

Fall 1987

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FALL/WINTER 1987

VOLUME 18, NUMBER 3

FOCAL SPOT

MALLINCKRODT INSTITUTE OF RADIOLOGY

RESEARCH
AT THE SUMMIT

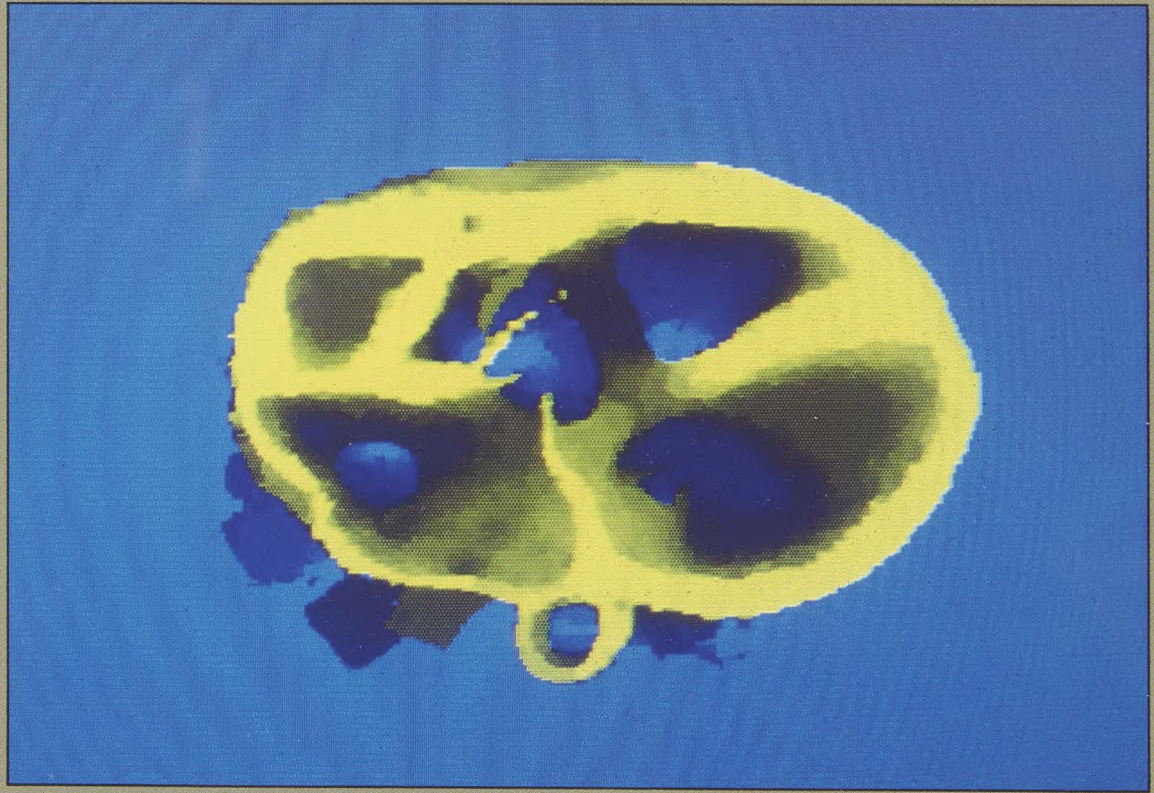
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ARCHIVES





The three-dimensional imaging techniques of Michael W. Vannier, M.D., and his associates, used to display a four-chamber view of the open heart in a child. The image clearly shows a ventricular septal defect, or hole in the heart, that was later closed surgically. Story on page 14.

FALL/WINTER 1987

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MALLINCKRODT INSTITUTE OF RADIOLOGY



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Marcus Raichle fulfills an old dream and advances the causes of science—both at 18,500 feet above sea level.



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Viewed on the screen in three dimensions, the computer-controlled image of a child's heart reveals the proper course of treatment.



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The newly defined interventional radiology section offers substantial promise to the patient treated directly by the radiologist.



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ON THE COVER:

Atop Gondora Peak in the Karakoram Range, Marcus Raichle displays a Mallinckrodt banner he created while snowbound in his tent. With him are Peter Smith (left), of the British Royal Air Force and John Coote, a well-known mountaineer and chairman of the Department of Physiology at the University of Birmingham, England.

SPOT NEWS



Bob Kolbrener

Welch, Roti Roti Review Grant Applications

Two Mallinckrodt Institute of Radiology professors have greatly enhanced their influence on the direction radiological research takes in this country during the next few years as a result of their appointments to National Institutes of Health (NIH) study sections.

Michael J. Welch, Ph.D., professor of radiation chemistry, is serving a four-year term on the diagnostic radiology study section. Meeting three times

Michael J. Welch, Ph.D.: Using MIR's cyclotrons to develop new radioactive labels for PET studies.

each year, he and 19 other eminent scientists review as many as 300 investigator-initiated research grant requests on the bases of merit and potential.

NIH is the largest single grantor of research funds in the field. In diagnostic radiology, 50 to 60 grants will be approved with a total value of approximately \$25 million, according to Catherine L. Wingate, Ph.D., executive secretary for the Division of Research Grants.

In an analogous position, Joseph L. Roti Roti, Ph.D., professor of cancer

biology and chief of the cancer biology section in the Radiation Oncology Center, serves on the therapeutic radiology study section.

Roti Roti calls the appointment a "grievous honor" because it involves considerable time and work. Reviewing at least 12 and as many as 20 applications at each of three annual meetings, he acknowledges that "it is all worth the effort because of the impact one has in setting the direction of research." Roti Roti succeeds Leonard J. Tolmach, Ph.D., professor of radiobiology in radiology, on the study section's roster.

Tracking Nuclear Medicine's Direction

Participants numbering 220, most of them from the Midwest, gathered September 19th and 20th at the Adam's Mark Hotel for the Missouri Valley Chapter of the Society of Nuclear Medicine's annual meeting.

Organizer Michael J. Welch, Ph.D., professor of radiation chemistry in Mallinckrodt's Division of Radiation Sciences, and a past president of the Society of Nuclear Medicine, reports that the meeting followed the theme of: "Advances in Radiopharmaceuticals—Accomplishments and Directions." Those attending discussed agents that clinicians and technicians will be using in nuclear medicine during the next three to five years. Of particular interest, Welch said, were anticipated developments in those agents

designed to measure myocardial and brain function.

William C. Eckelman, Ph.D., of E.R. Squibb and Sons, Inc., and a Washington University alumnus, delivered a paper regarding in vivo myocardial perfusion, and R.E. Coleman, M.D., a Washington University alumnus now at Duke University, gave the Les Wood Lecture titled: "Role of Single Photon Emission Computed Tomography (SPECT) in the Future of Medical Imaging."

Mallinckrodt staff member Edward Geltman, M.D., assistant professor of radiology, associate professor of medicine, and medical director of the cardiac diagnostic lab, offered a cardiology perspective, and Marcus E. Raichle, M.D., professor of neurology and radiology in radiation sciences, presented the neurological perspective.

Lee, Sagel Update Best-Selling Text

The nation's best-selling textbook on the subject of computed body tomography is being extensively revised, with the new edition expected to be completed before Christmas, 1987.

Mallinckrodt Institute of Radiology's Joseph K.T. Lee, M.D., professor of radiology, and Stuart S. Sagel, M.D., professor of radiology, form two-thirds of the editing team responsible for the work. Robert J. Stanley, M.D., formerly of MIR and now at the University of Alabama at Birmingham, rounds out the editing trio.

The latest edition of the text, *Computed Body Tomography*, includes new

SPOT NEWS

chapters on magnetic resonance imaging, and the title has been amended to read, "With MRI Correlation." First published by Raven Press in 1983, the work sold better than any other radiology text that year and still holds the distinction of being the top seller among such textbooks.

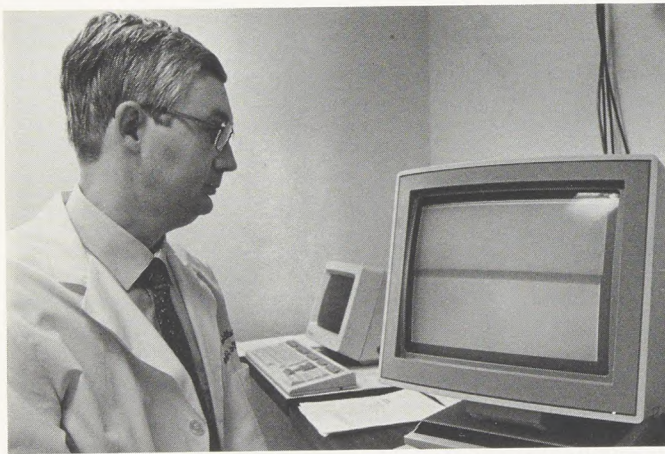
New information included in the revised text was contributed by Mallinckrodt staff members David Hardy, M.D.; Jay Heiken, M.D.; David Ling, M.D.; M. Victoria Marx, M.D.; Daniel Picus, M.D.; David Rabin, M.D.; William Reinus, M.D.; Klaus Sartor, M.D.; and John Wong, Ph.D.

Balfe Covers Controversies

Among the speakers on Thursday, October 22, at the Oncology Update held at St. Luke's Hospital in west St. Louis County, was Dennis M. Balfe, M.D., associate professor of radiology and chief of the gastrointestinal section.

Balfe's topic, Radiographic Evaluation of the Colon, was a subject far too large for a half-hour address, he says, so he concentrated on three specific areas about which controversy exists: detection, staging at presentation, and depicting recurrent disease.

In particular, Balfe told the group that radiology's biggest contribution to patients with colorectal cancer comes in early detection and early depiction of recurrent disease. Because no viable alternative to surgery currently exists, pre-operative radiological staging is not as important, he says.



Steve Kohler

Tom R. Miller, M.D., Ph.D., at the display terminal of the newest nuclear medicine imaging system.

Nuclear Medicine Enters 3-D Era

The relationship between Mallinckrodt and Siemens Medical Systems, Inc. expanded recently when the company presented the Division of Nuclear Medicine with its latest in three-dimensional imaging systems.

Using procedures common to nuclear medicine, the machine runs software developed at Mallinckrodt to "add realism to images," according to Tom R. Miller, M.D., Ph.D., associate professor of radiology. Miller, along with Jerold Wallis, M.D.; K.S. Sampathkumaran, M.S.; and senior medical student Justin Starren, created the software that Siemens eventually hopes to market commercially.

Final results of testing are not yet available, but the simple, realistic representations of blood flow to the myocardium and strength of heart action that the system produces, "allow us to interpret abnormalities more clearly," Miller says. The team is now working on adding numerical values to the program so the screen will display measurements in

real time.

The collaboration of manufacturing and science promises a new technology of benefit to patients, Miller says.

Five Fellows Have MIR Ties

Ronald G. Evens, M.D., Elizabeth Mallinckrodt professor of radiology and director of the Institute, reports that at the recent meeting of the American College of Radiology held in San Diego, five of the 103 new fellows named either have been or are associated with Mallinckrodt Institute of Radiology.

Those with ties to Mallinckrodt who were named to the honorary post are: Hywel Madoc-Jones, M.D., Ph.D., a former resident and faculty member and currently chief of the department of radiation oncology at New England Medical Hospital in Boston; Philip O. Alderson, M.D., a former member of the residency program here and now professor and vice

chairman of the department of radiology and director of nuclear medicine at Columbia-Presbyterian Medical Center in New York City; H. Jerry Murrell, M.D., a former resident and member of the faculty in Diagnostic Radiology, currently director of radiation oncology at Boone Hospital Center in Columbia, Missouri, and director of radiation oncology at the University of Missouri-Columbia Hospital; John A. Hodak, M.D., previously a fellow in neuroradiology at Mallinckrodt and presently chairman of the neuroradiology section of the radiology and imaging department at St. Joseph Hospital Medical Center in Phoenix, Arizona, as well as chairman of neuroradiology at Barrow Neurological Institute; and John L. Bardsley, M.D., staff radiologist at St. John's Mercy Medical Center in west St. Louis County and still on the Mallinckrodt staff as an assistant professor of clinical radiology.

Pioneer Award To Three

At a July 7 training session for volunteers, the American Cancer Society's appropriately named Pioneer Award was presented to the three principals in the St. Louis CanSurmount Program. Coordinators Lois Howland, R.N., B.S.N., managing director of the Cancer Information Center, and Karen Greening M.S.W., A.C.S.W., along with physician advisor Gary Ratkin, M.D., assistant clinical professor of medicine, each received a walnut plaque emblazoned with the image of a Conestoga wagon in recognition of their work in establishing

SPOT NEWS

the program here.

CanSurmount provides cancer patients with support from volunteers in a one-to-one hospital visitation program. A group of 46 trained volunteers has made more than 150 visits since April of 1986, Howland says. Volunteers are cancer patients themselves, and an effort is made to match each volunteer with a newly diagnosed patient on the bases of type of cancer, age, and sex. The philosophy, simply put, is that no one understands the new patient's situation as well as someone who has experienced it firsthand.

Patients who receive visits are recommended for the program by their physicians. Often, Howland says, patients ask, "Is there someone I can talk to?" That's when doctors who are aware of the program prescribe a visit, and the volunteers swing into action.

The program is coordinated through the Cancer Information Center, sponsored by Mallinckrodt Institute of Radiology and the Barnard Free Skin and Cancer Hospital.

