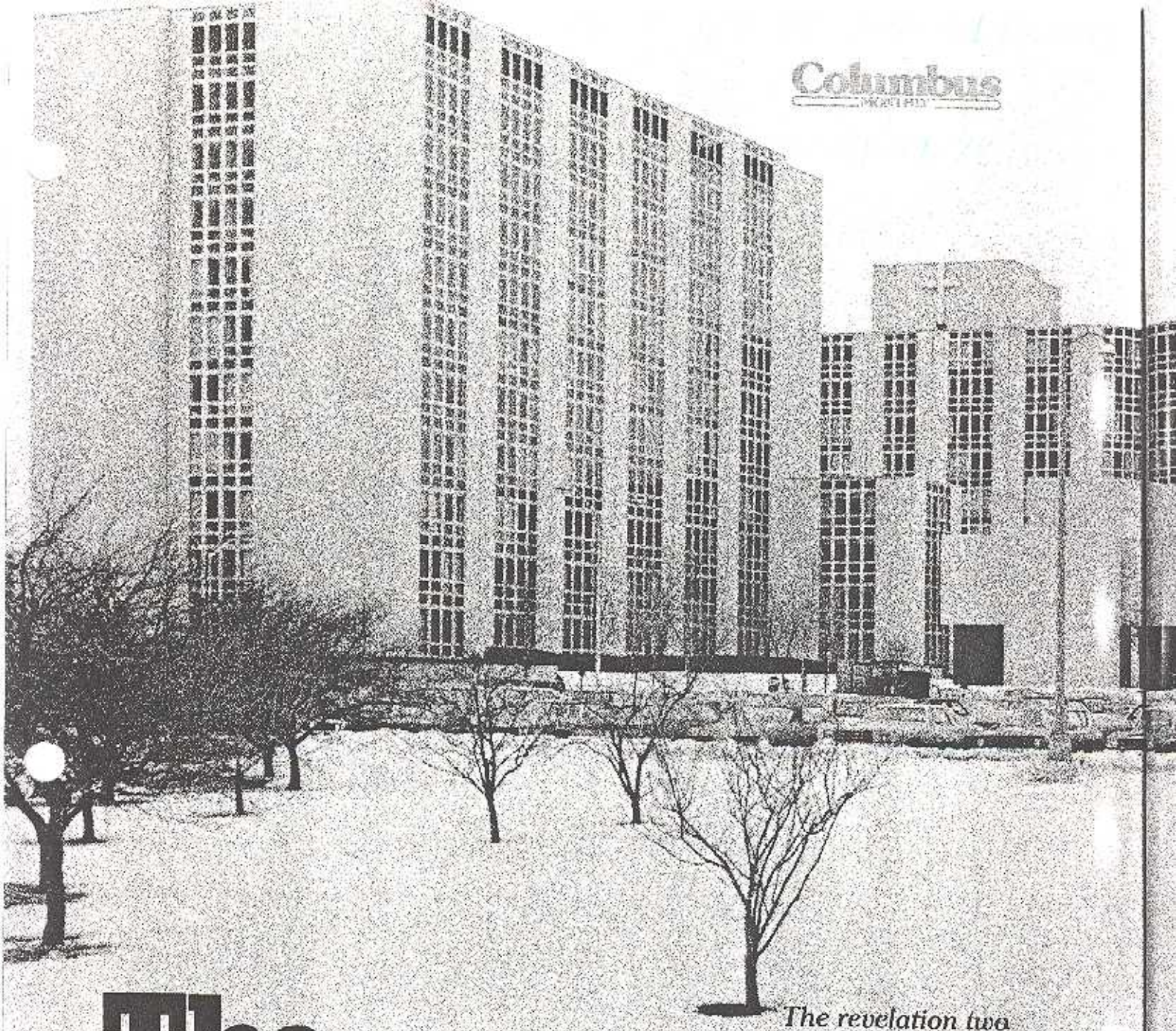


The Riverside radiation tragedy

The revelation two years ago that Riverside Methodist Hospital had inadvertently over-radiated nearly 400 cancer patients hit the medical community like a bombshell. This is the story of how it happened, and of the financial and human effects.

By Linda Stern Rubin

It began with what seemed like a routine management decision. Edgar Mansfield, the powerful and persuasive administrator of Riverside Methodist Hospital, decided to terminate a long-standing contractual arrangement with the hospital's radiation physicist and hire a full-time, salaried physicist.

