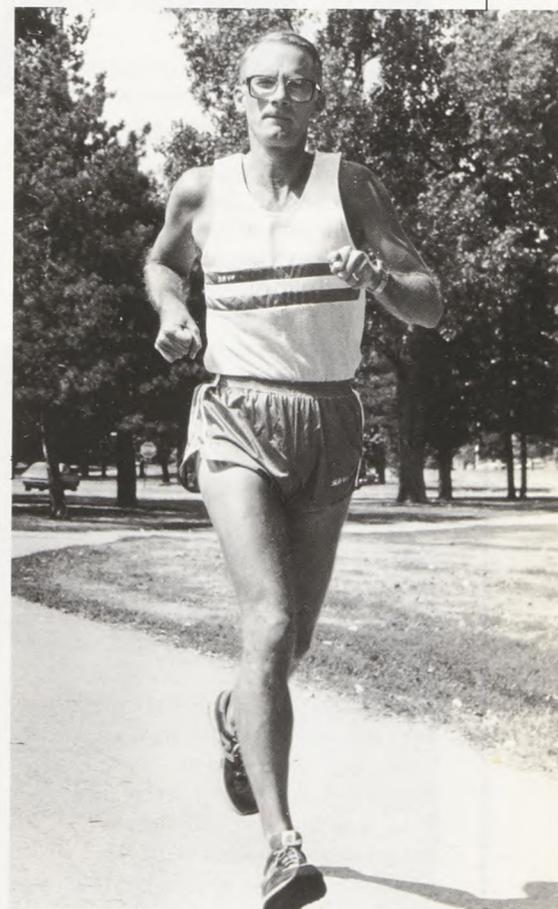
On any day, Ron Evens can be seen walking from his office down all 12 flights of stairs and sometimes up the stairs as well. He travels on foot partly for exercise but also because “there’s no need for me to burden our elevators; they have enough to do without my adding to it.”

For 12 years, running has been a major part of Ron Evens’ life. He has competed in five marathons in three states and two foreign countries.

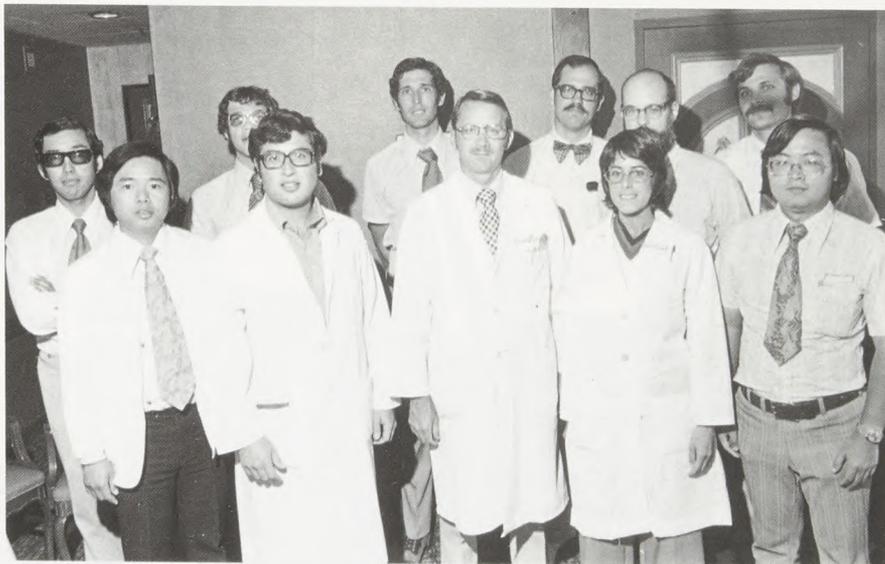
Another sport Evens enjoys is softball, which he plays annually on the Institute’s resident/faculty team. Bruce Bower, cochief resident in the class of 1989, who likes to pitch when he can, described Evens’ participation thusly, “I like to pitch, unless Ron Evens shows up. Then he’s the pitcher. Unless he says I’m the pitcher.”



Mallinckrodt Institute’s crack 1989 softball team (front row, left to right): Drs. Clinton Anderson, Paul Molina, Ronald Evens, Bruce McClennan, Larry Schertz, Doug Smith, Mark Mayhle, and Steve Solomon; (back row, left to right): Drs. Russ Norwood, Bruce Bower, Scott Stevens, Andrew Landes, Rob Smith, Gary Shackelford, Neal Frenkel, and Charles James.

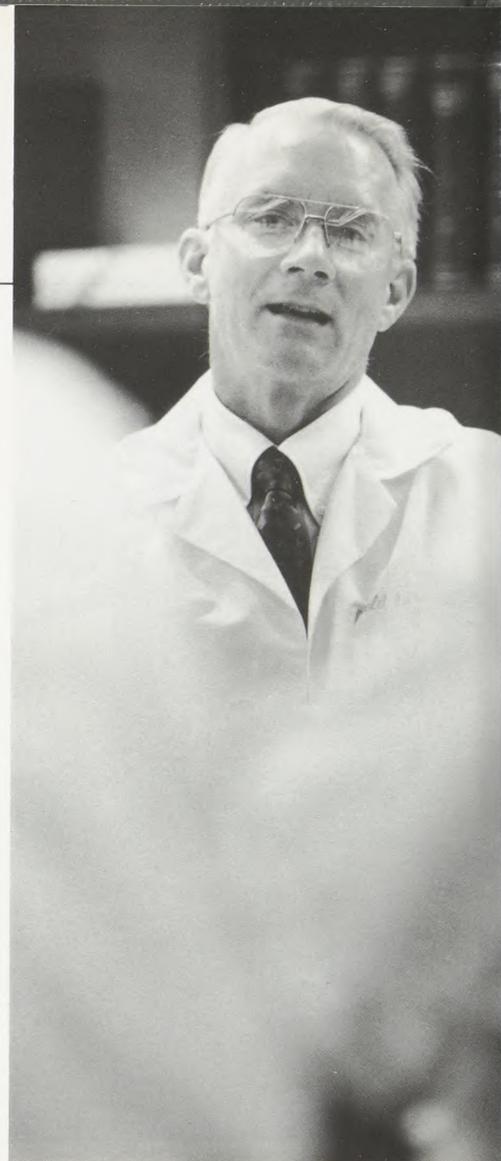


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(Back row, left to right): Drs. Isidro Huete, Dennis Welch, Matt Powers, Stephen Burrows, Christopher Moran, and Barry Ross Pauli; (front row, left to right): Drs. Naris Rujanavech, David Bookin, Ronald Evens, Marilyn Siegel, and Joseph K. T. Lee.