Rogers Delivers Scott Lecture

Lee F. Rogers, M.D., used the example of osteoporosis and the recent rush by entrepreneurs to capitalize on its pervasiveness to caution his fellow physicians against allowing the winds of change to blow too violently through medicine. "Change slowly," he advised, and keep the patient's best interest paramount.



Rogers, Bradd and Kennedy professor of radiology and chairman of the department at Northwestern University in Chicago, delivered his remarks at the 16th Annual Wendell G. Scott Memorial Lecture, September 9, 1987. Speaking in Scarpellino Auditorium, he presented an encapsulation of the nation's growing awareness of osteoporosis and its effects. As people expect to remain active later into longer lives, a greater concern is being shown for the ravages of age, Rogers said, and osteoporosis is a symptom of aging—especially in Caucasian women of small frame and sedentary lifestyle.

But the rush to aid its victims may have outstripped science. And any simple solution is also likely to be simplistic, according to Rogers. For

Lee F. Rogers, M.D. (left), Mrs. Wendell G. Scott, and Ronald G. Evens, M.D.

example, the list of high-calcium food items sometimes touted in the press as a "cure" greatly resembles the list of foods to avoid in a program to reduce cardiovascular disease.

Scientific evidence that the many costly supplements offered to the public do any good once degeneration has begun is also very slim, Rogers told his audience. And whether screening clinics can go on to offer real help is, "iffy at best," he said. Serious reservations remain, despite the lure of marketing.

More generally, Rogers predicted a widening rift between marketing professionals who think of their audience collectively and physicians who see patients as individuals.

Murphy Accepts, Marches

William A. Murphy, Jr., M.D., professor of radiology and cochief of the musculoskeletal section, accepted an appointment from the Radiological Society of North America (RSNA) to chair the Skeletal Radiology Subcommittee of the RSNA's Program Committee for 1988.

Working with four other subcommittee chairmen, Murphy will develop the program to be presented at the weeklong meeting to be held in Chicago, late in 1988. The appointment bestows an honor, but entails, "a lot of work," Murphy says.

In a separate honor, Murphy served as a representative of his undergraduate Alma Mater, the University of Pittsburgh, at the September 30th inauguration of Father Lawrence Biondi, S.J., as the 31st president of St. Louis University.

Standing in for the president of the University of Pittsburgh, Murphy took part in the processional and heard calls to service from St. Louis Mayor Vincent C. Schoemehl, Washington University Chancellor William H. Danforth, and others in a day filled with pomp and circumstance.

SRO At Hyperthermia Workshop

Despite competition from a growing number of similar meetings in all parts of the country, Mallinckrodt Institute of Radiology's Third

Norman Hente

SPOT NEWS

Annual Clinical Hyperthermia Symposium and Workshop was "a sellout," according to Bahman Emami, M.D., professor of radiology and the symposium chairman.

Emami credits the symposium's popularity to the presence of the world's most eminent hyperthermia experts. At this year's event, held September 17-19 at Mallinckrodt's Radiation Oncology Center, lecturers included Joan M.C. Bull, M.D., from the University of Texas Health Science Center at Houston; Thomas C. Cetas, Ph.D., University of Arizona Health Science Center; Peter M. Corry, Ph.D., William Beaumont Hospital in Royal Oak, Michigan; Mark Dewhirst, D.V.M., Duke University; Rakesh Jain, Ph.D., Carnegie Mellon University; and Ian Robins, M.D., University of Wisconsin.

In addition to Emami, host faculty involved were Carlos A. Perez, M.D.; Gilbert Nussbaum, Ph.D., workshop chairman; Robert Myerson, M.D.; Andrei Laszlo, Ph.D.; Joseph L. Roti Roti, Ph.D.; Leonid Leybovich, M.D.; Vythialingam Sathiaselalan, Ph.D.; and William Straube, B.S.

Many of the participating hyperthermia investigators pointed enthusiastically to new directions and a surge in research, Emami reports. Following a long period during which results of early work were quantified and deficiencies were identified, the field is poised on the edge of a series of new products and techniques that will stimulate renewed growth and interest, Emami predicts.



Norman Hente

Armand Diaz Receives Honor

On June 26, 1987, Armand Diaz, R.N., R.T., FASRT, assistant professor of technical administration, received an award of special recognition for having served as director of education for 18 years here at Mallinckrodt Institute of Radiology. Diaz has been a strong advocate of continuing education and advancement of radiologic technologists throughout his career. He was presented this award by Michael D. Ward, R.T., M.Ed., newly appointed chief technologist and director of technical education. Gary Brink, R.T., B.S., chief technologist; Michael Albertina, R.T., B.A., chief technologist; and technical supervisors Sharon Albertina, R.T., and Norman Hente, R.T., B.S. took part in the presentation. Diaz continues to provide leadership, guidance, and professional direction for radiologic

Armand Diaz, R.N., R.T., FASRT; Michael Ward, R.T., M.Ed.; Gary Brink, R.T., B.S.; and Michael Albertina, R.T., B.A.; during the award presentation.

technologists here at Mallinckrodt and across the country. A formal presentation of this award took place at a monthly administrative/supervisory meeting held on July 1, 1987.

Lee Lectures At Seoul Radiology Conference

The Fifth Asian-Oceanic Congress of Radiology hosted MIR's Joseph K.T. Lee, M.D., professor of radiology, at a five-day conference in Seoul, South Korea, in late September. Lee was one of two special lecturers invited to address the congress, which was composed primarily of radiologists from the Eastern Hemisphere.

Closing the meeting's final day, Lee reviewed recent advances in the clinical uses of magnetic resonance imaging. His address dealt with developments in using a very short repetition time of 15-50 msec for imaging the body. The technique, Lee said, shows great promise in eliminating artifacts related to respiratory motion.

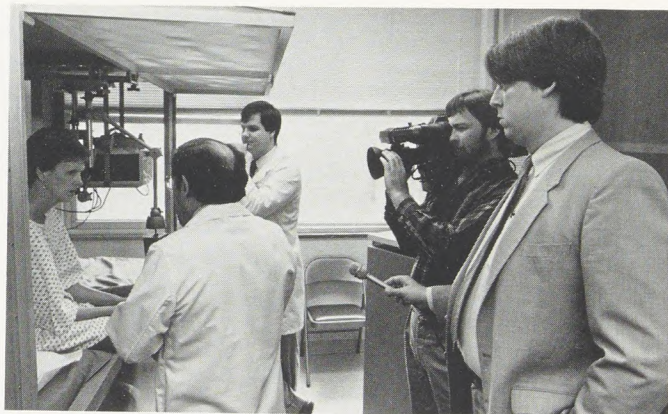
The lecture also reviewed the advantages of Helmholtz-type surface coils in magnetic resonance imaging. Most surface coils in use today, Lee said, are configured in a flat, single loop which produces images that drop off drastically in signal as distance from the coil increases. The Helmholtz-type coil gives a more uniform field of view, yet retains the high signal-to-noise ratio and resolution capabilities of flat designs.

MEDIA FOCUS

Mallinckrodt continues to draw widespread attention as the first medical facility in the nation to test the **Siemens Lithostar** extracorporeal shock-wave lithotripsy (ESWL) machine. The Lithostar, which disintegrates kidney and ureter stones without requiring immersion of the patient in a water bath, has been in use at MIR since December, 1986. Coinvestigators **Bruce L. McClennan, M.D.**, professor of radiology, and **Ralph V. Clayman, M.D.**, associate professor of urologic surgery and radiology, released their preliminary findings at the annual meeting of the American Roentgen Ray Society last May.

Applied Radiology was among the many publications that reported on those findings immediately. Subsequently, the Mallinckrodt study received illustrated front-page coverage in the June 9 edition of **Medical Post**, a weekly newspaper published in Toronto, Ontario. In the July edition of **Internal Medicine News & Cardiology News**, McClennan attributed high patient acceptance of the treatment to avoidance of the inconvenience of the water bath, the sufficiency of local anesthesia, and elimination of the overnight hospital stay ordinarily required for conventional lithotripsy.

Paducah, Kentucky television station **WPSD-TV** broadcast a segment on Lithostar on Friday, September 11 at 10 p.m. and again on Monday, September 14 at noon. Produced and presented by weekend anchorwoman **Bonnie Schrock**, the videotape included comments from McClennan and traced the latest developments in Lithostar treatments.



Bahman Emami, M.D., explains the hyperthermia procedure to a patient while physicist Bill Straube looks on. Filming the interchange are producer Paul Martin of Medstar Communications and cameraman Steve West.

A future episode of "Health Matters," a medical news program seen in 47 cities around the country, will spotlight Mallinckrodt Institute of Radiology and alternatives to surgery for prostate cancer patients.

During the third week of September, television producer Paul Martin was on location here taping footage for the show. Martin, of Medstar Communications out of Allentown, Pennsylvania, predicted that the many hours of tape he shot would be edited and condensed into a six- to seven-minute segment covering the procedures of radiation oncology and cell-sensitization techniques.

Mallinckrodt's **Carlos A. Perez, M.D.**, professor of radiology and director of the Radiation Oncology Center, and **Todd H. Wasserman, M.D.**, professor of radiology, were the subjects of major interviews. Martin also spoke with patients, taped in the Clinac 1800 treatment room, and went fishing

with a patient who had been treated successfully for prostate cancer without surgery.

Medstar's vice-president, Dale Minor, says no firm date for the airing of the show can be given, but distribution to stations will not begin until February, 1988.

Using a St. Louis-based production crew from Producers Communication Services, Martin also recorded footage of **Bahman Emami, M.D.**, administering treatment in one of the Institute's hyperthermia suites for use in another segment of the widely syndicated program.

Coping, which disseminates cancer information nationwide, reported on Mallinckrodt's advances in pairing hyperthermia—heat treatment—with radiation therapy. In its September/October edition, the magazine noted that **Bahman Emami, M.D.**, director of the clinical service of Mallinckrodt's Hyperthermia Treatment and Research Center, is so encouraged by hyperthermia's effectiveness on recurrent tumors that he plans to apply it as a first line of treatment for head and neck cancers.

A magazine's cover is the publication's most coveted space, usually reserved for work the editors consider to be both important and visually compelling. So when **Radiology Today** went looking for cover art for a key edition, they were pleased to find the three-dimensional heart images of **Michael W. Vannier, M.D.**, associate professor of radiology. The images display the heart in an easy-to-understand form that aids surgeons in their planning. Notable for their information content as well as for their graphic impact, the pictures were a natural choice.

The 3-D imaging work, done under the auspices of Mallinckrodt Institute of Radiology, is also the subject of one of the six short features in the edition which concentrates on the 1987 meeting of the Radiological Society of North America (RSNA). The article quotes Vannier as having said, "We have found that the accuracy of these images is very high and that the images are important in modifying or refining the diagnostic results obtained by more standard techniques, including making surgical decisions."

At the RSNA meeting, Vannier presented a review of the 3-D images his lab has created and compared their accuracy with that of more conventional techniques. He predicts widespread use of the process, proposing a time when, "many of these patients could go to the operating room with . . . no cardiac catheterization at all, which is very desirable because of the cost, morbidity, and mortality associated with it."

MEDIA FOCUS

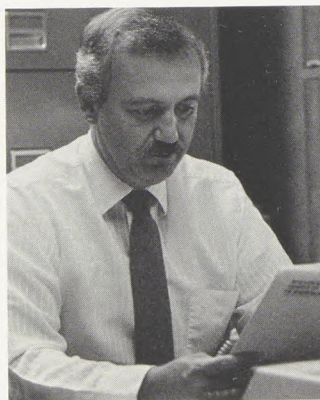
Mallinckrodt's aggressive outreach and education program has sharply raised both the demand for mammographic screening and physician concern about breast cancer, **Judy M. Destouet, M.D.**, told the *Ob. Gyn. News*.

Destouet, associate professor of radiology and head of Mammography at Mallinckrodt, told the Maryland-based publication that the number of women screened each quarter at MIR and its mobile unit shot from fewer than 140 in 1981 to more than 3,550 in 1986. Destouet, quoted in the publication's July issue, also said MIR's seminars and literature have helped make physicians more conscious of the need for early detection of breast cancer.

The success of the program has overcome many physicians' misgivings about the use of a van in the serious business of mammographic screening, Destouet said. Initially, she quipped, physicians "didn't think a woman should buy a loaf of bread and have a mammogram on the same trip."

Destouet also reported that response to Mallinckrodt's free screening program has been "overwhelming." One day a month, the mammography van provides free screenings through the St. Louis Regional Medical Center system for women 35 and older who are asymptomatic for breast cancer and cannot afford the \$50 screening fee. Destouet, interviewed for the June edition of *Applied Radiology*, said the program was a response to indications that the fee dissuaded many interested low-income women from taking advantage of the

service. Destouet also was interviewed for a television news story on trends in marketing clinical services for women. Destouet told **Lisa Allen**, a reporter for **KTVI Channel 2** in St. Louis, that providing mammograms via the mobile unit attracted more women than had advertising and educational outreach efforts alone. The interview, filmed at one of the van's service locations in Webster Groves, aired on the station's 5 and 10 p.m. news shows on September 7.



Joseph Doerhoff

Although he continues to feel self-conscious about the appellation, Mallinckrodt Institute of Radiology staff member **Joseph Doerhoff** has been appearing regularly on the off-the-air call-in show, "Ask the Expert."

Sponsored by **KMOX AM radio**, the show encourages questions on topics ranging from legal difficulties to auto care. Doerhoff's specialty: medicare benefits. His qualifications to speak on the subject include his employment as a supervisor of cashiers in patient accounts at MIR and his personal experience.