Predictably, that decision in 1972 attracted little attention within the hospital and none at all outside. But it planted the seeds of what Mansfield would later call Riverside's "most catastrophic event"—the serious over-radiation of nearly 400 cancer patients in 1975 and early 1976.

Fewer than half of those patients are alive today. And one of the most difficult problems in dealing with the incident—from both legal and human standpoints—is that many were already dying from cancer when they received the excessive radiation. However, some deaths were apparently caused or hastened by that very radiation, administered to slow the disease. And even those patients who remain alive were subjected to serious side effects, some of which persist today.

When the tragedy was first revealed in April, 1976, hospital officials blamed a faulty instrument probe which had been used to measure radiation. Only later, after extensive investigation by outside consultants and the Nuclear Regulatory Commission (NRC), did the public learn the overdoses "were the result of error in calculating the unit's radiation output rather than from malfunctioning of the unit"—in other words, human error.

There, as far as the general public knows, the story ended—never fully explained or understood. A staff radiation specialist was fired, and the long ordeal of settling lawsuits began.

But the "Riverside radiation case," as it has become known in both medical and legal circles, has had ramifications far beyond the pain and suffering of the overdosed patients. The *New York Times* reported that the NRC issued warnings to hospitals and clinics around the country as a result of the incident. Careers have been ruined or jeopardized, and the reputation of Columbus's most prestigious hospital has been severely damaged.

And more than Riverside's reputation is at stake. Many of the patients who remain alive and relatives of those who have died have filed lawsuits—more than 100 all told—for damages which could conceivably cripple the hospital financially. Some of the suits have already been settled out of court, but a number of the

"Notwithstanding Callendine's reputation and long service, Mansfield and others in Riverside's administration had concluded by 1972 that changes had to be made."

larger, more bitterly contested ones are due to come to trial within the next two or three months. Lawyers on both sides are predicting that the outcome of the first few cases to be tried will likely set a pattern for almost all of the remaining suits.

Beyond its immediate medical, legal and financial consequences, the radiation case has forced Riverside and lots of other hospitals and health care regulators to take a hard look at their own procedures.

If a simple human error could remain undetected for so long and wreak such havoc, some experts are asking, how many more "catastrophic events" are just beneath the surface of any hospital's veneer of modern technology and sophisticated systems analysis? Is Riverside's case just an aberration? Or is it a warning signal that the same technology which saves or prolongs so many lives always has the potential to go awry and savage its creators?

Riverside's story is not a pleasant one, and the hospital's officials and trustees are understandably reluctant to say much about it. At this point, they would prefer to go about the business of settling lawsuits and restoring Riverside's damaged reputation without further public exposure.

But Mansfield and Don Marsh, the hospital's current chairman, are well aware that there may be object lessons for any hospital in what happened at Riverside. And they have been willing, however reluctantly, to fill in some of the gaps in the hospital's previously untold story.

* * *

The story begins with George Callendine, Ph.D., a highly-respected nuclear physicist with a reputation as one of the top men in his field. Callendine had been associated with Riverside since 1956, when the hospital was still known as Holy White Cross, and he played a key role in developing what is now Riverside's nuclear medicine division. From 1958 to 1972 Callendine's radiology group —Carter, Schwartz and Schmidt— provided both physics and radiology services to the hospital.

During those 15 years, Riverside's use of radiation for both diagnostic and therapeutic purposes increased dramatically. Cobalt-60, the source of the later overdoses, became the dominant radiation source for treating cancer patients. Riverside, typically, was the first Central Ohio hospital to develop an extensive cobalt therapy program.

Because they were essentially contractors with the hospital rather than employees, Callendine and his partners owned much of the radiation equipment they used, and provided services to physicians and other institutions as well as to Riverside. Callendine himself worked closely with the hospital's staff physicians, as well as his radiologist partners, in establishing and monitoring proper

Riverside administrator Edgar O. Mansfield, in a photograph which appeared in the September, 1974, issue of 3535, a publication of the public relations department at Riverside. Mansfield refused to allow Columbus Monthly *to take a current photograph.*

dosages. Callendine's certification by the American Board of Radiology indicated that, although he was not a physician, he had demonstrated competence at clinical analysis.

In 1970, Callendine's group hired a second physicist; Callendine now estimates the two averaged about 70 hours' work each week for Riverside, often double-checking each other's calculations.

By his own statement, Callendine is a perfectionist, who often insisted on checking two separate calibration systems against each other when monitoring the output of a cobalt radiation source. "I recognize that anyone can make a medical mistake," he recalls, "so we wanted to minimize this.... When George signs his name, I want to be sure. It's a personal thing."