Under Ron Evens' visionary eye, the residency program has grown from five in 1971 to 12 in 1991. Many of his former trainees are now practicing in teaching hospitals and academic centers around the world. Indeed, 25 chairmen of university radiology departments in the United States and more than 35 chairmen throughout the world received their training at or taught at Mallinckrodt Institute. Joseph K. T. Lee, M.D., class of 1974, is the latest of Evens' disciples to go on to a chairmanship. Lee was named chairman of the department of radiology, as of July 1, 1991, at the University of North Carolina, Chapel Hill. Lee takes with him lessons he learned in how to lead a radiology department. "Ron Evens always said, 'While I enjoy and love reading films, my job is to make sure films get read.' I remember those words to this day," said Lee.



Some time ago, when Ron Evens was beginning a soul-searching strategic planning process and thinking about his someday replacement, he said, "Maintaining a high-quality medical facility of any type is becoming harder and harder. It's especially difficult in radiology these days. Technology is advancing quickly and costs are rising even faster. It's been fun for me to bring the Institute along, but not many radiologists would like to do what I do."

Ron Evens clearly enjoys teaching and takes the opportunity to philosophize to the class of 1994 about limiting resources: "When I was vice-chancellor of financial affairs for Washington University, 1988 to 1990, I found that the limiting resource was excellent students. What do you think is the limiting resource at the School of Medicine?" he asked.

"Parking space," quipped Rachael Fineberg, M.D.

"You're almost right," he said. "It's capital. If we had the capital, we could build all the parking spaces we'd need."

When Thomas Getz, M.D., chief resident of the class of 1987, was interviewing for residency at the Medical College of Wisconsin, Jim Youker, M.D., professor and chairman of the department of radiology, asked Getz where else he had applied. Getz mentioned Mallinckrodt Institute, whereupon Youker said, "If you get in there, you should go. Ron Evens' program attracts such good residents that you could put them in a closet with textbooks for four years and they would still come out great radiologists."

(Seated, left to right): Drs. Elizabeth Albright, Karen Goodhope, Ronald Evens, Inta Berniz, and William Ganz; (middle row, left to right): Drs. Debra Bolding, Michael Karnaze, William Pao, Theresa Reiman, and Susan James; (back row, left to right): Drs. Evan Unger, Thomas Getz, Jerry Tobler, William Conway, and Mark Fischer.

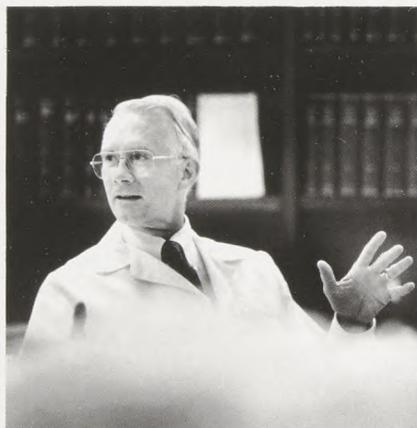


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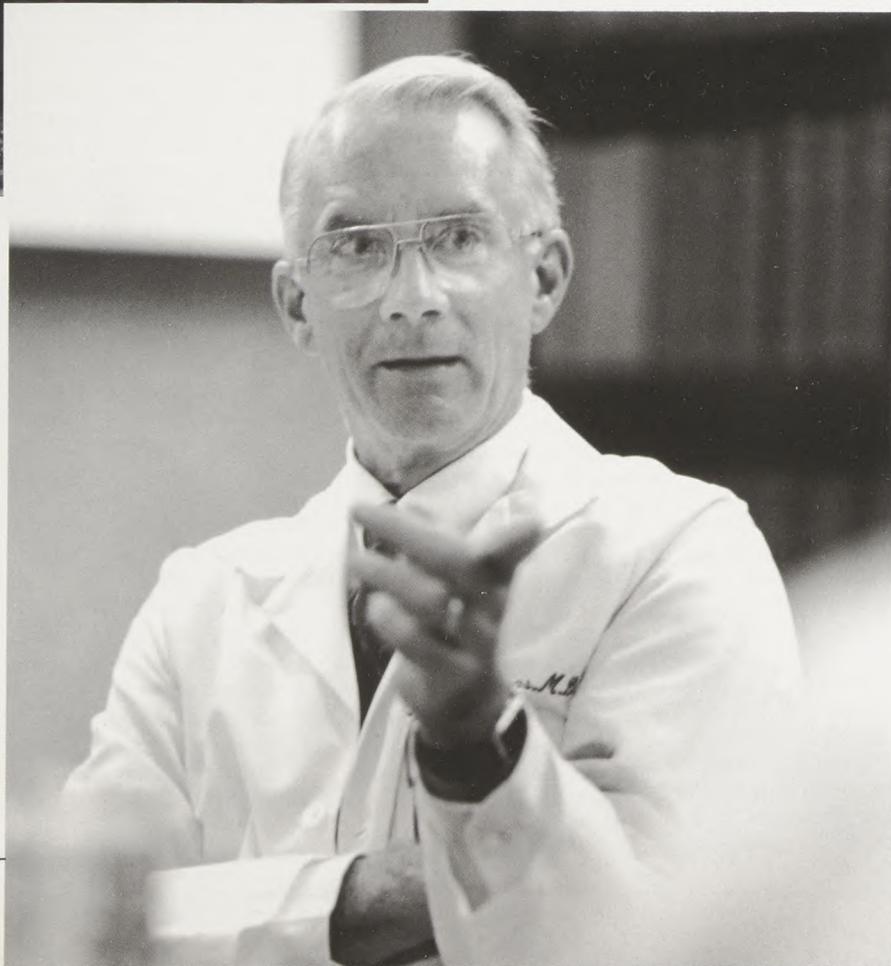
*W*illiam A. Murphy, Jr., M.D., class of 1975 and cochief of the musculoskeletal section since 1975, is grateful for the environment Evens has created over the years: "The Institute always possessed the elements of greatness. But Ron Evens brought those elements together under his stewardship and set the standards. He provided resources and a strong administrative leadership and then allowed sections to develop strong teaching programs that have attracted high-quality residents."