Doerhoff has taken

calls in four Saturday appearances—in March, April, August, and early November—and hasn't been stumped yet, he says. Given the convoluted intricacies of his subject, that surely qualifies him as an expert, no matter that the title embarrasses him.

The show is advertised on the airwaves, but the actual telephone conversations are not broadcast. The program is provided as a public service.

Diagnostic Imaging Magazine published two photos of Mallinckrodt research projects in its November issue. The photos—one of an interventional radiological procedure performed by **Daniel Picus, M.D.**, and **Philip Weyman, M.D.**, the other a magnetic resonance image of a brain—help illustrate a five-page story on issues relating to reimbursement for imaging services. The magazine distributed several thousand free copies of the November issue at the RSNA meeting in Chicago.

Magnetic resonance imaging is maturing rapidly and has become profitable in many of its applications, according to **Ronald G. Evens, M.D.**, Elizabeth Mallinckrodt professor of radiology and director of the Institute. Evens was quoted, along with several of his colleagues, in a cover story that appeared in **Hospitals Magazine** concerning the economics of the rapidly advancing imaging modality.

The twice-monthly periodical presented a run-down of the present status

and future hope of MRI in its November 5, pre-RSNA edition. A Mallinckrodt MR image of a heart in three dimensions graced the cover of the same issue.

"**The Infinite Voyage**," a 12-part documentary made for national distribution on PBS channels, debuted Thursday, October 29, with a segment that included some of the startling images being made at Mallinckrodt Institute of Radiology these days.


The series examines the adventure of scientific exploration, and the initial segment—titled "Unseen Worlds"—was an overview of science's vision into realms most of us never imagine. Twelve minutes were devoted to medical imaging; Mallinckrodt was the focus of a part of that.

Featured were the three-dimensional heart imaging techniques of **John M. Laschinger, M.D.**, and **Michael W. Vannier, M.D.** The translation of satellite-mapping computer programs to body mapping being done by Vannier also received mention.

Three or four installments of the series will be produced each year—all of them to be telecast on **KETC**, St. Louis's Channel 9. "The Infinite Voyage" is produced by public television station **WQED/Pittsburgh** in association with the National Academy of Sciences and is underwritten by Digital Equipment Corporation.



1953-54 MOUNTAIN EXPEDITION
MOUNTAIN EXPEDITION
MOUNTAIN EXPEDITION



PEAK EXPERIENCES

Marcus Raichle's Research
Takes Him to the Summit

By Steve Kohler

Mountains are in Marcus Raichle's blood, and it is blood that recently took him halfway around the globe into the realm of the world's highest peaks.

Raichle's alpine connection stretches back three generations, to the time when the family name was first emblazoned on fine Swiss mountaineering boots. He grew up near Seattle, in a town ringed by the Olympic Range, and today, the wall decorations in his office are all striking photographs of Mount Rainier in several of her moods.

In that Mallinckrodt Institute of Radiology office, Marcus E. Raichle, M.D., professor of radiology and neurology, directs research that employs positron emission tomography (PET) to precisely measure blood flow in the brain so areas of activity can be isolated and mapped. His deep knowledge of both the brain and blood flow, as well as his status as a neurologist, recommended him to the Birmingham (U.K.) Medical Research Expeditionary Society (BMRES) as they organized their fifth mountain research expedition for July, 1987. That Raichle had always dreamed of making a major expedition to the high mountains was gravy. Science was the meat.

Against a clear, alpine sky, members of the scientific expedition make their assault on the summit. A camp was established within 500 feet of the top of Gondora Peak as a base for research into acute mountain sickness.

Marcus Raichle

The Society required a man of Raichle's abilities because its goal was to continue investigations into acute mountain sickness, a little-understood syndrome marked by

PEAK EXPERIENCES

symptoms of headache, insomnia, nausea, vomiting, and cerebral edema. The heart and lungs are also implicated in the complex problem, since pulmonary edema can occur as well. Severe cases among even experienced climbers occasionally have claimed lives. Four earlier BMRES treks—to such lofty regions as the high Andes and Nepal's Annapurna range—had shown the syndrome to be closely related to the brain and its uptake of oxygen. Raichle, as well as any scientist alive, could trace the connection.

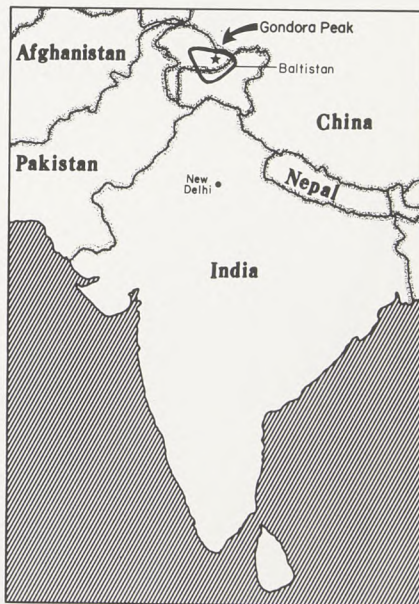
He was asked to help the expeditionists with their study of the drug acetazolamide.

A person's chances of going beyond even 12,000 feet without sleep disturbances and headaches are as thin as a breath of Himalayan air.

Shown by BMRES investigations to reduce the chances of becoming sick at high altitude when administered in small doses for three or four days before ascending, could it, team members set out to discover, alleviate symptoms when given in megadoses after the onset of the debilitating syndrome.

To find that answer and others, 18 scientist-mountaineers planned to use themselves as subjects in a double blind test of the drug. Those who administered and monitored the tests would not know whether they were giving acetazolamide or placebo; neither would the subjects. This time, the tests

wouldn't be conducted in a Mallinckrodt lab. The sixth floor of a building in what is essentially a flatland city just doesn't meet the qualifications. And Birmingham, England, is no better.



Instead, the researchers took themselves deep into the Baltistan region of Pakistan, to the renowned Karakoram Range, an altitudinous and politically unstable place where Indians shoot at Pakistanis across a disputed border, not far from where Afghan Mujahadin shoot at Soviet soldiers, and yet, where man's disputes can seem ridiculously unimportant in the cold shadows of more than 60 peaks that stretch beyond 22,000 feet.

From Islamabad, Raichle and the BMRES expeditionary force rode buses to Skardu, a mountaineers' jumping-off point, then climbed aboard trucks for the end of the road at Hushe.

A hundred porters shouldered the scientific and climbing equipment, food and supplies, including two electric generators to power the computers that would record the research data.

As the scientists started up

the mountain without a dose of acetazolamide, they were aware that the likelihood of developing acute mountain sickness was particularly strong. The top of Gondora Peak, their goal, pokes its way to 18,500 feet above sea level. A person's chances of going quickly beyond even 12,000 feet without sleep disturbances and headaches are as thin as a breath of Himalayan air.

Moving around in the oxygen-poor atmosphere at 18,000 feet, every step was a painful labor.

Traditional advice to climbers who develop altitude sickness has been to stop climbing, to reduce their elevation by at least 1,000 feet, and to wait to acclimatize before resuming their ascent. But these researchers would push on and up despite their symptoms, recording the physiological changes that accompanied the suffering.

To collect the necessary data, each day's climb ended with a complete physical examination that included blood gases, visual evoked responses, gastrointestinal absorption studies, kidney function measurements, tests of muscle strength, and an assessment of fat levels that revealed whether the trekkers' bodies had begun to burn muscle rather than fat in the relative absence of oxygen.

Raichle administered radioactive xenon to team members intravenously, then employed a multidetector specially designed and built for field use to measure the xenon as it passed into the brains of the mountaineers.



Marcus Raichle

Marcus Raichle with the multidetector's elements arrayed around his skull to measure blood flow to the brain.

Though the measuring equipment was no PET scanner, it accurately recorded blood flow to the brain.

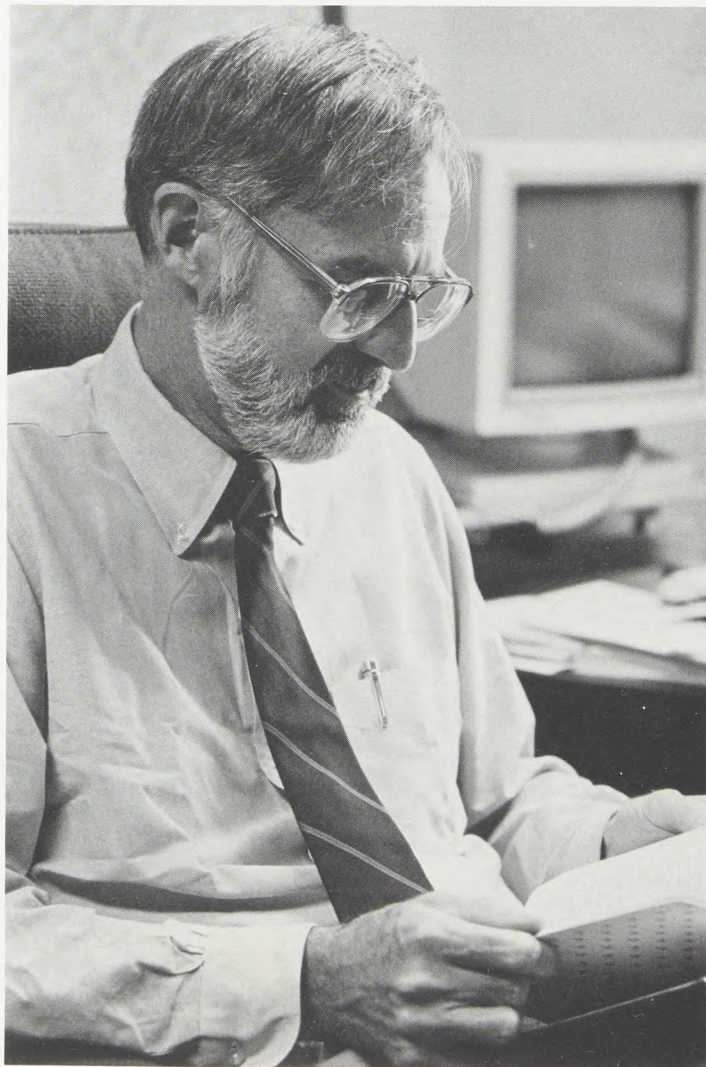
When the physicals were complete and the day's numbers had been fed to the computers, the climbers filled out psychological questionnaires, recording their emotional states and feelings. The effects of extreme altitude are far reaching, and the BMRES is slowly revealing their interrelationship. On the expedition to Gondora Peak, six team members were involved in a study of sleep disturbances at elevation to learn more about the problem that plagues all climbers.

As they ascended, Raichle says, the mountaineers' icy realm opened, and they found themselves moving among the earth's tallest peaks: K2, the world's second highest mountain, loomed at their backs; Chogalisa towered on their left; Masherbrum nailed the clouds to the sky. Across the Chogo Lungma Glacier, described by Raichle as a "moving, living thing—a jumble of dirty rock and ice," they encountered a steep face wiped clean by a recent avalanche. A sheer drop to a glacial pool lay below; rocks the size of small houses teetered above. Crossing that exposed face, though far from the most glamorous part of the climb, was the most dangerous moment Raichle recalls.

Four climbing camps were required to get the team to 18,000 feet, where a high camp was established within one day's striking distance of the summit. Once there, they created a village of mountain tents, research tents, and community dining lodges out of rip-stop nylon for an eight-day stay.

Long an avid outdoorsman, Raichle had at first assumed that his bulging sports closet held the equipment he would need for the expedition. But as he prepared and read about the challenges he would face, he began to wonder. When he checked with Washington University alumnus Tom Hornbein, noted mountaineer and now chairman of the University of

PEAK EXPERIENCES



Back in his Mallinckrodt office, Marcus Raichle consults the diary he kept of his high mountain adventure.

Washington's anesthesiology department, he quickly learned that his gear was not adequate to protect him at extreme altitudes and temperatures. Expedition quality equipment costing \$2,500 was added to the outfit, including a system of sleeping bags comfortable to minus 30 degrees Fahrenheit. Raichle was disappointed to learn that the leather boots made by his family in Switzerland would leave him with cold feet. Instead, he bought high-tech plastic overboots that sealed out all snow and water.

On the mountain, the scien-

tists were forced by high winds and heavy snows to dig their tents in to a depth of four feet. Raichle describes the job of burrowing in the snow as, "the most exhausting work I've ever done." Moving around in the oxygen-poor atmosphere at 18,000 feet, every step was a painful labor. "I know now what it's like to take one step and then have to wait ten breaths before you can move again," Raichle says. "It's not something you can imagine unless you've experienced it."

During the day, temperatures on the huge snowfields were pleasant, though Raichle never

measured them. At night, they dropped drastically, leaving extremities perpetually cold. As a counterpoint, in the daylight warmth the snow became unstable and dangerous; avalanches occurred frequently within sight of the protected camp. At night, the snow refroze into a stable mass.

Although the reduced oxygen level of high altitude made everything he did more difficult, Raichle never felt the draining effects of real mountain sickness, despite having been allowed almost no time for acclimatization. And after a few days at 18,000 feet, he became more comfortable with his surroundings and their demands. Only his appetite suffered. He later learned he had lost 15 pounds, a decrease he attributes to lowered caloric intake when just the effort of eating became drudgery.