Notwithstanding Callendine's reputation and long service, Mansfield and others in Riverside's administration had concluded by 1972 that changes had to be made. Because there was no employer-employee relationship, Mansfield contends, Riverside was unable to establish the priority of work assignments for Callendine. Planning was underway for significant expansion of the radiation therapy program, and new equipment was scheduled for the diagnostic radiology section. In July, 1972, Riverside recruited Dr. Lawrence Fahey, a physician, to direct the Department of Radiation Therapy.

Mansfield and Fahey apparently agreed that Riverside needed a full-time nuclear physicist. The new job was offered first to Callendine, but he elected, after considerable soul-searching, to remain with Carter, Schwartz and Schmidt. Callendine says the new job description seemed to him to require a technician, not a professional physicist. "I tried to point out to them that it wasn't the type of position they needed," he recalls, "that it didn't really do the job in my judgment. They seemed to think the description was adequate for what they wanted, so instead proceeded to look for someone else.

"The difference revolved around the philosophy of what a physicist ought to do. I couldn't live with the job as they described it. I need to feel that I can grow in my job, and I couldn't grow if someone was telling me how to be a physicist."

Once Callendine had made his decision, Riverside began advertising for a new physicist. Callendine agreed to take a part-time salaried job until the full-time slot was filled. He says he continued to spend about 30 hours a week working for Riverside, but almost all of that time was in Diagnostic Radiology and Radiation Safety, very little in Radiation Therapy. Other than calibrating instruments and preparing cobalt output tables, Callendine says, Fahey asked him to do almost nothing in the therapy department. His previous clinical role in planning patient therapy pro-

Cancer and the goblin

German miners digging for silver were sometimes rudely deceived by a gray, lustrous metal with some of the same external properties but none of the same value. Believing the false silver had been planted in the mines by pesky spirits, they called it cobalt, after a German word for goblin.

Cobalt later became a key element in many industrial alloys, but in the 1950s the pedestrian metal was overshadowed by one of its own radioactive isotopes — cobalt-60.

Cobalt-60 has two qualities which were immensely valuable to physicists and doctors developing new programs of radiation treatment for cancer. First, it is a stable, predictable isotope with an unvarying half-life of 5.258 years. Knowing an element's half-life — the period during which it loses half of its radioactivity — allows a medical physicist to make precise calculations of the exposure time necessary to produce any total radiation dosage. As radioactivity decreases, exposure time must correspondingly increase to achieve the same dosage.

Second, cobalt-60 is a penetrating radiation source, which releases its energy *inside* the radiated body. In cancer treatment, this allows radiation of a tumor with minimum risk of such side effects as skin burns.

But no radiation therapy can be completely free of side effects. The same radiation which destroys mutant cancer cells also inevitably destroys or alters some healthy cells. Much of the research in radiation therapy in the past three decades has been devoted to controlling such side effects.

The "treatment scheme" for an individual patient will be determined by a physician specializing in radiology, often working with a radiation physicist, and taking into account the type of cancer, the size and location of the tumor, and the patient's age, size and general condition. Many hospitals now subscribe to computer services which can process all the variables for a patient and recommend an optimal treatment program.

Some "normal" radiation side effects include nausea, diarrhea, sore throat and abdominal pain. Longer-term effects, such as tissue and bone damage, are more difficult to assess and predict, partly because a high percentage of patients die from their cancers before the long-term effects show up. In obtaining a patient's "informed consent" for radiation treatments, a physician must outline the possible side effects. But the depth and candidness of such information varies from doctor to doctor and from case to case.

As long as the patient is adequately informed and the total radiation dosage remains within acceptable limits (Riverside says — and many experts agree — that plus or minus 10 per cent from the prescribed dosage is acceptable; other radiation experts say the tolerance should be only 2 or 3 per cent) then the damaging side effects are considered a necessary adjunct to the treatment.

To minimize the possibility of radiation overdoses, all hospitals periodically check or calibrate their cobalt-60 teletherapy units. Riverside and most other hospitals use an ionization chamber or probe, connected to an electrometer, to measure output from the cobalt source. The equipment, costing about $3,000, is considered quite reliable. Some radiation experts believe a hospital should have two complete calibration systems, each including an electrometer and two probes, to double-check measurements. Others say one system is sufficient.