(Front row): Drs. Ronald Evens and Edda Quintero; (back row, left to right): Drs. Michael Mikhael, William Murphy, Jr., R. Gilbert Jost, John Cieply, Guy Torstenson, John Arnold, Robert Scheible, J. Bruce Hauser, and Garry Carls.





As we prepare for our 60th Anniversary Celebration this coming September 12 through 14, we naturally reflect on the contributions to the advancement of medicine that Mallinckrodt Institute has made, such as the development of positron emission tomography, computed tomography, and magnetic resonance imaging. It is also fitting that we recognize the role Ron Evens has played in those advancements as a great businessman, physician, and leader and educator of young radiologists. □



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THE DIRECTOR'S OFFICE REPORT

NEW STAFF

Pietro R. Biondetti, M.D., adjunct research associate in radiology, Division of Diagnostic Radiology.

Benjamin C. P. Lee, M.D., associate professor of radiology, Division of Diagnostic Radiology.

Chun Ma, Ph.D., research associate in radiology, Division of Radiation Sciences.

OFF STAFF

William W. Baber, M.D., instructor in radiology, Division of Diagnostic Radiology, has entered private practice in St. Louis.

Christopher J. Bannochie, Ph.D., research associate, Division of Radiation Sciences.

VISITING PROFESSORS & INVITED LECTURERS

Jeffrey J. Brown, M.D., assistant professor of radiology and acting director of magnetic resonance imaging, spoke on "Cardiovascular MRI" at the evening tutorial session of the Society for Magnetic Resonance Imaging Annual Meeting, Chicago, April 14.

Robert E. Drzymala, Ph.D., assistant professor of radiology, lectured on "Quality Assurance for Linac-Based Stereotactic Radiosurgery" at the Quality Assurance in Radiotherapy Physics Symposium, sponsored by the American College of Medical Physics, Galveston, May 16-18.

Bahman Emami, M.D., professor of radiology and associate director of the Radiation Oncology Center (clinical research), lectured on "Radiation Oncology" at the "Management of Cancer of the Lung" session of the Second Annual Cancer Symposium, Columbia Regional Hospital, Columbia, Missouri, May 4.

Mokhtar H. Gado, M.D., professor of radiology, as invited lecturer, spoke on "Classifying Signal Intensity Changes in MRI of the Brain: A Practical Approach," "Demyelinating Diseases," and "Low Back Pain and Sciatica" at Columbia Presbyterian Medical Center, New York, March 27-28. He presented "Approach to Tissue Characterization" and "Displaying MR-related Parameters: An Attempt to Improve Tissue Characterization" at the Swedish Society of Neuroradiology Greitz Lecture, Stockholm, April 26. Gado spoke on "Diagnostic Imaging of Degenerative Disease" at the Low Back and Sciatic Pain: Evaluation and Treatment Conference, Washington University School of Medicine, St. Louis, May 17-18.

Delia M. Garcia, M.D., assistant professor of radiation oncology, spoke on "Interstitial High Dose Rate Brachytherapy and Hyperthermia in the Treatment of Malignant Brain Tumors" at

the Brachytherapy: Past, Present and Future meeting, Scottsdale, May 3. She presented a poster presentation on "Simultaneous Interstitial Brachytherapy and Hyperthermia," coauthored with **Gilbert H. Nussbaum, Ph.D.**, associate professor of radiology; **Anthony E. Fathman, M.D.**, and **Debbie Welsh, R.N.**, Department of Radiation Oncology, St. Luke's Hospital, St. Louis; **Robert E. Drzymala, Ph.D.**, assistant professor of radiology; **Mark Bleyer, B.S.E.**, and **John A. DeFord, Ph.D.**, MED Institute, Inc., West Lafayette, Indiana, at the 9th International Congress of Radiation Research, Toronto, July 7-12.

Louis A. Gilula, M.D., professor of radiology and cochief of the musculoskeletal section, as invited lecturer, spoke on "Radiographic Analysis of Complex Carpal Trauma" and "Different Patterns of Lunate Disease Manifested by MRI, CT and Scintigraphy" at the University of Bonn, Germany, May 6. He presented "The Tailored CT Exam of the Wrist" at the Musculoskeletal Symposium, Wiesbaden, Germany, May 9. Gilula lectured on "CT of the Foot" at the University of California, San Diego, June 3. He spoke on "CT and 3-D CT of the Wrist" at the Aktuelle Gelenkdiagnostik Satelliten Symposium, Weisbaden, July 5.

Harvey S. Glazer, M.D., associate professor of radiology, presented "Pitfalls in Thoracic CT" and "Basic Thoracic Anatomy and Techniques" at the Fourteenth Annual Course of the Society of Computed Body Tomography, Washington, D.C., April 15-19. He spoke on "CT of the Mediastinum" at the

Society of Thoracic Radiology Annual Meeting, Toronto, May 14.

Jay P. Heiken, M.D., associate professor of radiology and codirector of computed body tomography, as visiting professor, spoke on "CT of the Peritoneal Spaces," "MRI of Pelvic Neoplasms," and "Rapid MR Imaging of the Abdomen" at the M. D. Anderson Cancer Center, Houston, March 11-13. He presented "Imaging of Renal Parenchymal Tumors" and conducted workshops on "Imaging Hepatic Metastases: Techniques and Accuracy" and "Imaging Renal Masses" at the Fourteenth Annual Course of the Society of Computed Body Tomography, Washington, D.C., April 15-19.

Charles F. Hildebolt, D.D.S., Ph.D., assistant professor of radiology, spoke on "Alveolar Bone Quality Classification," coauthored with **Michael K. Shrout, D.D.S.**, Medical College of Georgia, Augusta; **Michael W. Vannier, M.D.**, professor of radiology, director of the Division of Radiology Research, and head of the image processing lab; and **David J. Zerbolio, Ph.D.**, University of Missouri, St. Louis, at the Annual Meeting for the American/International Association of Dental Research, Acapulco, April 17-21. In collaboration with **Jane Phillips-Conroy, Ph.D.**, Washington University School of Medicine; **Clifford Jolly, Ph.D.**, New York University; and **Vannier**, Hildebolt presented "Quantitative Periodontal Disease Assessment in Nonhuman Primates" at the Annual Meeting of American Physical Anthropologists, Milwaukee, April 3-6. He lectured on "Semiautomatic Classification of Alveolar Bone

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Quality," coauthored with **Louis V. Avioli, M.D.;** **Sheldon C. Cohen, D.M.D.;** and **Reta C. Rupich, Ph.D.,** Jewish Hospital, St. Louis; **Michael K. Shrouf, D.D.S.;** and **Vannier** at the Gordon Research Conference on Periodontal Diseases, Plymouth, June 24-28.