In the final stage of the study, even those who had not displayed symptoms were given the large dose of acetazolamide. And then Raichle experienced the pounding headache he recognized as acute mountain sickness from earlier trips to high altitude. The implications, he says, are that, "acetazolamide does improve respiration, but it may also make it harder for oxygen to be released from the blood."

Previous research has shown the controversial drug to have several effects: It causes hyperventilation and improves blood flow to the brain for about 12 to 24 hours before a return to normal rates occurs. Even when the drug is taken over three or four days, the effects wear off quickly. Further answers regarding the effects of acetazolamide will be examined during the last week of November, when the group of explorers gathers in Birmingham to review the data.

Steve Kohler

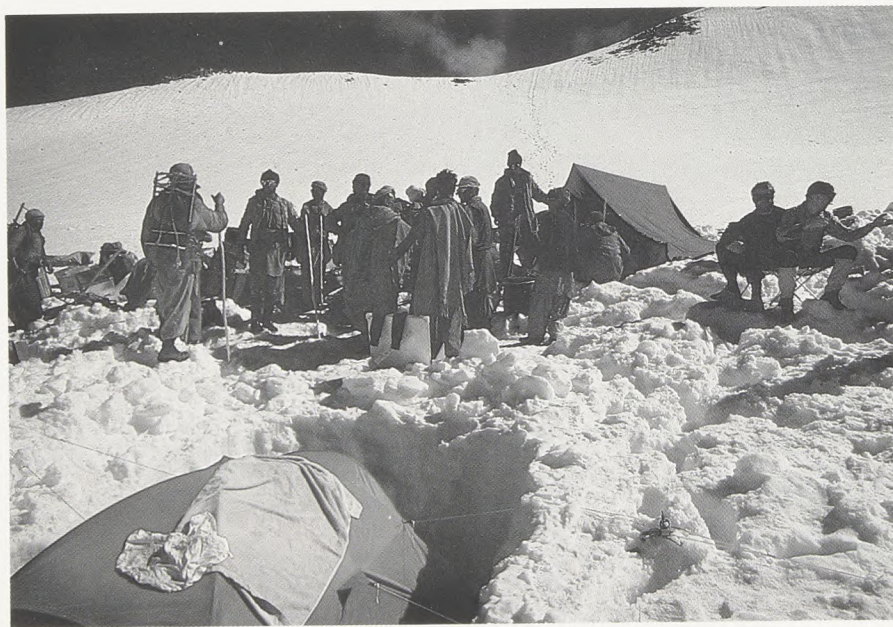
A hundred porters and 25 scientists made the trek. Here, a second wave arrives at the high camp.

The adventure ended successfully for Raichle, who grew accustomed to thinking of lacing boots, putting on jackets, and merely getting into bed as major tasks. On July 14, 1987, his diary of the trip records, he reached the summit of Gondora Peak, where he had our cover photograph made. No frostbite and no physical scars

A hundred porters shouldered the scientific and climbing equipment that included two electric generators to provide power for the computers.

remain from his foray to extreme elevation; only the satisfaction of completing his first true expedition and of contributing to the body of knowledge stick with him.

In his sixth-floor office and lab at Mallinckrodt, Raichle is again deeply ensconced in research that maps the human brain's functional topography, a study lofty in its own right. Looking down at his desk, he sees the detail and precision of modern medical research. But when he glances up, he sees images of the earth's tall peaks and anticipates the expedition that will someday take him above 20,000 feet, a goal that is in his blood. □



Marcus Raichle

MALLINCKRODT ON TOP

More than three miles high on the side of a mountain, in the raging center of a snowstorm that confines the climbing party to its tents and isolates them beyond imagining, a bearded figure hacks at a T-shirt with a small pair of scissors.

Despite the appearance, this is neither Sherpa nor Yeti. It's Mallinckrodt's Marcus E. Raichle, M.D., professor of radiology and neurology, focused on his work. And he's making something important.

The T-shirt was—before he began cutting—a memento of his home institution's 50th anniversary and the footrace held as part of the celebration. It came to him in a last-minute presentation from the office of Mallinckrodt Director Ronald G. Evans, M.D., and it has traveled halfway around the world in his duffel.

Raichle's purpose is to create a flag he can display when he reaches the summit of the mountain, in the tradition of climbers everywhere. There's no sense mentioning a 5K run in an atmosphere where every breath is lung-searing work, so Raichle is customizing the shirt's printing until it shows only the name and the symbol of Mallinckrodt.

No seamstress, he nonetheless manages with chilled hands a respectable appearance for the triangular banner that will fly from the 18,500-foot tip of Gondora Peak in Pakistan's Karakoram Range when weather permits. With the gray T-shirting rolled tightly and tucked into a parka for the assault, Raichle pours himself into his sleeping bag and strives for rest against the beating of the storm. Tomorrow he'll put Mallinckrodt on top. □



THE BEATING HEART

by Steve Kohler

The techniques of the best medical science, like those of fine art and first-rate athleticism, are transparent. At its most effective, technology becomes invisible. Results appear as if they've been conjured up, without any intrusion from all the gears—and disc drives—whirring behind the scenes.

For example, in the 3-D laboratory of Michael W. Vannier, M.D., associate professor of radiology, a small video screen sits amid an array of computers and a disarray of data in many forms. A half-dozen other CRTs flicker. But the image on the little screen dominates the room. No schooling or expertise is required to recognize the picture. It is clearly a human heart. And not just an abstract, two-dimensional rendering, but an individual's beating heart. Alex Dixon's heart.

Before 10-month-old Alex underwent heart surgery in April of 1987, his mother watched the same image. Margie Dixon focused her attention on the display of what is arguably her son's most vital organ while John Laschinger, M.D., a cardiothoracic surgery fellow, explained. Laschinger pointed out the four components of the congenital heart disease known as tetralogy of Fallot. The four anomalies could be corrected surgically, he assured her, but the image of Alex's heart on the screen revealed another difficulty: left pulmonary stenosis, or constriction of the artery. The pictures showed the artery to be only one-third its normal size. Surgery to repair the heart internally would be too risky. The treatment plan was changed; a shunt would be performed to alleviate the stenosis. Complete repair would come later.

Margie Dixon understood. She could see everything Laschinger pointed out. She says now, "It was amazing to me. I

Alex Dixon enjoys a hug from his mother, Margie, in the backyard of the family's Jefferson County home. Alex's health is good, and the last stage in the repair of his heart is expected soon.

Had it not been for the new technique, he would have had a surprise to deal with under operating room conditions.

was so grateful and relieved that we had the technology to use. It made things so much easier for Alex in surgery."

And that's the idea. The new technology's function is to provide a vision as close as possible to the actual, says Vannier, who has brought his considerable experience in computer imaging to the project. Patients and their loved ones who would gain nothing from viewing more conventional heart images can see exactly what must be done and why. Even to the untrained eye, "abnormalities become evident," Vannier says.

More importantly, the new process helps the trained surgeon in much the same way. By providing accurate, realistic, and detailed information in a form with which he is familiar—a

form consistent with conventional seeing and understanding—the images aid a surgeon's planning.

Thomas L. Spray, M.D., assistant professor of cardiothoracic surgery at Children's Hospital, says conventional methods failed to reveal Alex's stenosis. Had it not been for the new technique, he would have had a surprise to deal with under operating room conditions. Though Spray would have looked for stenosis as a matter of course, Alex's risk might have been greatly increased.

Traditional angiograms, until now the diagnostician's gold standard for heart imaging, suffer from several shortcomings. Most seriously, angiography requires catheterization and the injection of a contrast material, invasive procedures that involve certain risks of morbidity and mortality.

Because it relies on data collected by magnetic resonance imaging (MRI), the technique that results in three-dimensional, animated pictures avoids any such complications. MRI is a totally noninvasive tool that maps human tissue by using a powerful magnetic field and radio waves to record the emis-

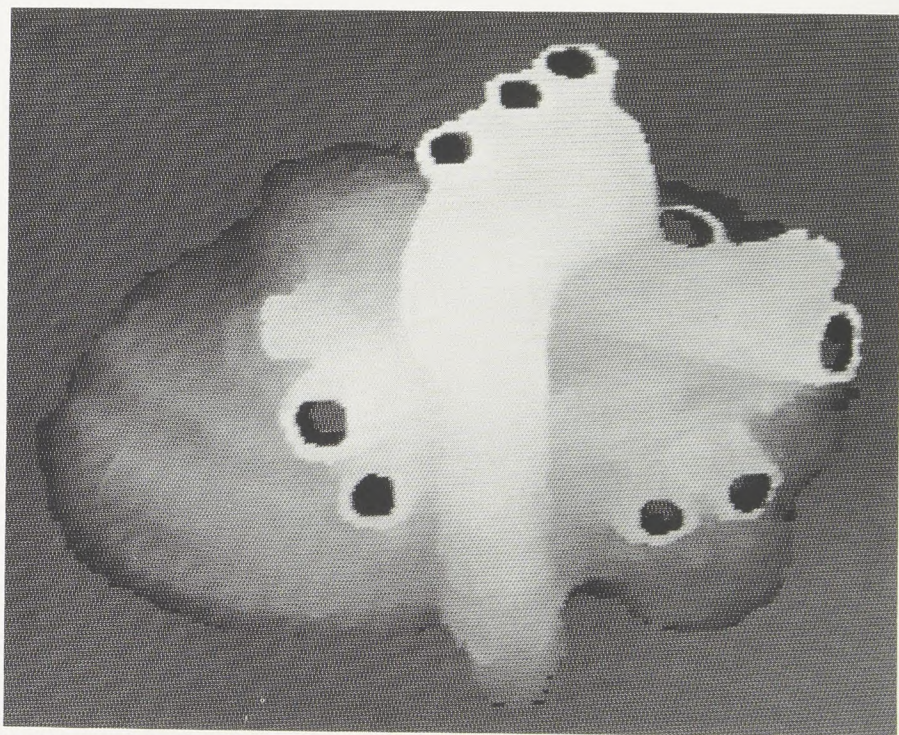
THE BEATING HEART

sions of excited hydrogen nuclei. Water and fat, high in hydrogen content, create bright images; teeth and bones are dark.

This characteristic of MRI gives it another advantage over angiography, which can fail to show the precise size and boundaries of some heart problems, such as the ventricular septal defect (VSD) that is a part of young Alex's trouble. Because MRI technology differentiates clearly between tissue types, the exact border and size of such abnormalities are clearly recorded. Currently, MRI fails to resolve small detail clearly enough to be of much use in assessing adult heart disease that often involves arteries or valves, but it is ideal for gathering data about congenital heart disease in children.

What Vannier and Laschinger have done is to get rid of most of the guesswork by giving a computer the task of coalescing the data.

Because of the complexity of angiograms, physicians spend years accumulating experience with them and gaining confidence in their interpretations. Laschinger speaks for many when he says, "I sometimes have a hard time figuring out what's going on from looking at an angiogram." And conventional MRI data is little better. To read MRI scans, many small pieces of two-dimensional information must be juggled mentally into a



Representative of the images produced by the new 3-D technique is this posterior superior view of the heart and great vessels showing the aorta and its branches, pulmonary arteries and veins, and superior vena cava.

single concept while a welter of redundant images is ignored.

What Vannier and Laschinger have done is to get rid of much of the headwork and most of the guesswork by giving a computer the task of coalescing the data. The resulting image is "much more useful," according to Spray. "The surgeon can look at the complete heart and see clearly, without having to do all the interpretation."

The process begins when a complete MRI scan of a patient's heart and great vessels is made in two sets, doubling the usual number of images. "Slices" of the heart approximately five millimeters thick are electronically recorded. Then, via Vannier's programming wizardry, the 28 to 30 contiguous slices are stacked

and aligned into a single, three-dimensional picture.

That final image represents an average of where the heart was at one stage of its cycle over a one-hour period of more than 3,600 beats. Seven such increments in time record one whole beat. By linking the seven "frames," a complete heartbeat can be animated on screen, from start to finish. Repeat that average cycle and the heart's operation—the thickening of muscle, the regional and global wall motions—can be observed. Stop the image and precise measurements of volume and ventricular mass can be made. The walls of the heart are displayed in what's called a surface reconstruction. The opposite, an endocast reconstruction, shows the volumes.

“What sets this new tool apart,” says Laschinger, “is that we can see the anatomy in three dimensions preoperatively,

BEYOND PERSEVERANCE

At first meeting, John Laschinger looked like another of the many bright, young men who show up in Michael Vannier's laboratory with big ideas but no concept of how a computer works or what it can't do. Laschinger had heard of Vannier's advanced skull imaging techniques, and he spoke about adapting them to work on the human heart. Vannier sent him off to learn more, grateful to have the newcomer out from under foot in the hectic research lab and figuring he'd hear no more.

But Laschinger didn't give up. Instead, he took the suggestion and nosed around the magnetic resonance imaging facility, making scans of his own heart. Those he took to Vannier's workshop where he enlisted the help of laboratory manager Bob Knapp, B.M., R.T. The two tried to get the data to run.

Nothing worked. But Laschinger kept coming back. At night and during his free time he worked for months with Knapp, using programs modified by Vannier. When they had results to show—

crude images of Laschinger's heart in three dimensions—Knapp told Vannier there was something he'd better see.

His interest piqued, Vannier became more involved. He, too, began spending his evenings at the computer console. "The first version was rough," he says, "but we kept gaining experience, and each one got better." In a nod to Laschinger, he adds, "I get wrapped up, and I'll only do something new like this if somebody pesters me. Frankly, he hounded us into it, and it's a credit to him."