After a calibration, the results are checked against the hospital's predicted output graph, which can be calculated mathematically for any radioactive source if the original strength and the half-life are known. Graphically, the output projection can be either a straight line on semilogarithmic paper or a curve on linear paper. A close match between the measured output and the predicted output indicates the system is functioning normally.

Expert opinions vary widely on how often a cobalt-60 source should be calibrated. Some hospitals do it monthly. Others consider a calibration once every three to six months adequate. But all agree that periodic calibration is essential to guard against exactly the kind of mathematical miscalculation which skewed Riverside's predicted output graph and eventually caused the overdoses. —*L.S.R.*

grams and calculating tissue dosages ceased almost totally.

Riverside had some difficulty in recruiting a full-time staff physicist, and Callendine's part-time work stretched on for more than a year. Then, on Nov. 5, 1973, 30-year old Joel Axt arrived to fill the new job. A few days earlier, at Riverside's request, Callendine had moved his equipment out.

"I told them I would be available and glad to help if he [Axt] needed me," Callendine says, "but I wouldn't intrude. Since he never called on me, I purposely stayed away for one year. After a year, I went in to introduce myself to Joel Axt. I offered assistance if he would ever need it. He said OK, and that was the last I heard from him."

Because both Callendine and his equipment were gone when he arrived, Axt was forced to reconstruct Riverside's radiation physics program almost from scratch. His clinical experience had been limited to a 14-month stint at the University of California Medical Center at San Francisco — not enough to qualify for American Board of Radiology certification. Part of his training there involved working with cobalt-60.

From California, Axt had moved to New Orleans to teach advanced physics and mathematics at Xavier University of Louisiana. There, in October, 1973, he saw Riverside's ad in the placement bulletin of the American Association of Physicists in Medicine. After mailing his resumé, Axt was invited to Columbus for an interview with Fahey, Riverside senior associate administrator James Flynn, and Dr. Gordon Taylor, director of the hospital's Department of Radiology. After several more conversations by phone, Axt was offered the job, quickly resigned his teaching post at Xavier and moved to Columbus. His starting salary at Riverside was slightly more than $20,000 a year.

In addition to being radiation protection officer for the entire hospital, Axt had specific duties in all three sections of Taylor's radiology department — nuclear medicine, diagnostic radiology and radiation therapy.

"Expert opinions vary as to how often a cobalt-60 source should be calibrated to check its output, but an average recommendation might be once every two or three months."

For his work in the radiation therapy section, Axt was accountable to Fahey and Fahey to Taylor.

One of Axt's simpler jobs in the radiation therapy section was to check periodically the radiation output of Riverside's cobalt-60 machine, using a device called a probe, and to compare the measured radiation against predicted values. Because cobalt-60 is a relatively stable radioactive source, its decay rate the rate at which its radiation output decreases over time—is predictable with close to absolute certainty (see "Cancer and the goblin"). A physicist or doctor who is trained in radiation therapy and who knows how long a source has been decaying can easily use tables or graphs to determine how long a patient must be exposed to cobalt-60 radiation to achieve a prescribed total dosage.

Expert opinions vary as to how often a cobalt-60 source should be calibrated to check its output, but an average recommendation might be once every two or three months. Yet, in the 27 months between his arrival and the discovery of the radiation overdoses in January, 1976, Axt apparently calibrated the source only twice—and not at all after May, 1974.

Why did Axt stop making cobalt-60 calibrations? Mainly, he told attorneys who interviewed him at length in June, 1977, he stopped because his time was fully occupied by other, higher-priority projects. Very soon after his arrival at Riverside, Axt was given considerable responsibility for the acquisition, installation and testing of a new linear accelerator—one of the most advanced and complex high-energy nuclear therapy machines available.

The installation did not go smoothly, and because his other duties were also increasing, Axt sometimes found himself spending 12 and 13 hours a day, seven days a week, at the hospital.

In an initial interview with investigators from the Nuclear Regulatory Commission (NRC), Taylor said that before the overdoses were discovered, the hospital had for some time been considering hiring another physicist to assist Axt. But Axt, who by all accounts was a quiet, unaggressive man, apparently did not push hard for the new position, and nothing was done, aside from hiring an electronic technician to help in diagnostic radiology.