Joseph K. T. Lee, M.D., professor of radiology, presented "Fast MR Imaging" at the Fourteenth Annual Course of the Society of Computed Body Tomography, Washington, D.C., April 15. He spoke on "CT of Lymphoma Patients" and "MRI of Lymphoma Patients" at the New York Roentgen Society Meeting, New York, May 2.

Bruce L. McClelland, M.D., professor of radiology and head of abdominal imaging, spoke on "Discussion of the Major Issues Before the ACR" at the Missouri Radiological Society, Kansas City, April 1. As invited speaker, as well as a member of the Board of Chancellors of the American College of Radiology, he presented "Discussion of the Major Issues Before the ACR" and "Contrast Agent Update" at the North Carolina Chapter of the American College of Radiology Annual Meeting and Spring Refresher Course, Charlotte, April 26-28. McClelland lectured on "Contrast Reactions" and "Extracorporeal Shockwave Lithotripsy: Renal and Biliary" at the International Special Procedures Course, Chicago, May 15-16.

G. Leland Melson, M.D., professor of radiology and chief of diagnostic ultrasound, spoke on "Color Doppler Ultrasonography: Introduction to Image Interpretation," "Color Doppler Ultrasound of the Kidneys," and "Color Doppler Ultra-

sound of the Hepatic Vasculature" as well as conducted a workshop on "Color Doppler Ultrasonography of Acute and Non-Acute Scrotal Disorders" at the conference on "A Practical Analysis of Various Imaging Procedures," sponsored by the Hospital of University of Pennsylvania, Department of Radiology, Martha's Vineyard Island, July 8-12.

Scott A. Mirowitz, M.D., assistant professor of clinical radiology, spoke on "MR Imaging of the Normal Rotator Cuff: New Observations Using Conventional and Fat-Suppression Technique" and presented "Hyperintense Basal Ganglia on T₁-Weighted MR Imaging in Patients on Parenteral Nutrition," coauthored with **Thomas Westrich, R.Ph.,** Jewish Hospital, St. Louis, and **John D. Hirsch, M.D.,** instructor in clinical surgery, Washington University School of Medicine, St. Louis; "Craniospinal Magnetic Resonance Imaging in Neurofibromatosis," coauthored with **Hui H. Shu, M.D.,** assistant in radiology, and **Franz J. Wippold, II, M.D.,** assistant professor of radiology; and "Hyperintense Cranial Lesions on T₁-Weighted MR Imaging," coauthored with **Wippold; Albert M. Hammerman, M.D.,** instructor in clinical radiology; and **Noah Susman, M.D.,** associate professor of clinical radiology. He also presented "Dynamic Gadolinium Enhanced Rapid Acquisition Spin Echo MR Imaging of the Spleen," coauthored with **Jeffrey J. Brown, M.D.,** assistant professor of radiology and acting director of magnetic resonance imaging; **Joseph K. T. Lee, M.D.,** professor of radiology; and **Jay P. Heiken, M.D.,** associate professor of radiology and codirector of computed

body tomography; and "Dynamic Gadolinium Enhanced Rapid Acquisition Spin Echo MR Imaging of the Liver," coauthored with **Brown, Lee, Heiken, and Steven S. Eilenberg, M.D.,** instructor in radiology. All presentations were made at the Society of Magnetic Resonance Imaging Annual Meeting, Chicago, April 14.

Stephen M. Moerlein, Ph.D., associate professor of radiology and associate professor of biochemistry, presented "Evaluation of N- ω -[F-18] Fluoroethyl Flumazenil for *In Vivo* Measurement of Central Benzodiazepine Receptor Binding with PET," coauthored with **Joel S. Perlmutter, M.D.,** associate professor of neurology and research associate professor of radiology, and **David Parkinson, Ph.D.,** assistant professor of cell biology and physiology, at the 15th International Symposium on Cerebral Blood Flow and Metabolism (Brain-91), Miami, June 1-6.

Paul L. Molina, M.D., assistant professor of radiology, lectured on "CT and MRI in Chest Imaging: Current Indications and Applications" at the James H. Scatliff, M.D., Symposium: 25 Years of Progress in Radiology, University of North Carolina, Chapel Hill, May 1-4. He spoke on "CT and MRI in Chest Imaging" at St. Mary's Health Center and Memorial Hospital, Jefferson City, Missouri, June 4.

William A. Murphy, Jr., M.D., professor of radiology and codirector of the musculoskeletal section, as the 18th Annual Benjamin Felson Lecturer, presented "MRI of Musculoskeletal Masses," "Pathophysiology of Inflammatory Arthritis," "Bone Marrow MRI," and

"Radiology in Death Investigation" at the University of Cincinnati College of Medicine, Cincinnati, April 6-7. As visiting professor, he spoke on "Pathophysiology of Inflammatory Arthritis," "Difficult Diagnoses: Paget Disease" and also conducted an "Unknown Case Conference" at the University of Nebraska, Omaha, April 16-17. He presented "Forensic Radiology: Techniques for Death Investigation" at the Nebraska Radiological Society, Omaha, April 17. Murphy spoke on "The Temporomandibular Joint" at the Missouri Valley Dental Study Club, St. Louis, May 9. He lectured on "Percutaneous Needle Biopsy for Tumor and Infection in the Lumbosacral Spine" at the Low Back and Sciatic Pain: Evaluation and Treatment Conference, Washington University School of Medicine, St. Louis, May 17-18.

Robert J. Myerson, M.D., Ph.D., assistant professor of radiology, presented "Electromagnetic Techniques for Hyperthermia of Bulky or Deep Seated Tumors" at the International Congress of Radiation Research, Toronto, July 7-12.

Gilbert H. Nussbaum, Ph.D., associate professor of radiology, presented a poster presentation on "Excessive Heating at Tissue-Bone Interfaces with Parallel-Beam Ultrasound," coauthored with **Jeffrey J. Kovalic, M.D.,** chief resident, Radiation Oncology. He also coauthored a poster presentation on "Simultaneous Interstitial Brachytherapy and Hyperthermia" with **Delia M. Garcia, M.D.,** assistant professor of radiation oncology; **Anthony E. Fathman, M.D.,** and **Deb-**

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VISITING PROFESSORS & INVITED LECTURERS

Continued from page 27.

bie Welsh, R.N., Department of Radiation Oncology, St. Luke's Hospital, St. Louis; **Robert E. Drzymala, Ph.D.**, assistant professor of radiology; **Mark Bleyer, B.S.E.**, and **John A. DeFord, Ph.D.**, MED Institute, Inc., West Lafayette, Indiana. Both presentations were made at the 9th International Congress of Radiation Research, Toronto, July 7-12.