Just 31, Laschinger was fresh from his general surgery residency at New York University when he first visited Vannier with a developing interest in pediatric congenital heart disease and its effective diagnosis. A year later, with what appears to be a significant medical advance to his credit, Laschinger still says, "I don't know anything about computers." Perhaps not, but now he's admired and respected in the lab where the machines process his idea into useful images. □

and we can set it in motion."

For Vannier, the animation is, "a nice extra." He says, "We don't do it for every case, though we can." He's more pleased with the technique's ability to provide the information required to accurately evaluate a patient's needs. When the time comes for Alex Dixon's heart repair, for example, the size of the patch to close the VSD will be available from the computer preoperatively.

Since his days as a NASA engineer, Vannier has been instrumental in furthering the science of computer imaging. His work includes the development of advanced computed tomography display techniques for craniofacial disorders, the wrist, and even three-dimensional examination of rare South African hominid skulls. Much of the programming created for those projects was applicable to the

new work with the beating heart.

Still, there was considerably more to getting such sophisticated pictures on the screen than simply loading new data into the computer. With the source changed from CT scanner to MRI, the inevitable bugs had to be worked out. And then there's the two to three hours of editing time required for each case. If the image is to be useful, someone with training in anatomy must use a special stylus and editing functions to eliminate

The new technology's function is to provide a vision as close as possible to the actual.

unnecessary information. The spinal cord, chest wall, and lungs have to be wiped from the screen. Laschinger himself did much of this editing on the 200 images (28 to 30 slices multiplied by seven increments of time) for the first patients examined with this technique.

Early results of the work have shown it to be worth the trouble, however. James L. Cox, M.D., professor of surgery and chief of the Division of Cardiothoracic Surgery at Washington University School of Medicine, labels the endeavor's results "exciting," and points toward a bright future. Among the possibilities he sees is the potential for the new technique to supplement cardiac catheterization as a diagnostic tool. "It grants us the opportunity to see, noninvasively, if a child's vessels are developing normally. We can repeat the procedure as often as necessary," he says.

THE BEATING HEART

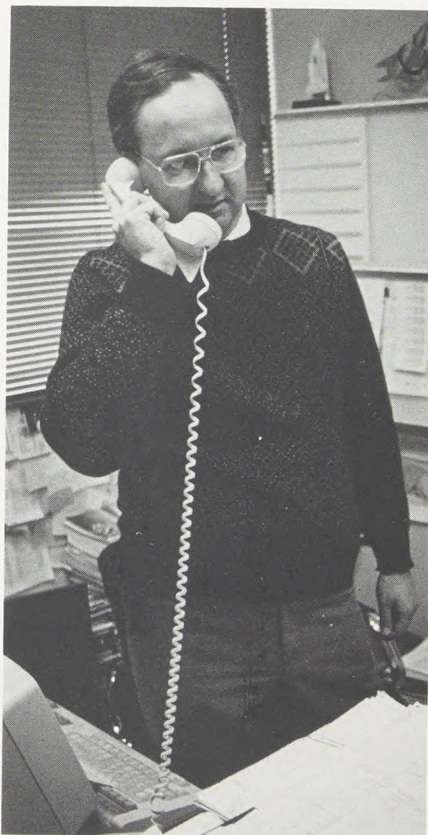
In the case of Alex Dixon, the imaging technique did in fact eliminate the need for a repeat catheterization, reports Spray. He adds that in some instances, catheterization may be avoided altogether by using a combination of the new process and echocardiography. And he anticipates the day when he will look up from the surgical field to the screen for a three-dimensional view of an MRI scan to guide his surgery.

As quickly as the research is progressing, that day may not be far off. Laschinger first used the technique on himself to begin establishing a baseline normal at the end of 1986. Two adult patients awaiting heart-lung transplants followed. With no surprises resulting and the computer kinks disappearing, work with congenital heart disease patients began early in 1987.

In each of the first eight cases ever, diagnosis was determined to be "one hundred percent accurate," Laschinger says. Seven of the first eight people to benefit were children under four years of age. For six of them, the technique provided important information that had *not* been available from other sources. Not a single operation in which the surgeon had viewed a three-dimensional, animated picture of the heart presented doctors with an unexpected complication.

Vannier is presenting the results of cases diagnosed with the 3-D technique at the 1987 meeting of the Radiological Society of North America in Chicago.

Such overwhelmingly positive results have both good and bad implications. Hope for what Vannier calls "a significant improvement in both process and outcome" runs very high. To the 25,000 children who undergo surgery for congenital heart disease every year, the promise is



Michael W. Vannier, M.D.: Using his techniques, "abnormalities become evident."

Steve Kohler

one of faster, safer diagnoses and superior information. As a result, they should suffer fewer complications and live longer. The confidence and effectiveness of surgeons will rise as the ambiguity of their information is suppressed.

Most MRI scanners can generate the necessary data, so once the results of the study are in, the relatively economical procedure should be available to every patient who might benefit. And that's a problem. Vannier and Laschinger are quickly becoming not just researchers and developers, but deliverers of the technology. Because early results are so encouraging, a blind study may never be completed, Vannier says. "The moral

issue of how we can continue to deny the technique while we study its effectiveness becomes crucial. We don't want to make claims we can't support, but we can't withhold valuable information, either," he says.

Already the lab is in a "near-panic situation." Beginning at just one scan to process per week, the number quickly grew to two. By mid-May, five scans were scheduled for five days, and a sixth looked likely. As many as 48 man-hours would have to be spent editing them. Vannier's objective now is to scale up the equipment to handle a larger number of patients more efficiently. His plan: "teach" the computer to differentiate between types of tissue so editing functions can be automated, greatly reducing the processing time required and eliminating the bottleneck.

What's the method for achieving that goal? Well, NASA satellite mapping programs interpret photographs taken from great altitudes, identifying many kinds of terrain and vegetation. Those programs are being altered to run medical data and differentiate between heart tissue and other types.

Vannier, who is always cautious to warn of unrealistic expectations for technological developments, seems genuinely enthused over the possibilities here. The heart images meet his first criterion for value: They advance patient care. They're not just dead-end forays into the flashy but fruitless world of computer graphics. Despite all the complicated engineering required, the pictures on the screen and their ultimate ability to serve the patient are what satisfy him. Alex Dixon and his parents would only agree. □

HOME IN TIME FOR DINNER

Mallinckrodt's New Interventional Radiology Section Reduces Suffering, Cuts Costs, and Sends Patients Home Early

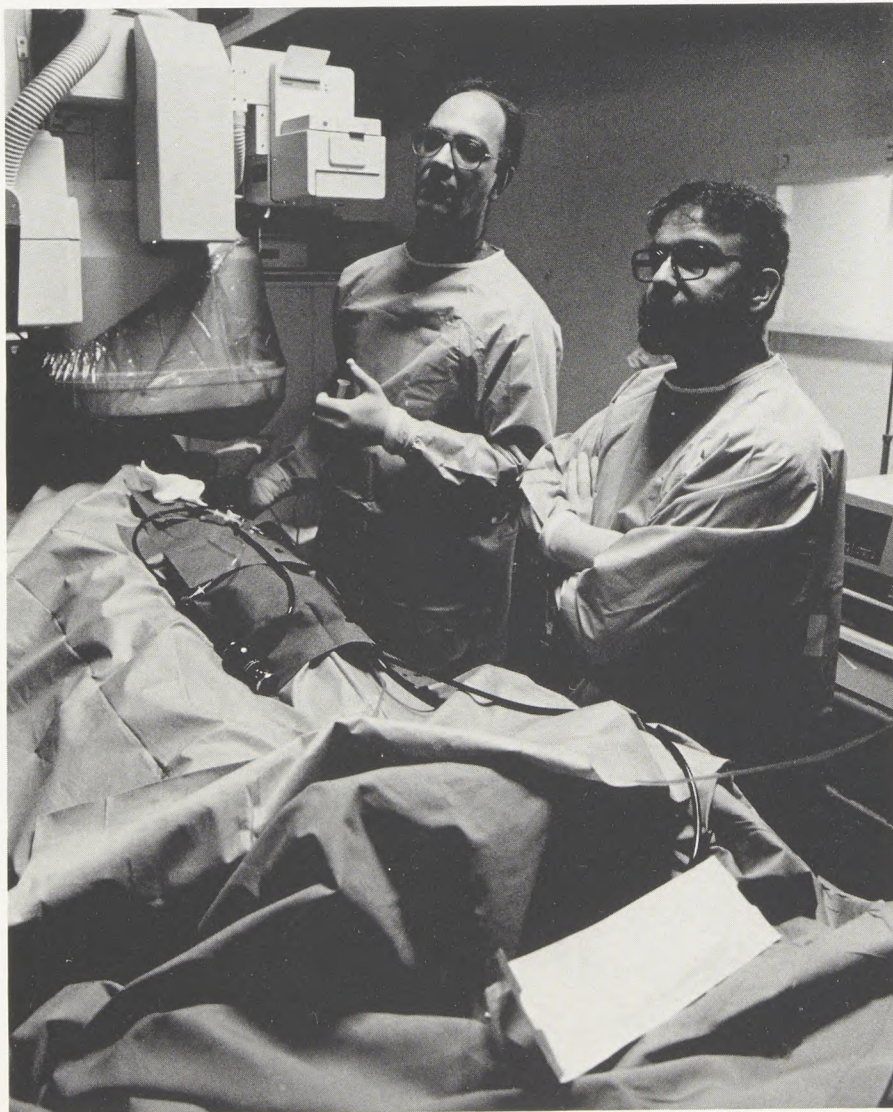
by Steve Kohler

Although his contributions to patient care have always been vital and substantial, the radiologist's work traditionally has been less obvious to patients than that of many other care givers. The reading room has not been on the front lines of treatment, no matter how often it's been on the cutting edge of diagnosis.

But now, a growing emphasis on interventional radiology as a separate discipline is moving the radiologist's skills another step into the patient's direct line of sight. As that happens, patients are universally thankful.

In Mallinckrodt Institute of Radiology's newly created section of vascular and interventional radiology, patients receive treatment for a variety of ills. In a less sophisticated era, many would have required general anesthesia, surgery, and long hospital stays. But radiology intervened. "Our list of procedures is long and growing every day," says Daniel D. Picus, M.D., assistant professor of radiology and chief of the new section. About half the cases he sees are diagnostic, the other half therapeutic, and "everything we do starts with a needle," Picus explains.

He and his associates—Philip J. Weyman, M.D., associate professor of radiology, and M. Victoria Marx, M.D., fellow in interventional radiology—use radiology to guide them as they insert gastrostomy and drainage tubes, deliver drugs to stop bleeding or as chemotherapy, drain abscesses, perform per-



Daniel D. Picus, M.D. (foreground) and Philip J. Weyman, M.D., at work performing a percutaneous common duct stone removal guided by a flexible choledochoscope.

cutaneous gallstone removal, and do angiography and angioplasty.

As an adjunct to or in lieu of surgery, interventional radiology promises reduced costs, less

suffering, and lower risks. "For instance," Picus says, "consider balloon angioplasty," in which a small balloon is inflated to a predetermined size inside a blood vessel to flatten plaques against the vessel wall. "It's cheaper, safer, and easier on the patient than surgery. Most people can go home the next day. Vascular surgery might require seven to ten days in the hospital."

Steve Kohler

HOME IN TIME FOR DINNER

R. Gilbert Jost, M.D., professor of radiology and chief of the Diagnostic Division that embraces the new section, adds a more dramatic example of interventional radiology's benefits: "We recently treated a patient with a large abscess in his chest. Complicating illness made the surgeon reluctant to operate, but we were able to put a tube in, drain the abscess, and help the patient to feel much better immediately. That kind of interaction is relatively new for the radiologist."

Indeed, it was the goal of improved patient care that prompted the creation of the new section. Until July 1, when the realignment became official, each existing section of diagnostic radiology had its own interventional specialists and procedures. By coalescing those efforts under a leader who can develop and expand the work, Mallinckrodt has committed its resources to this growing trend in radiology.

As an adjunct to or in lieu of surgery, interventional radiology promises reduced costs, less suffering, and lower risks.

"Interventional radiology is not really new," Jost says, "it has been emerging for several years. By establishing this new section, we are taking a step to move Mallinckrodt into the forefront of this field." And he points out



Steve Kohler

M. Victoria Marx, M.D.: "A chance to do important work with patients."

that in the few months since the reorganization, an increasing number of requests has been received for interventional radiology's services.

Much of the interventional practice that was being done in the various sections prior to July 1 has been consolidated under Picus' leadership. That meant a sacrifice had to be made by those staff members who were interested in the emerging field, Jost acknowledges. But he was gratified to discover that, to a person, the staff agreed "the time was right for this change."

The unification of effort also reaffirms Mallinckrodt's status as a teaching institution. The first fellow in interventional radiology, Marx, will complete her training at the end of December, then join the staff. A fellow has been named for 1988, and recruiting for additional staff members is under way.

Marx, here following her residency at Ohio State, echoes the section's theme of direct patient care: "I need to do more than interpret films. This gives me the chance to do important

work with patients." Further, she relishes the chance her subspecialty provides to advance radiological science while serving as a patient-care physician.

Many of radiology's impending advances are expected to come in the interventional subspecialty. Lasers hold promise as treatment tools; small drills designed to clear blocked vessels are in development; and soon the section here will take delivery of an atherectomy device that removes plaques from vessel walls by scraping.

"Complicating illness made the surgeon reluctant to operate, but we were able to put a tube in, drain the abscess, and help the patient to feel much better immediately."

For the moment, the vascular and interventional radiology section at Mallinckrodt is scattered across floors two, three, and four of the Institute, but blueprints have been drawn for a permanent home. Within six months, work is expected to begin on refitting the eighth floor into an interventional treatment center.

The day has arrived when a man in need of care for an arterial blockage in his legs might say to his wife over breakfast that he has an appointment with a radiologist rather than a surgeon, and that he'll be home for dinner at the usual time. □

FYI

THE DIRECTOR'S OFFICE REPORT

RECENT PROMOTIONS

Bahman Emami, M.D., to the rank of professor of radiology

Joseph L. Roti Roti, Ph.D., to the rank of professor of cancer biology in radiology

Todd H. Wasserman, M.D., to the rank of professor of radiology

Harvey S. Glazer, M.D., to the rank of associate professor of radiology

William J. Powers, M.D., to the rank of associate professor of radiology

Joseph R. Simpson, M.D., to the rank of associate professor of radiology

Robert R. Kuske, M.D., to the rank of assistant professor of radiology

Jerold W. Wallis, M.D., to the rank of assistant professor of radiology

Ryuji Higashikubo, Ph.D., to the rank of research assistant professor of cancer biology in radiology

NEW STAFF

G. James Blaine, D.Sc., associate professor of computer sciences in radiology (also Institute of Biomedical Computing), Division of Diagnostic Radiology

Bruce A. Cross, M.D., instructor in radiology, Division of Radiation Oncology

Robert J. Gropler, M.D., instructor in radiology, Division of Nuclear Medicine

Abraham Kuten, M.D., research instructor in radiology, Division of Radiation Oncology

William D. Middleton, M.D., assistant professor of radiology, Division of Diagnostic Radiology

Dennis A. Moore, Ph.D., research associate in radiology, Division of Radiation Sciences

Susan J. Shapiro, M.D., instructor in radiology, Division of Radiation Oncology (completed 4-year residency in Radiation Oncology at MIR)

Martin S. Weinhaus, Ph.D., assistant professor of radiation physics in radiology, Division of Radiation Oncology

Anthony J. Wilson, M.D., assistant professor of radiology, Division of Diagnostic Radiology

Xingren Ying, Ph.D., research associate in radiation physics in radiology, Division of Radiation Oncology

Michael A. Mackey, Ph.D., research associate in cancer biology in radiology, Division of Radiation Oncology

OFF STAFF

Elizabeth B. Albright, M.D., completed a 4-year residency in Diagnostic Radiology and has begun a fellowship in CT, ultrasound, and MRI at Stanford University in Stanford, California.

Don C. Arwood, M.D., completed a 3-year residency in Radiation Oncology and has moved to Greenwood, Indiana.

Catherine H. Beal, M.D., instructor in radiology, completed a 1-year fellowship in neuroradiology and has entered private practice at Deaconess Hospital in St. Louis.

Richard A. Bedont, M.D., completed a 3-year residency in Diagnostic Radiology and has entered private practice with

emphasis in nuclear medicine at Mercy Hospital Medical Center, Des Moines, Iowa.

William F. Conway, M.D., instructor in radiology, completed a 3-year residency in Diagnostic Radiology and a 1-year fellowship in musculoskeletal radiology. He has accepted the position of assistant professor of radiology and codirector of Musculoskeletal Radiology at the Medical College of Virginia, Richmond.

M. Reza Dadsetan, M.D., instructor in radiology, completed a 1-year fellowship in neuroradiology and has accepted the position of assistant professor of radiology at the Health Science Center of the University of Texas-San Antonio.

Thomas A. Getz, M.D., chief resident in radiology 1986-87, completed a 4-year residency in Diagnostic Radiology and has entered private practice at the Methodist Medical Center of Illinois, Peoria. Getz has joined a seven-man radiological group that includes three other MIR alumni—Art Bishop, M.D.; William Berkman, M.D.; and Jerry Pallagallo, M.D.

Roland B. Hawkins, M.D., completed a 4-year residency in Radiation Oncology and has accepted a position as a radiation therapist with the Department of Radiation Medicine, Florida Hospital, Orlando.

Kristie G. Jones, M.D., instructor in radiology, completed a 1-year fellowship in Radiation Oncology and has accepted a position as assistant professor of radiation oncology at the University of Louisville, Louisville, Kentucky.

Harm H. Kampinga, Ph.D., visiting research associate in cancer biology in radiology, has accepted a position in research in cancer biology, hyperthermia, and DNA repair at the University of Groningen, The Netherlands.

Michael G. Karnaze, M.D., completed a 4-year residency in Diagnostic Radiology and has accepted a 1-year fellowship in interventional radiology at Alexandria Hospital, Alexandria, Virginia.

Michael Kilbourn, Ph.D., assistant professor of radiation sciences in radiology, has accepted the position of associate professor of internal medicine and director of PET chemistry and the cyclotron/PET facility at the University of Michigan Medical Center, Ann Arbor, Michigan.

Randolph J. Knific, M.D., instructor in radiology, completed a 1-year fellowship in abdominal radiology and has entered private practice in general radiology in Fort Myers, Florida.

David Ling, M.D., assistant professor of radiology, has entered private practice with the Wake Radiology Group in Raleigh, North Carolina.

Kenneth W. Martin, M.D., instructor in radiology, completed a 4-year residency in Diagnostic Radiology and a 1-year fellowship in pediatric radiology. He has entered private practice at Oakland Children's Hospital in Oakland, California.

Fyllis L. Otsuka, Ph.D., research instructor in radiology, has accepted the position of technical writer in the regulatory affairs department of Invitron, Inc., St. Louis.

FYI

THE DIRECTOR'S OFFICE REPORT

OFF STAFF

Continued from page 21.

Willaim J. Pao, M.D., completed a 4-year residency in Radiation Oncology and has accepted a position with the Department of Radiation Oncology at St. Jude Children's Research Hospital, University of Tennessee Medical Center, Memphis.

Miljenko, V. Pilepich, M.D., associate professor of radiology, has accepted the position of director, Department of Radiation Oncology, at C. McAuley Health Center, Ann Arbor, Michigan.

Janice W. Semenkovich, M.D., Instructor in Radiology, completed a 4-year residency in Diagnostic Radiology and has moved to Texas.

Joel S. Sigeti, M.D., completed a 3-year residency in Diagnostic Radiology and has accepted a fellowship in computed tomography and genitourinary radiology at the San Francisco School of Medicine, University of California-San Francisco.

Jerry Tobler, M.D., cochief resident in 1986-87, completed a 4-year residency in Diagnostic Radiology and has entered private practice in general diagnostic radiology with Radiological Associates in St. Louis.

Andrew C. Wu, M.D., completed a 3-year residency in Diagnostic Radiology and has accepted a fellowship in angiography in interventional radiology in the Department of Radiology, University Hospitals, University of Michigan, Ann Arbor, Michigan.

FIRST YEAR RESIDENTS

Steven L. Anolik, M.D., received his premedical training at the University of Pittsburgh. He attended Washington University School of Medicine and completed an internship at St. Mary's Hospital in St. Louis. He is a member of Rho Chi and the AMA.

Martin Alan Burns, M.D., received his premedical training in molecular biology at Vanderbilt University in Nashville, Tennessee. He completed his medical education at Vanderbilt and served an internship at Medical Center Central Hospital in Georgia. He is a member of AOA and OBK.

John Clemett, M.D., completed his premedical studies in government at Wesleyan University in Middletown, Connecticut. His medical education was completed at the University of Rochester in Rochester, New York, where he also undertook his internship.

Karen J. Halverson, M.D., received her premedical education in natural sciences at the University of North Dakota-Grand Forks. She earned her medical degree from Washington University. Halverson is a member of Phi Beta Kappa.

Sonke Harms, M.D., graduated from the University of Tübingen, Tübingen, West Germany, and attended medical school at the University of Freiburg, Freiburg, West Germany. Before coming to St. Louis, he worked as a visiting fellow in the radiology department of the Kantonsspital Bern in Switzerland.

Sian E. Iles, M.D., studied for two years at Dalhousie University in Halifax, Nova Scotia before going on to

complete her medical education at the same institution. She completed a 2-year internship at Victoria Hospital in London, Ontario, and a 4-year residency in radiology at Dalhousie University. Iles is a member of AOA.

Jeffery J. Kovalic, M.D., received his premedical education at Loyola University, Chicago. He completed his medical education at the Medical College of Wisconsin, in Milwaukee. He is a member of the AMA, RSNA, and American Society for Therapeutic Radiology and Oncology (ASTRO).

David L. Rifken, M.D., received a degree in microbiology from Cornell University, Ithaca, New York, before continuing his medical education at S.U.N.Y. Health Science Center at Syracuse, New York. He went on to complete his internship and residency at Hartford Hospital, Hartford, Connecticut. He is a member of RSNA, the American College of Radiology, and the Society of Nuclear Medicine.

Douglas K. Smith, M.D., graduated from Hendrix College in Conway, Arkansas, with a degree in biology, then received his medical education at Bowman-Gray School of Medicine in Winston-Salem, North Carolina. He completed an internship and a residency in orthopedics at the Mayo Clinic in Rochester, Minnesota. Smith is a member of AOA.

Scott David Stevens, M.D., received his premedical education in anthropology at Dartmouth College, Hanover, New Hampshire. He completed his medical educa-

ALUMNI NEWS

E. Wiley Johnson, Jr., M.D. of Dallas, died Thursday, October 1, at a Texas nursing home after a lengthy illness.

Johnson, 48, was a graduate of Washington University Medical School and completed a residency in Diagnostic Radiology and a fellowship in Nuclear Medicine at Mallinckrodt Institute of Radiology. He retired in 1979 from his post as chairman of the Department of Radiology and Nuclear Medicine at Medical City Dallas.

Michael Loberg, Ph.D., has been named president of Squibb Diagnostics by the firm's U.S. president, Bill Weathersby. Loberg, who earned his doctorate in chemistry at Washington University Medical School under the direction of Michael J. Welch, Ph.D., professor of radiation chemistry, is the first president of the firm's diagnostic group.

He has been affiliated with the company's Institute for Medical Research since 1979 and prior to that time was an associate professor of medical chemistry at the University of Maryland. A St. Louis native, Loberg is a Ritenour High School graduate.

FYI

FIRST YEAR POSTGRADUATES

tion at Duke University in Durham, North Carolina, and served an internship at Barnes Hospital.

Stephen Surratt, M.D., received his premedical education in chemistry at Vanderbilt University in Nashville, Tennessee. He completed his medical education at Washington University and undertook his internship at Barnes Hospital. Surratt is a member of Phi Beta Kappa.

Mary L. Vogelsang, M.D., graduated from Graceland College in Lamoni, Iowa, with a B.S.N. before going on to study medicine at the University of Missouri-Kansas City. She completed a 2-year internship in internal medicine at Duke University in Durham, North Carolina. Vogelsang is a member of AOA.

William Greene Way, Jr., M.D., received his premedical education in chemistry at the University of Virginia-Charlottesville, where he also earned his medical degree. He served an internship at Presbyterian/St. Luke's Medical Center, Denver. He is a member of AOA and OBK.

Thomas W. Zusag, M.D., received his premedical education in chemical engineering at the Illinois Institute of Technology, Chicago. He completed his medical training at the University of Illinois and served an internship at St. Joseph's Hospital in Chicago. He worked as a medical physicist for eight years before entering medical school. He is a member of AOA.

Carlos Jiminez, M.D., received his premedical training at the University of Miami, graduating with a degree in biology. He completed his medical education at the University of Florida-Gainesville, where he received the Hippocratic Award and the W.C. Thomas Award. He is a member of AOA and Phi Beta Kappa.

Mark A. Perry, M.D., graduated from the University of Missouri-Columbia with a degree in biology. He received his medical education at Washington University. He is a member of AOA and Phi Beta Kappa.

Michael R. Schiering, M.D., attended Vanderbilt University in Nashville, Tennessee, graduating cum laude with a degree in molecular biology. He completed his medical education at the University of Florida-Gainesville. Schiering received a scholarship from the College of Medicine Alumni and is a recipient of the university's Charles J. Collins Award for outstanding achievement in obstetrics and gynecology. He is a member of AOA and the AMA.

NEW FELLOWS

Howard C. Hutt, M.D., is a new fellow in neuroradiology. He received his premedical education at the Massachusetts Institute of Technology in Cambridge, Massachusetts, graduating with a degree in mathematics. He earned a doctorate in mathematics from the University of Uppsala, Uppsala, Sweden, and received his medical education at the University of Gothenburg, Gothenburg, Sweden. He served an internship and a residency in radiology at Albany Medical Center, Albany, New York. Previously, Hutt completed a one-year fellowship in neuroradiology at Montreal Neurological Hospital at McGill University, Montreal. He is a member of RSNA.

Paul L. Molina, M.D., is a new fellow in chest radiology. He received his premedical education at Johns Hopkins University in Baltimore, graduating with

a degree in natural sciences. He attended medical school at the University of North Carolina-Chapel Hill. Molina completed a residency in diagnostic radiology at North Carolina Memorial Hospital, an affiliate of the University of North Carolina Medical Center. He is a member of RSNA.