Carlos A. Perez, M.D., professor of radiology and director of the Radiation Oncology Center, as the Buschke Lecturer, presented "Radiation Therapy Alone in the Management of Carcinoma of the Uterine Cervix" at the 11th Annual Current Approaches to Radiation Oncology, Biology and Physics, San Francisco, March 6-8. As visiting professor, he spoke on "Treatment Planning and Quality Assurance," "Advanced Carcinoma of the Breast," and "Carcinoma of the Prostate" at the Massachusetts General Hospital, Boston, April 15-16. He presented "Frontiers in Radiation Oncology" at the Ochsner Clinic, New Orleans, April 25-26. Perez spoke on "Effect of Tumor Volume on Prognosis of Carcinoma of Uterine Cervix Treated with Irradiation Alone" at the American Radium Society, May 5-8. As visiting professor, he lectured on "Carcinoma of the Prostate" and "Carcinoma of the Uterine Cervix" at the Georgetown University Medical School, Washington, D.C., May 22-23.

James A. Purdy, Ph.D., professor of radiology and associate director of the Radiation Oncology Center, lectured on "3-D Treatment Planning" and "Quality Assurance in Radiation Oncology" at the American Association of Medical Dosimetrists Region V Dosimetry Conference, Tampa, April 18-20. He presented "Future Needs for 3-D Planning" at the American Association of Medical Dosimetrists Annual Meeting, Seattle, June 2-6. Purdy spoke on "Profile of Medical Physics Practices" at the American College of Medical Physics Annual Meeting, Stowe, Vermont, June 26-30.

Joseph L. Roti Roti, Ph.D., professor of radiology, associate director of the Radiation Oncology Center, and chief of the cancer biology section, presented "Subnuclear Structure in Radiation and Heat Response" and cochaired a workshop on "Cell Cycle Biology and Radiation" at the International Congress of Radiation Research, Toronto, Ontario, July 7-12.

Henry D. Royal, M.D., associate professor of radiology and associate director of the Division of Nuclear Medicine, spoke on "Pulmonary Radioisotope Scanning" and "Cardiovascular Radioisotope Scanning" at the Residents Radiology Review Course, University of California, San Diego, April 22. He presented "The Role of Pulmonary Imaging in the Diagnosis of Pulmonary Embolism: An Overview" at the Central Chapter of the Society of Nuclear Medicine, Milwaukee, April 28. As an invited lecturer, he spoke on

"Health Effects of the Chernobyl Accident" at the International Atomic Energy Agency, Vienna, May 22.

Stuart S. Sagel, M.D., professor of radiology, chief of chest radiology, and codirector of computed body tomography, lectured on "Mediastinal Imaging" at the 14th Annual Course of the Society of Computer Body Tomography, Washington, D.C., April 17. As visiting professor, he presented "CT of Asbestos-Related Thoracic Disease," "Effective Audiovisual Presentation," and "Challenging CT Cases" at the Department of Radiology, Yale University, New Haven, April 18. Sagel lectured on "CT of the Thorax," "CT of the Adrenal," and "CT of the Kidney" at the CT Technologist Seminar, Amelia Island, Florida, May 30.

Barry A. Siegel, M.D., professor of radiology and medicine and director of the Division of Nuclear Medicine, lectured on "Ventilation-Perfusion Scintigraphy in the Diagnosis of Pulmonary Embolism" at the Boca Raton Community Hospital, Boca Raton, March 22.

Marilyn J. Siegel, M.D., professor of radiology, presented "CT of the Pediatric Mediastinum," "Abdominal CT in Children," and "MRI of Bone Marrow" at the Fourteenth Annual Course of the Society of Computed Body Tomography, Washington, D.C., April 15-19. She lectured on "MRI of the Pediatric Abdomen" at the International Pediatric Radiology Meeting, Stockholm, May 27-June 1.

Michael W. Vannier, M.D., professor of radiology, director of the Division of Radiology Research, and head of the image processing lab, lectured on "3-D Head and Neck Imaging: State-of-the-Art" at the Radiation Sciences Research Seminar, Loma Linda University School of Medicine, March 6. He spoke on "Medical Work Stations" at the Medical Imaging and Computer Assisted Radiology Meeting, International Congress Centrum, Berlin, May 21-25. He presented "3-D Biomedical Imaging" at the Radiology Clinical and Research Colloquia, Johns Hopkins Hospital, Baltimore, April 30. Vannier lectured on "Diagnostic Imaging of Craniosynostosis," coauthored with **Barry S. Brunsten**, research engineer, and **Jeffrey L. Marsh, M.D.**, professor of surgery, and also presented a tutorial on "Medical Work Stations" at the 5th International Symposium and Exhibition: Computer Assisted Radiology '91, Berlin, July 3-6.

Franz J. Wippold, II, M.D., assistant professor of radiology, presented "Preparing for the Oral Board Examination in Neuroradiology" at the Walter Reed Army Medical Center and the National Naval Medical Center, Bethesda, May 13-24.

John W. Wong, Ph.D., associate professor of radiology, presented "Overview of Old and New Models for Photon Dose Calculations," "Rapid Area Radiotherapy Dosimetry Using a Sheet of Plastic Scintillator," "Study of Treatment Variation Using a Fiber-Optic On-line Radiotherapy Imaging System," and "Atomic Number Effects on Photon Dose Perturbation," and served as chairman of the session on photo dosimetry at the World Congress, Kyoto, July 7-12.

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SYMPOSIA

THE AMERICAN ROENTGEN RAY SOCIETY

The following Mallinckrodt Institute staff members participated in the 91st Annual Meeting of The American Roentgen Ray Society, Boston, May 5-10, 1991.

INSTRUCTIONAL COURSES

Harvey S. Glazer, M.D.;
Paul L. Molina, M.D., "Pitfalls in Plain Film and CT Analysis of the Mediastinum."