George F. Murphy, M.D., is a new fellow in abdominal radiology. He received his premedical education at Dalhousie University in Halifax, Nova Scotia, graduating with a degree in chemistry. He also received his medical education at Dalhousie. He served an internship at Victoria Hospital in London, Ontario, and completed a residency in radiology at Victoria General Hospital in Halifax. He is a member of AOA, RSNA, the Canadian Association of Radiologists, the Nova Scotia Association of Radiologists,

the Canadian Medical Association, and the Nova Scotia Medical Society.

David N. Rabin, M.D., is a new fellow in abdominal imaging. Rabin earned an undergraduate degree in biology at Loyola University in Chicago and received his medical education at the University of Illinois, Chicago. He served an internship at Illinois Masonic Hospital, Chicago, and completed a residency in radiology at Rush Presbyterian-St. Luke's Hospital in Chicago. He is a member of AOA.

Allan J. Romano, M.D., is a new fellow in neuroradiology. He received his premedical education at the University of Washington-Seattle, graduating with a degree in biology. He received his medical education at the same institution. He served an internship and a residency in radiology at the University of California-San Diego Medical Center. He is a member of Phi Beta Kappa, ARRS, AMA, ACR, RSNA, and AOA.

Elliot I. Shoemaker, M.D., is a new fellow in neuro-radiology. He received his premedical education at Muhlenberg College in Allentown, Pennsylvania, graduating with a degree in natural sciences. He received his medical education at Temple University Medical School in Philadelphia. He served an internship at Albert Einstein Medical Center at the University of Pennsylvania-Philadelphia, and completed his residency in radiology at Presbyterian Hospital, an affiliate of the medical center.

FYI

VISITING PROFESSORS & INVITED LECTURERS

Bahman Emami, M.D., professor of radiology, gave a lecture on "Interstitial Hyperthermia" at the annual meeting of the International Clinical Hyperthermia Society, in Sweden, June 16. On May 20-21, he spoke at Wayne State University in Detroit, Michigan.

Joseph L. Roti Roti, Ph.D., professor in cancer biology, spoke at the Third Annual Clinical Hyperthermia Symposium held in St. Louis, September 17-19. The lecture was titled "Mechanisms of Heat Action and Thermotolerance." On October 21, he also lectured on "Heat and Radiation Effects on Cells" at the University of Illinois-Champaign-Urbana.

Barry A. Siegel, M.D., professor of radiology and director, Division of Nuclear Medicine, was a visiting professor at Columbia University, New York City, on April 6. He also spoke at the New York City Nuclear Medicine Grand Rounds on "The Scintigraphic Diagnosis of Pulmonary Embolism," April 6.

Carlos A. Perez, M.D., professor of radiology and director of the Radiation Oncology Center, spoke on "Radiation Therapy in the Management of Carcinoma of the Prostate" and "Radiation Therapy in the Management of Carcinoma of the Uterine Cervix" at Wayne State University, Detroit, Michigan, July 22-23

Judy M. Destouet, M.D., associate professor of radiology, was guest lecturer at the annual meeting of The Society for the Study of Breast Disease. The lecture was titled "Breast Imaging-1987," St. Louis, October 31.

Mokhtar Gado, M.D., professor of radiology and codirector of the neuro-radiology section, was a visiting professor at Cairo University, Egypt, July 4-24.

Harvey S. Glazer, M.D., associate professor of radiology, spoke at Loyola University in Chicago on "Pitfalls in Mediastinal CT," "CT of the Lobar Collapse," "CT of the Cystic Neck Masses" and "MRI of the Mediastinum," September 11.

Michael W. Vannier, M.D., associate professor of radiology, was invited to give the lecture, "Future Aspects of Digital Angiography" at the Hospital of the University of Pennsylvania, Philadelphia, Pennsylvania, May 20. Vannier was invited to speak at the Sixth Annual Pacific Northwest Computer Graphics Conference, where he presented "State of the Art in Three-dimensional Medical Imaging", October 25-27.

Todd H. Wasserman, M.D., professor of radiology, was invited to address the Johnson-Matthey Corporation in Pennsylvania on the "Role of Chemical Modifiers" on October 5. He also spoke to Warner Lambert Corporation on November 5 on "The Role of Hypoxic Cell Sensitizers." Wasserman was a National Cancer Institute reviewer for the Gynecology Oncology Group. This review took place in Buffalo, New York on October 14-16.

Wasserman has been appointed the radiotherapy representative to of the Lymphoma Committee for the Cancer and Leukemia Group B, National Cooperative Clinical Oncology Research Group.

Andrei Laszlo, Ph.D., assistant professor in cancer biology, addressed the Laboratory of Cell Biology at Berkeley Lawrence Laboratory of the University of California, Berkeley, on "Hyperthermic Cell Killing-Putative Protective Roles for hsp70."

Michael J. Welch, Ph.D., professor of radiation chemistry, was invited to speak at the annual meeting of the American Chemical Society in New Orleans, August 30-September 4. He spoke on "Animal Models for the Evaluation of Radiopharmaceuticals to Measure Brain Blood Flow and Function."

ELECTIONS

Klaus J. Sartor, M.D., associate professor of radiology, was elected to serve on the ad hoc committee on Magnetic Resonance Imaging of the American Society of Neuroradiology (ASNR), for the year 1987-88.

Barry A. Siegel, M.D., professor of radiology and director of the Division of Nuclear Medicine, was elected trustee of the Society of Nuclear Medicine from June 1987 to June 1990. He was reappointed by the American Board of Nuclear Medicine to a second three year term in May, 1987. He was also appointed chairman of the committee for the 1989 certifying examination of the board.

The Society of Nuclear Medicine elected **Michael J. Welch, Ph.D.**, professor of radiation chemistry, to the position of general program chairman for a three-year term through 1990.

APPOINTMENTS

William H. McAlister, M.D., professor of radiology, was elected to the board of directors of the Society for Pediatric Radiology.

John L. Bardsley, M.D., assistant professor of clinical radiology, was elected a fellow of the American College of Radiology (ACR) at the annual meeting of the ACR in San Diego, California, September 29.

Carla J. Mathias, research assistant in radiation sciences, was awarded a National Science Foundation (NSF) travel grant to attend the NATO Advanced Studies Institute Symposium, in Cape Sounion Beach, Greece. The Symposium was titled "Targeting of Drugs: Anatomical and Physiological Considerations," June 20-July 1.

FYI

TECHNOLOGIST NEWS

Michael Albertina, R.T., B.A., chief technologist for operations, spoke on "Magnetic Resonance Imaging" at the Missouri Society of Radiologic Technologists Annual Meeting in St. Louis, October 7-10. He also has been appointed to the Health Board Committee for Madison County, Illinois.

Philip Sotir, R.T., B.A., technical supervisor of pediatric radiology, spoke on "Pediatric Radiography" at the Missouri Society of Radiologic Technologists Annual Meeting in St.

Louis, October 7-10.

Michael D. Ward, R.T., M.Ed., chief technologist for quality assurance and director of technical education, presented two lectures titled, "What Educators Should Know About Due Process of Law in Radiology Training" and "Writing a Winning Resume and Preparing for Your Job Interview" at the Missouri Society of Radiologic Technologists Annual Meeting, October 7-10, in St. Louis. Michael was honored to receive the first "Mallinckrodt Award of Excel-

lence," sponsored by Mallinckrodt Diagnostics and presented by the Missouri Society of Radiologic Technologists. He was appointed to the Nominations Committee and Committee on Student Activities for the American Society of Radiologic Technologists, 1987-1988 and was honored as one of the "Outstanding Young Men in America."

Paul Becker, senior radiography student, was elected Member at Large for the Fourth District, MSRT for 1987-1988.

(given in memory of Dr. Charles Gulick) and *Comprehensive Management of Head and Neck Tumors*. Everyone associated with the Cancer Information Center appreciates these gifts.

The CIC is now open every Tuesday night until 8:00 PM.

CONTRIBUTIONS

The CIC has received generous support during this past year.

Mr. and Mrs. Donald Bidgood in memory of Sara Ann T. Cady

Mr. and Mrs. Donald Bidgood in honor of William R. Cady

Hilda Bruns in memory of Rosemary Mense

Muriel and Missy Schmalz in memory of Rosemary Mense

Sylvia and Carl Goeke in memory of Rosemary Mense

Elaine Grayson in memory of Rosemary Mense

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Mr. and Mrs. Thomas Byrnes in memory of Rev. Edmund Lammert

Mr. and Mrs. Frederick Hermann in memory of William H. Otto

Mrs. Wanda Hermann in memory of Mary F. McGraw

Mr. and Mrs. Frank Meyers in honor of the birthday of Marvin Anderson

Mr. and Mrs. Lee Hawes in memory of William H. Otto

THE SOCIETY OF NUCLEAR MEDICINE

The following presentations were made at the 34th annual meeting of The Society of Nuclear Medicine in Toronto, Ontario, Canada, June 2-5 by Mallinckrodt staff members and other contributors.

SCIENTIFIC PAPERS

F.L. Otsuka, Ph.D.; M.R. Kilbourn, Ph.D.; W.G. Cance, M.D.; W.G. Dilley, Ph.D.; S.A. Wells, Jr., M.D.; J.M. Davie, Ph.D.; and M.J. Welch, Ph.D. "Evaluation of Positron Labeled Parathyroid Specific Monoclonal Antibody Fragments Using a Nude Mouse Model System."

M.A. Mintun, M.D.; M.J. Welch, Ph.D.; C.J. Mathias research assistant; J.A. Brodack, Ph.D.; Barry Siegel, M.D.; and J.A. Katzenellenbogen Ph.D., "Application of 16a-(F-18)-

FLUORO-17B-Estradiol (1) for the Assessment of Estrogen Receptors in Human Breast Carcinoma."

M.G. Pomper, Ph.D.; J.W. Brodack, Ph.D.; D.Y. Chi, Ph.D.; S.J. Brandes, Ph.D.; J.A. Katzenellenbogen, Ph.D.; M.J. Welch, Ph.D., "Synthesis and Animal Distribution Studies of a F-18-Labeled Progesterin: 17a-(3-FLUORO-1-PROPYNYL)-19-NOR-Testosterone."

C.J. Mathias, research assistant; M.J. Welch, Ph.D.; "Studies on the Entrapment of Indium-111 in the Liver Following Administration of Proteins Labeled Using Bifunctional Chelates."

CATEGORICAL SEMINAR

Peter Fox, M.D., "Role of PET Tracers."

POSTER SESSIONS

J.W. Brodack, Ph.D.; M.R. Kilbourn, Ph.D.; M.J. Welch, Ph.D., "A Robot for the Routine Production of Positron-Emitting Radiopharmaceuticals for PET."

CIC NEWS

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

The C.V. Mosby Company recently donated three books to the CIC—*A Woman's Decision, Cancer and Its Management and Aesthetic and Reconstructive Breast Surgery*. Other additions to the Center's library include *Fundamentals of Surgical Oncology, Gynecological Oncology*

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CONTRIBUTIONS

Mr. and Mr. R.D. Bodkin in memory of Carrie France

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Dr. S.L. Keyes in memory of Dr. Charles Gulick

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Debbie Federspiel

Brenda Davis Mr. and Mrs. Homer Downard in memory of Kris Thomason

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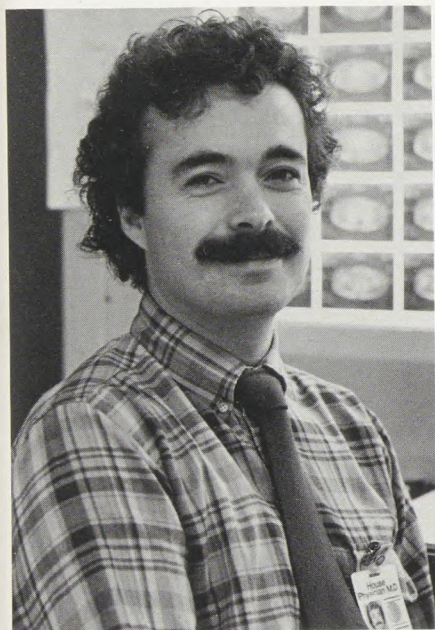
Mr. and Mrs. Simon Taslischky in memory of Ervin Aufderheide

Mr. and Mrs. Edward H. Trezn in memory of Gerald Visintine

SPOTLIGHT

PROFILES OF THE CHIEFS

by Candace O'Connor



Steve Kohler

So he returned to Hampshire and, thanks to the freedom it offered, managed to incorporate unusual elements into his curriculum. He plunged into a project that had him designing robot hands for a copying machine company's commercials. That led to a final-year stint in biomedical engineering for the Department of Orthopedic Surgery at New York University Medical Center. Using sophisticated electronic devices, he helped with the difficult task of designing durable artificial limbs for children.

To capitalize on this background, he initially planned to specialize in general or orthopedic surgery. But in 1984, when he received his M.D. from Johns Hopkins University, he decided to come to Mallinckrodt for a career that would combine his technical skill with his old interest in film.

"Not only had I always loved looking at pictures," he says, "but I also liked the computer orientation of the new modalities. They're just like big machines that are fun for me to play with."

Next year, he will move to Bradenton, Florida, where he'll go into private practice. His wife, Katherine Downes, now manager of volunteer services at the St. Louis chapter of the American Red Cross, plans on pursuing her social work career.

Nadel may also undertake home renovation number four. A veteran of two New York City rehab projects, Nadel has just successfully overhauled a farmhouse in Caseyville, Illinois.

He's an energetic person in a constantly changing profession. "Many older doctors say that if they were our age now, they'd go into radiology," Nadel says. "All the latest technological advances are being applied almost immediately to the field. It's an exciting place to be." □



Steve Kohler

SCOTT NADEL

A man with AIDS has leg pains. Are they caused by nerve problems or, worse still, by a lesion hidden in the leg's soft tissue? Scott Nadel, M.D., new chief resident in Diagnostic Radiology, studies MR scans of the area. No lesion. "They look pretty normal," he says.

Clearly, Nadel loves poring over these images. After all, an interest in pictures runs in his family: Back home in New York City, his brother is a film-maker and his father a photographer. Nadel tried the field himself during a year off from Hampshire College, an experimental school in Massachusetts.

Prop-making, model-making and special effects were all a lot of fun. "But I got a little sick of spending my life making soup cans look good," he says. "I wanted to do something that would make a difference in the world."

LYNN BARRETT

Old X-rays of the abdomen didn't show very much. "You saw gas in bowel, maybe the outline of an organ," says

Lynn Barrett, M.D., new cochief resident in Diagnostic Radiology. But the three-dimensional gaze of a CT scanner has changed those images dramatically. "Now you can see entire organs, in cross-section, with blood vessels," she adds. "It's an incredible difference."

New diagnostic tools—CT scans, magnetic resonance imaging, ultrasound—are probing the depths of the human body. And the images they produce are not only scientifically valuable. "Abdominal CT scans are really beautiful," Barrett says.

In her work, Barrett needs the skill of a scientist and the eye of an artist. She faces the technical challenge of getting the best scans of her patient and the artistic challenge of differentiating the many shades of gray

SPOTLIGHT

PROFILES OF THE CHIEFS

that separate healthy tissue from tumor, muscle from bone.

Barrett, a Detroit native, got interested in medicine at Duke University, where she received a B.S. in 1980 and an M.D. in 1984. Radiology appealed to her for two reasons: She wanted to be a consultant, not a primary care physician, and she wanted to deal with all parts of the body.

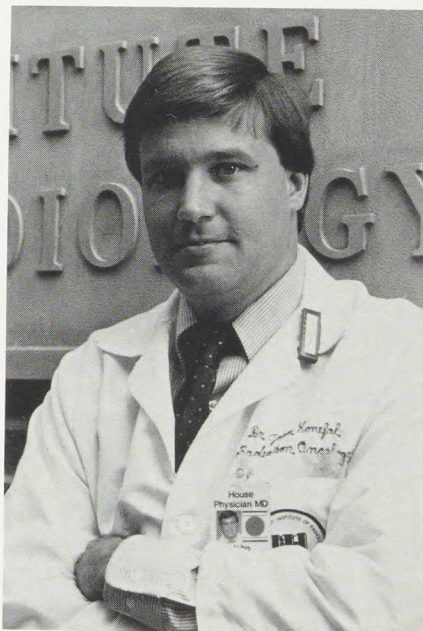
Next year, she will pursue a one-year fellowship in CT, ultrasound, and magnetic resonance imaging at Rush Presbyterian-St. Luke's Hospital in Chicago. Her husband, Herbert Glatt, M.D., now a resident in ophthalmology at Washington University Medical Center, will take up a fellowship in oculoplastics at the University of Illinois.

Afterward, they will look for jobs in an academic setting, in a medium-sized community accessible to mountains and water. Both love all kinds of sports: windsurfing, skiing, soccer, "ultimate Frisbee."

Meanwhile, Barrett will continue studying scans to obtain the best diagnosis for each patient. About half the time, she says, it's possible to make a specific diagnosis right away; the other half, she's left with a handful of possibilities which she must narrow down by examining the patient's history and, when necessary, biopsy results.

"I love it," she says. "It's very exciting work. We deal with all organ systems, with one-month-olds to 95-year-olds. And we look at patients with perplexing clinical problems, with rare diseases, with a lot of diagnostic dilemmas."

The trick is to know when you *don't* know, she says, when you need to probe further to be sure you have the right answer. It's not easy. "But nothing in this world is cut and dried." □



Steve Kohler

JOHN KONEFAL

John B. Konefal, M.D., new assistant chief resident in Radiation Oncology, doesn't mind rooting for any cause he believes in. During this year's Eastern Division pennant race, he stood up at Busch Stadium, among rabid Cardinals fans, to cheer for his all-time favorite team—the New York Mets.

And in medical school, he decided to make a career in oncology, despite the discouraging attitude of some classmates. "Many medical students didn't want to work with oncology patients, yet they were the ones who needed the most medical and personal attention," he says.

Konefal, a New York City native who grew up in the shadow of Shea Stadium, knew early that he'd like to be a doctor. He had the example of his father, a general practitioner in Flushing, who still has a busy practice though he's over 70.

For a while, a talent for

music threatened to sideline his medical career. On weekends, he played piano—show music, jazz, popular favorites—for the dinner crowd at a series of neighborhood restaurants. But at Colgate University, he gave up piano for a composite major in physics, chemistry, and math.

At the University of Vermont College of Medicine, tucked away in the state's mountain and lake district, Konefal found himself in "the most beautiful place I've ever lived—if you can stand the cold weather." At nearby Stowe, he became an avid skier.

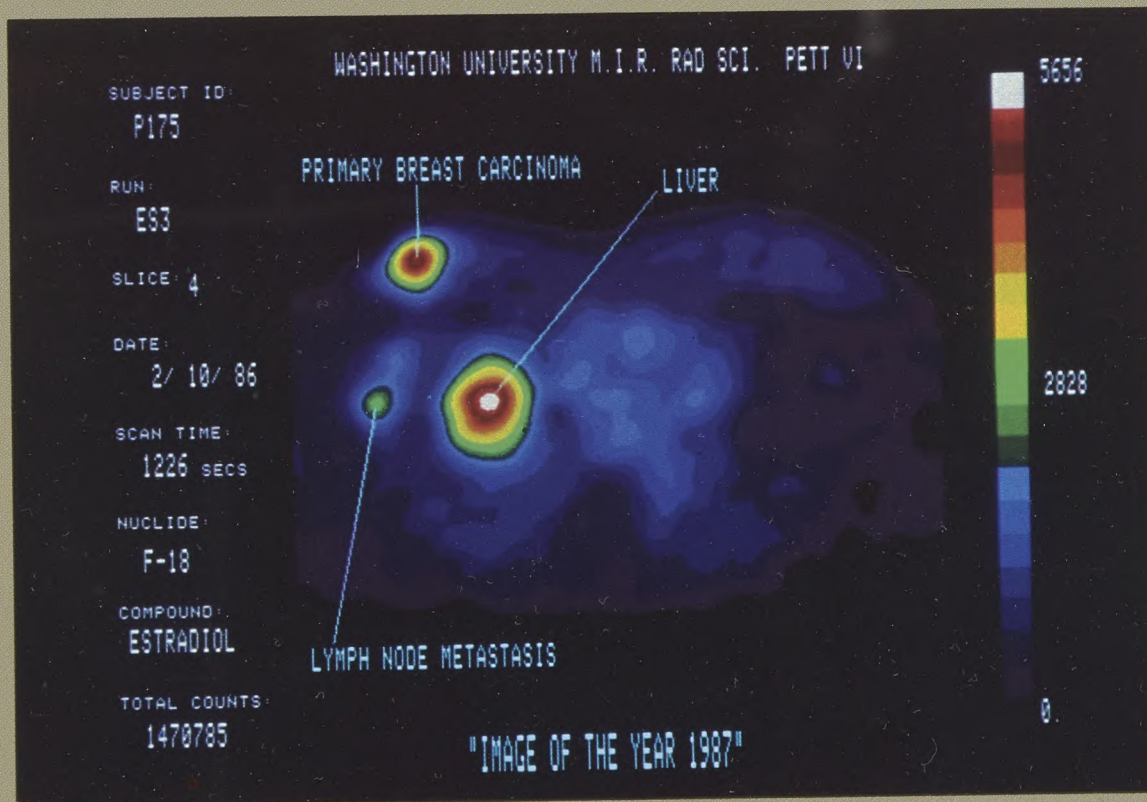
During his senior year, he found himself choosing oncology rotations, one of them at Memorial Sloan Kettering in New York City. At first, he was intrigued by medical oncology and spent a one-year internal medicine residency at the University of Kentucky Medical Center.

At Mallinckrodt since 1985, he is now convinced that his shift to radiation oncology has been a good choice. The field offers intellectual stimulation, challenging job opportunities, and a chance for long-term patient contact.

"Over a six- to seven-week course of treatment, you get to know patients really well. I think that would surprise people outside the field who think of radiation oncology as a technical service," Konefal says.

Is it depressing? "Even people in medicine ask me that all the time," he says. "They think radiation is just given to patients on their deathbed. In fact, a lot of patients are cured by radiation, and even those who are treated palliatively can be helped a great deal."

He is looking forward to his future in radiation oncology. And, unlike the Mets, this choice will surely prove to be a winner. □



Named "Image of the Year" at the 34th Annual Meeting of The Society of Nuclear Medicine, this scan is a transverse PET slice at the level of the diaphragm of a 62-year-old female with carcinoma of the right breast and right lymph node metastasis. In the past, successfully imaging estrogen receptors in primary and metastatic breast tumors was only possible in excised tissue. In naming the Image of the Year, Henry N. Wagner, Jr., M.D., said, "Identifying the presence of estrogen receptors in situ provides evidence that patients can be treated with estrogen-receptor antagonists, which is effective in about two-thirds of these patients." The image is from work done by Michael J. Welch, Ph.D.; Mark A. Mintun, M.D.; and their associates at Mallinckrodt Institute of Radiology, along with John A. Katzenellenbogen, Ph.D., University of Illinois.

FOCAL SPOT

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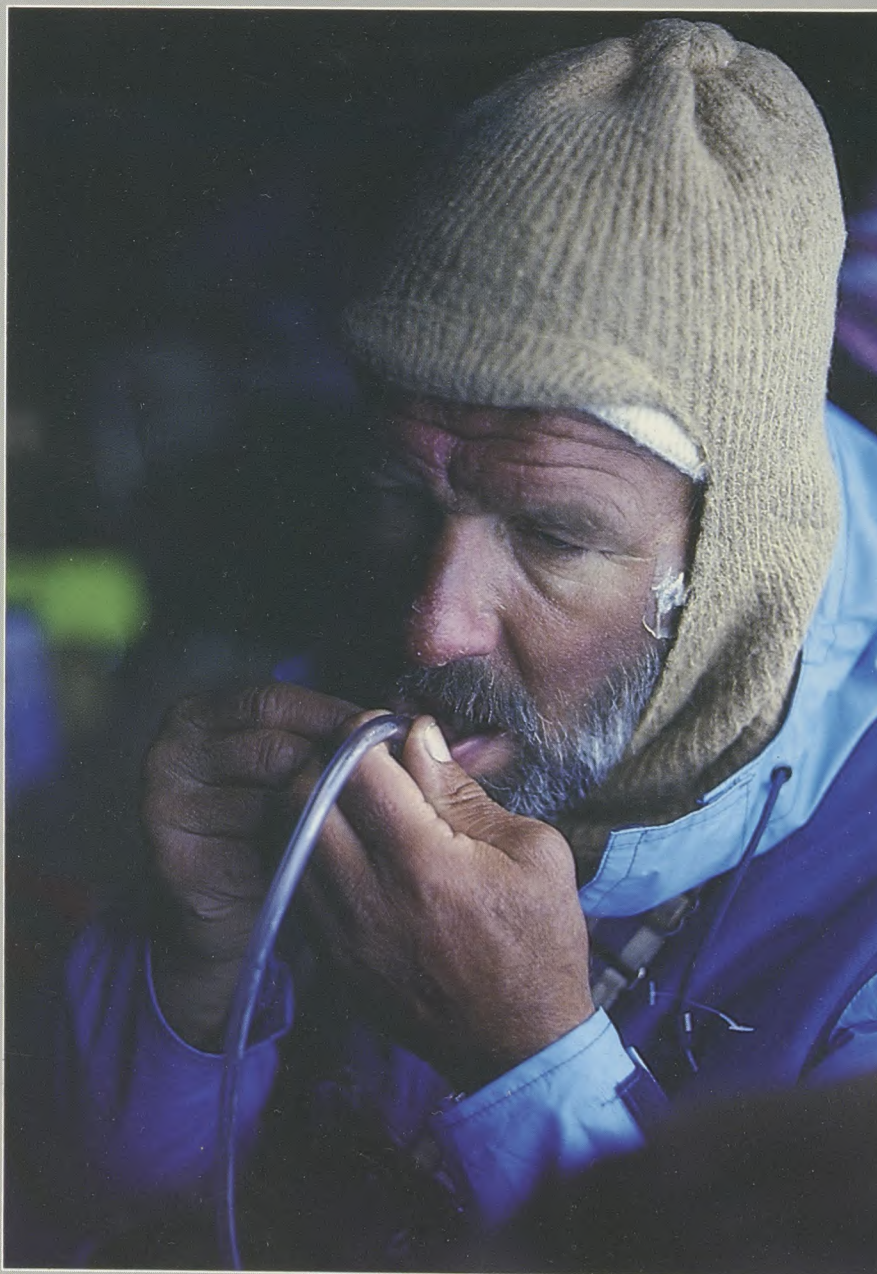
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Marcus Raichle

Marcus Raichle's adventure to extreme altitude involved him in several research studies. In one project, the fragility of capillaries was measured via the application of negative pressure to the lip. The number of broken vessels, compared with the number recorded at sea level, provided an indication of man's increasing frailty as elevations climb.

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