Robert E. Koehler, M.D.*;
Dennis M. Balfe, M.D., "Biliary Diagnosis: A Problem-Oriented Approach."
*University of Alabama Hospital, Birmingham.

Joseph K. T. Lee, M.D.; **Jay P. Heiken, M.D.,** "CT and MRI of the Retroperitoneum."

William H. McAlister, M.D., "The Role of Ultrasound in Pediatric Gastrointestinal Tract Disease."

Bruce L. McClennan, M.D., "Imaging of Acute Renal Inflammatory Infections."

RESEARCH PROGRAMS

Paul L. Molina, M.D., "Selection of an Academic Career."

SCIENTIFIC SESSIONS

Joseph A. Borrello, M.D.;
Joseph K. T. Lee, M.D.;
Jeffrey J. Brown, M.D., "Dynamic Gd-DTPA Enhanced MR Evaluation of Indeterminate Renal Masses."

James A. Brink, M.D.; **Birgit Kammer, M.D.*;** **Peter R. Mueller, M.D.*;** **Joseph F. Simeone, M.D.*;** **Sanjay Saini, M.D.*;** **Joseph T. Ferrucci, M.D.*,** "Prediction of Gallstone Composition: Synthesis of Growth Patterns and Radiographic Features."
*Massachusetts General Hospital, Boston.

Ronald G. Evens, M.D.;
Ronald G. Evens, Jr., M.B.A., M.H.A.*, "Economic and Utilization Analysis of MR Imaging Units in the United States in 1990." *Iowa Methodist Medical Center, Des Moines.

Albert M. Hammerman, M.D.; **Lawrence M. Kotner, Jr., M.D.;** **Thomas B. Doyle, M.D.,** "Periportal Contrast Enhancement on CT Scans of the Liver."

William G. Horstman, M.D.; **William D. Middleton, M.D.;** **G. Leland Melson, M.D.,** "Color Doppler Ultrasonographic Findings in Scrotal Inflammatory Conditions."

Birgit Kammer, M.D.*;
James A. Brink, M.D.;
Peter R. Mueller, M.D.*;
Joseph F. Simeone, M.D.*;
Sanjay Saini, M.D.*;
Joseph T. Ferrucci, M.D.*, "In Vitro Dissolution Kinetics of Calcified Gallstones in MTBE: Correlation with Pattern of Calcification by Computed Tomography."
*Massachusetts General Hospital, Boston.

William R. Reinus, M.D.;
Kavita K. Erickson, M.D.;
Franz J. Wippold, II, M.D., "Utilization of Head CT by Emergency Department."

Mark S. Zobel, M.D.; **Harvey S. Glazer, M.D.;** **Marilyn J. Siegel, M.D.,** "Tracheal Compression in Childhood Lymphoma."

SCIENTIFIC EXHIBITS

William G. Horstman, M.D.; **William D. Middleton, M.D.;** **G. Leland Melson, M.D.,** silver medal award for "Color Doppler Ultrasonography of the Scrotum."

Jamie T. Surratt, M.D.; **Marilyn J. Siegel, M.D.,** bronze medal award for "Imaging of Pediatric Ovarian Lesions."

Thomas M. Vesely, M.D.; **Michael D. Darcy, M.D.;** **Marshall E. Hicks, M.D.;** **Daniel Picus, M.D.,** award of merit for "Technical Problems Associated With Bird's Nest Vena Cava Filter Placement."

THE SOCIETY OF NUCLEAR MEDICINE

The following Mallinckrodt Institute staff members participated in the 38th Annual Meeting of The Society of Nuclear Medicine, Cincinnati, June 11-14.

REFRESHER COURSES

Henry D. Royal, M.D., "Nuclear Accident Management."

ORAL PRESENTATIONS

Farrokh Dehdashti, M.D.; **Landis K. Griffeth, M.D., Ph.D.;** **Andrea H. McGuire, M.D.*;** **Larry R. Kaiser, M.D.**;** **Maureen J. Fusselman, M.S., B.S.N.;** **Daniel M. Goodenberger, M.D.***;** **David J. Perry, C.N.M.T.;** and **Barry A. Siegel, M.D.,** "FDG-PET Evaluation of Suspicious Pulmonary and Mediastinal Masses." *Mercy Hospital, Des Moines; **Department of Surgery, Washington University School

of Medicine, St. Louis; ***Department of Internal Medicine, Washington University School of Medicine, St. Louis.

Landis K. Griffeth, M.D., Ph.D.; **Farrokh Dehdashti, M.D.;** **Keith M. Rich, M.D.*;** **Joseph R. Simpson, M.D.;** **Andrea H. McGuire, M.D.**;** **Maureen J. Fusselman, M.S., B.S.N.;** **David J. Perry, C.N.M.T.;** and **Barry A. Siegel, M.D.,** "Preliminary FDG-PET Evaluation of Brain Metastases From Non-CNS Neoplasms." *Department of Neurosurgery, Washington University School of Medicine, St. Louis; **Mercy Hospital, Des Moines.

Paul C. Hanson, C.N.M.T.; **Henry D. Royal, M.D.,** "Physiologic Changes Following Single Lung Transplants."

Henry F. VanBrocklin, Ph.D.*; **Pamela A. Rocque, B.A.;** **Michael J. Welch, Ph.D.;** **John A. Katzenellenbogen, Ph.D.*,** "17 - Ethynyl-16 -[F-18] Fluoro-11 - Methoxyestradiol: Control of Metabolism Enhances Target Tissue Uptake."
*Department of Chemistry, University of Illinois, Urbana.

Pilar Herrero, M.S.; **Joanne Markham, M.S.*;** **Carla J. Weinheimer, B.S.**;** **Mark A. Green, Ph.D.***;** **Michael J. Welch, Ph.D.;** **Steven R. Bergmann, M.D., Ph.D.,** "Quantification of Myocardial Perfusion with CU-62-PTSM and Positron Emission Tomography." *Biomedical Computing Laboratory, Washington University School of Medicine, St. Louis; **Cardiovascular Division, Washington University

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SYMPOSIA

Continued from page 29.

School of Medicine, St. Louis; ***School of Pharmacy, Purdue University, West Lafayette, Indiana.

Jerold W. Wallis, M.D.; Tom R. Miller, M.D., Ph.D., "Display of Cold Lesions in Volume Rendering of SPECT Studies."

Pilar Herrero, M.S.; Joanne Markham, M.S.*; Carla J. Weinheimer, B.S.; Mark A. Green, Ph.D.***; Michael J. Welch, Ph.D.;** **Steven R. Bergmann, M.D., Ph.D.**, "Quantification of Myocardial Perfusion with PET: Comparison of $H_2^{15}O$ and ^{62}Cu -PTSM." *Biomedical Computing Laboratory, Washington University School of Medicine, St. Louis; **Cardiovascular Division, Washington University School of Medicine, St. Louis; ***School of Pharmacy, Purdue University, West Lafayette, Indiana.

Stephen M. Moerlein, Ph.D.; Alan Daugherty, Ph.D.*; Burton E. Sobel, M.D.*; Michael J. Welch, Ph.D., "Utility of Tc-99m and In-111-Labeled Low-Density Lipoprotein as Radiopharmaceuticals for Metabolic Imaging." *Department of Internal Medicine, Washington University School of Medicine, St. Louis.

Henry F. VanBrocklin, Ph.D.*; Michael J. Welch, Ph.D.; John A. Katzenellenbogen, Ph.D.*, "16-[F-18] Fluoroestradiols: Synthesis and Evaluation of Novel PET Imaging Agents for Estrogen Receptors." *Department of Chemistry, University of Illinois, Urbana.

James P. DiZio, Ph.D.*; Rita Fiaschi, Ph.D.*; John A. Katzenellenbogen, Ph.D.*; Clinton M. Anderson, M.D.; Gary J. Ehrhardt, Ph.D.; Michael J. Welch, Ph.D.**, "Progesterone-Rhenium Complexes: Potential Metal-Based Imaging Agents for Steroid Receptors." *Department of Chemistry, University of Illinois, Urbana; **University of Missouri Reactor, Columbia.

Stephen M. Moerlein, Ph.D.; Joel S. Perlmutter, M.D.; David Parkinson, Ph.D.*, "3-N- ω -[F-18] Fluoroalkylated Benperidol: Novel Butyrophenone Ligands for Mapping CNS Dopaminergic Receptors by PET." *Department of Cell Biology and Physiology, Washington University, St. Louis.

POSTER PRESENTATIONS

William R. Banks, Ph.D.; Stephen M. Moerlein, Ph.D.; David Parkinson, Ph.D.*; Michael J. Welch, Ph.D., "6-O-[F-18] Fluoroalkylated Analogues

of Raclopride: Potential Radiopharmaceuticals for Mapping Cerebral D-2 Receptors with PET." *Department of Cell Biology and Physiology, Washington University, St. Louis.

Gordon W. Philpott, M.D.*; Barry A. Siegel, M.D.; Judith Connett, Ph.D.*; Michael J. Welch, Ph.D.; Jim Fleshman, M.D., "Evaluation of ^{111}In -Br HBED-MAB1A3 as a Tumor Agent in Patients with Colorectal Cancer." *Jewish Hospital, St. Louis.

Ruth E. Shefer, Ph.D.*; Robert E. Klinkowstein, Ph.D.*; Barbara J. Hughey, Ph.D.*; Michael J. Welch, Ph.D., "Production of PET Radionuclides with a High Current Electrostatic Accelerator." *Science Research Laboratory, Somerville, Massachusetts.

CATEGORICAL COURSES

Jerold Wallis, M.D., "Three Dimensional Display in Nuclear Medicine: Principles and Applications."

APPOINTMENTS/ ELECTIONS

Jay P. Heiken, M.D., associate professor of radiology and codirector of computed body tomography, was appointed examiner for the American Board of Radiology Oral Examination, Louisville, June 3-6.

Joseph K. T. Lee, M.D., professor of radiology, was elected vice president of the Society of Computed Body Tomography.

Bruce L. McClennan, M.D., professor of radiology

and head of abdominal imaging, was appointed associate director of refresher courses for the 91st Annual Meeting of The American Roentgen Ray Society, Boston, May 5-10.

Joseph L. Roti Roti, Ph.D., professor of radiology, associate director of the Radiation Oncology Center, and chief of the cancer biology section, was elected councilor of the North American Hyperthermia Group.

HONORS/ AWARDS

William D. Middleton, M.D., assistant professor of radiology, was elected into the Society of Radiologists in Ultrasound.

Stephen M. Moerlein, Ph.D., associate professor of radiology and associate professor of biochemistry, was initiated into the Phi Kappa Phi honor society at the University of Illinois College of Pharmacy, Chicago.

CIC NEWS

The Cancer Information Center (CIC) is cosponsored by Barnard Hospital and Barnes Hospital and supported by Mallinckrodt Institute of Radiology at the Washington University Medical Center.

CONTRIBUTIONS

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June Eranoff

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Noella and John Rockus in
memory of Roger Burnett

Kathy Burns and Tamara
Boling in memory of Grace
Henry

CALENDAR

CONFERENCES

August 9-11, 1991

The Intersociety
Commission Summit '91,
sponsored by The American
College of Radiology
Asheville, North Carolina

August 12-16, 1991

MR Angiography and
Imaging, sponsored by the
Medical College of Wiscon-
sin, Milwaukee
Whistler, British Columbia

August 18-22, 1991

American Healthcare Radiol-
ogy Administrators
Nashville

September 12-14, 1991

MIR's 60th Anniversary Cele-
bration and ACR-accredited
Scientific Session
St. Louis

September 13-14, 1991

6th International Symposium
on Transrectal Ultrasound in
the Diagnosis and Manage-
ment of Prostate Cancer,
sponsored by Diversified
Conference Management
Chicago

September 25-28, 1991

"Diagnosis of Musculoskele-
tal Disorders: State of the
Art," sponsored by The Inter-
national Skeletal Society
San Diego

September 30-October 2, 1991

11th Annual Breast Imaging
Conference, sponsored by
The Medical College of
Wisconsin, Milwaukee
Monterey

October 6-13, 1991

International Neuroradiology
Congress
Zurich

November 3-8, 1991

American Society for
Therapeutic Radiology
and Oncology
Washington, D.C.

MOBILE MAMMOGRAPHY

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est technology in breast
cancer screening plus low-
dose, state-of-the-art equip-
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Louis-area Schnucks stores
for a cost of \$60. Call 362-
7111 to schedule an
appointment for the follow-
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September 3 - Mark Twain
Store, 1355 Fifth Street
63301

September 9 - Mid Rivers
Store, 577 Mid Rivers Mall
Drive 63376

September 10 - Zumbahl
Store, 1950 Zumbahl Road
63303

September 11 - Arnold
Store, 30 Arnold Mall 63010

September 16 - Concord
Village Store, 5434 South-
field Center 63123

September 23 - Reavis Bar-
racks Store, 3661 Reavis Bar-
racks Road 63125

September 24 - Affton
Store, 10070 Gravois Road
63123

September 30 - Overland
Store, 9074 Overland Plaza
63114

October 2 - Breckenridge
Store, 9785 St. Charles Rock
Road 63114

October 7 - Carrollton
Store, 12305 Natural Bridge
Road 63044

October 14 - Dorsett Store,
2030 Dorsett Road 63043

October 15 - Creve Coeur
Store, 10650 Olive Street
63141

October 21 - Chesterfield
Store, 141 Hilltown Village
63017

October 22 - Des Peres
Store, 11945 Manchester
Road 63131

October 28 - Fairview
Store, 625 Lincoln Highway
62208

October 29 - Belleville West
Store, 5720 North Belt West
62223

November 4 - Collinsville
Store, 501 Belt Line Road
62234

November 5 - Swansea
Store, 2665 North Illinois
Street 62221

November 11 - Butler Hill
Store, 4333 Butler Hill Road
63128

November 12 - Crestwood
Store, 9719 Watson Road
63126

November 18 - Telegraph
Store, 5519 Oakville Shop-
ping Center 63129

November 19 - Fenton
Store, 241 Fenton Park Mall
63026

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RESIDENTS' FAREWELL DINNER, *Sponsored by Eastman Kodak Company June 20, 1991*



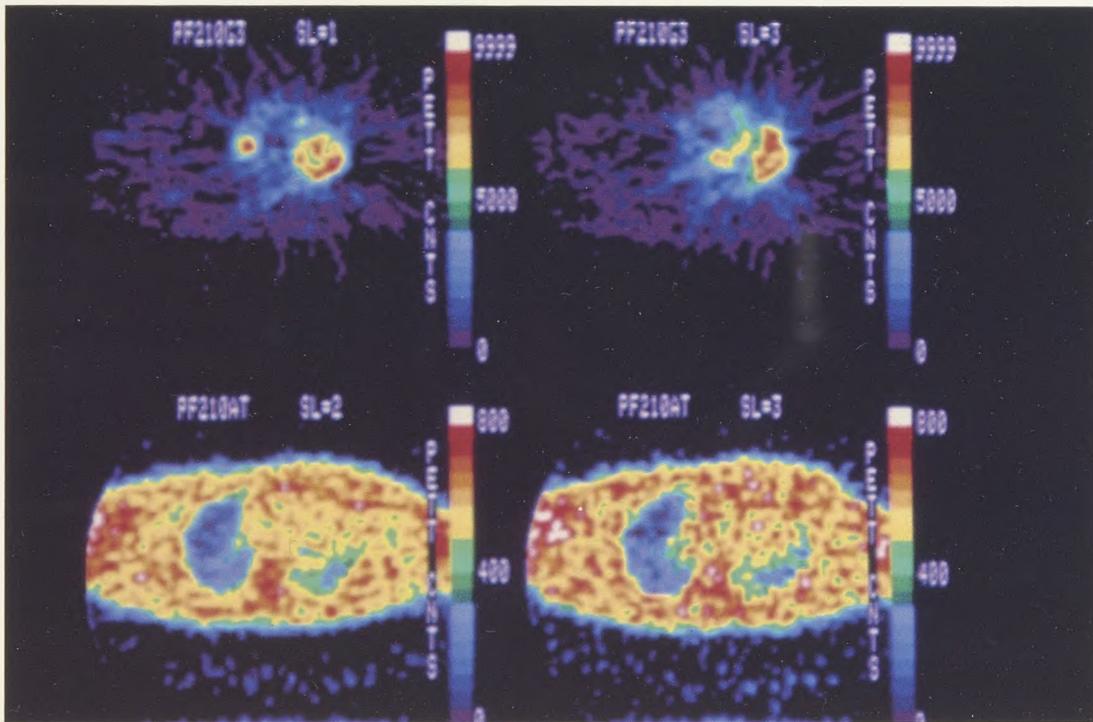
(Left to right): Drs. Allen Oser (foreground); Ronald Evens, director of the Institute; Michael Schiering; and William Mehard.



Robert Smith, M.D., and Michelle Smith.



(Left to right): Alan Burns, M.D.; Douglas Eamon, zone general manager - Midwest, Eastman Kodak Company; and Melissa Burns.



Positron emission tomography (PET) used with the tracer F-18 fluorodeoxyglucose (FDG) as shown above, is providing beneficial information before surgery in determining whether lung tumors are malignant or benign. Watch for the details of this study in an upcoming issue of Focal Spot.

FOCAL SPOT

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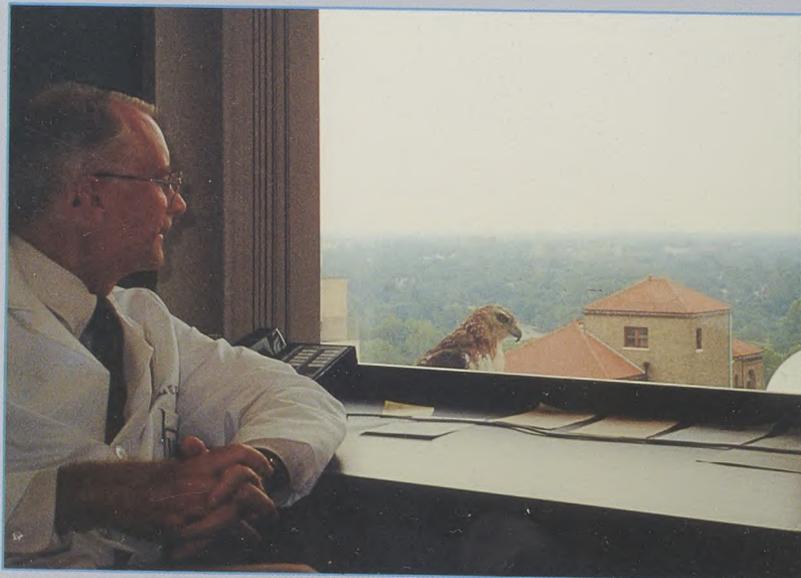
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High in his aerie on MIR's 12th floor, Ronald Evens, M.D., director of MIR, shares a quiet moment with a frequent visitor.

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