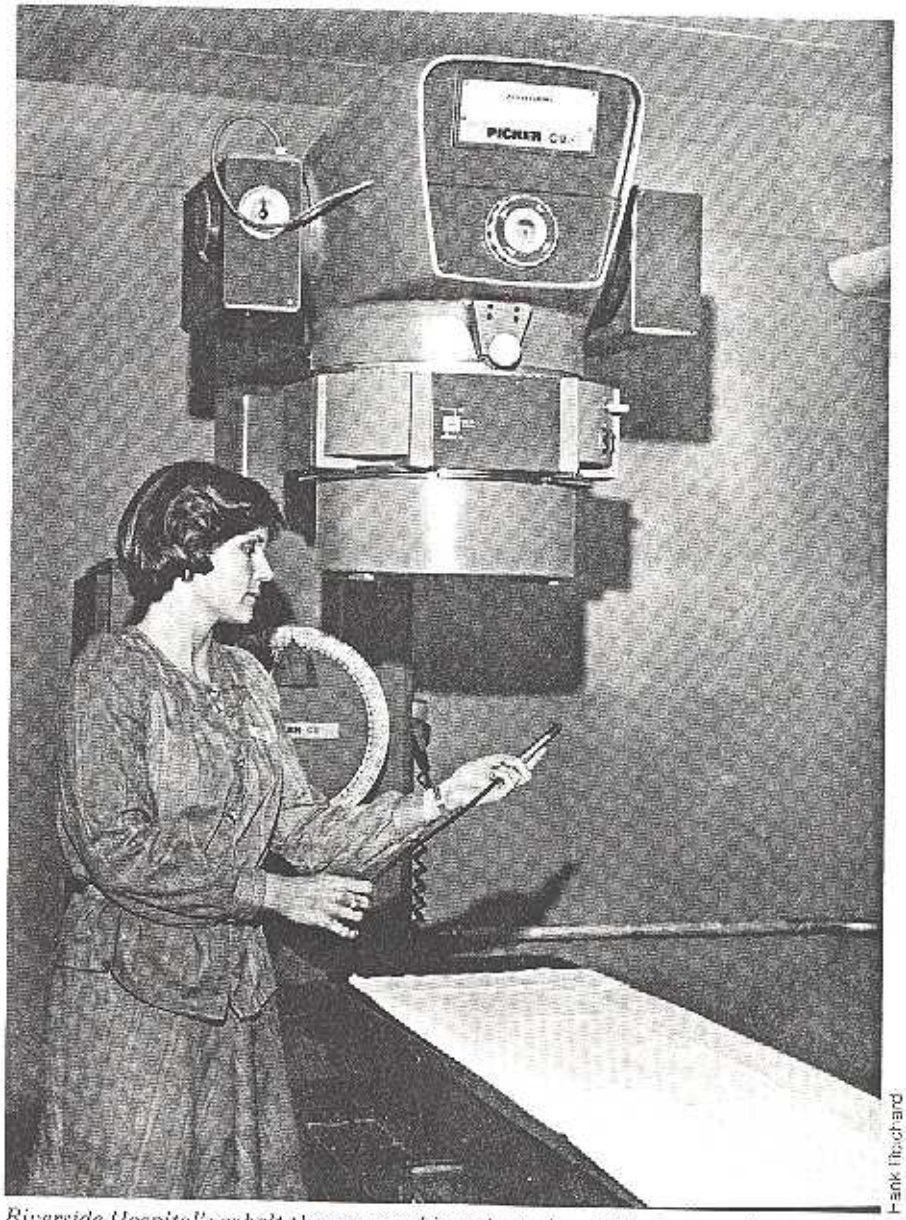
Perhaps because he made little noise as he went about his duties, Axt may have received very little direct supervision from Fahey or Taylor. He later told attorneys he was largely left to establish his own work priorities, and calibrating the cobalt-60 source never ranked high on his list. Believing that his success in getting the linear accelerator operational and dealing with some other radiation matters at the hospital was being closely watched, he elected to spend his time on those jobs.

Besides, he may well have reasoned, there wasn't much that could go wrong with a cobalt-60 source. And indeed, nothing *did* go wrong; the hospital's cobalt-60 continued to decay at precisely its normal rate throughout the months when Joel Axt failed to calibrate it.

What went wrong was Joel Axt's own methodology.

When he arrived at Riverside, Axt was given the manufacturer's original data on the cobalt source and some copies of calibration data left by Callendine.

Fahey handed Axt a sheet of linear



Hank Hackard

Riverside Hospital's cobalt therapy machine, shown in a 1976 photograph. Jennifer Guy, then a hospital public relations assistant, holds a radiation measuring probe. Riverside refused to allow Columbus Monthly *to take current photographs of its radiation therapy room.*

How it happened

Figure A

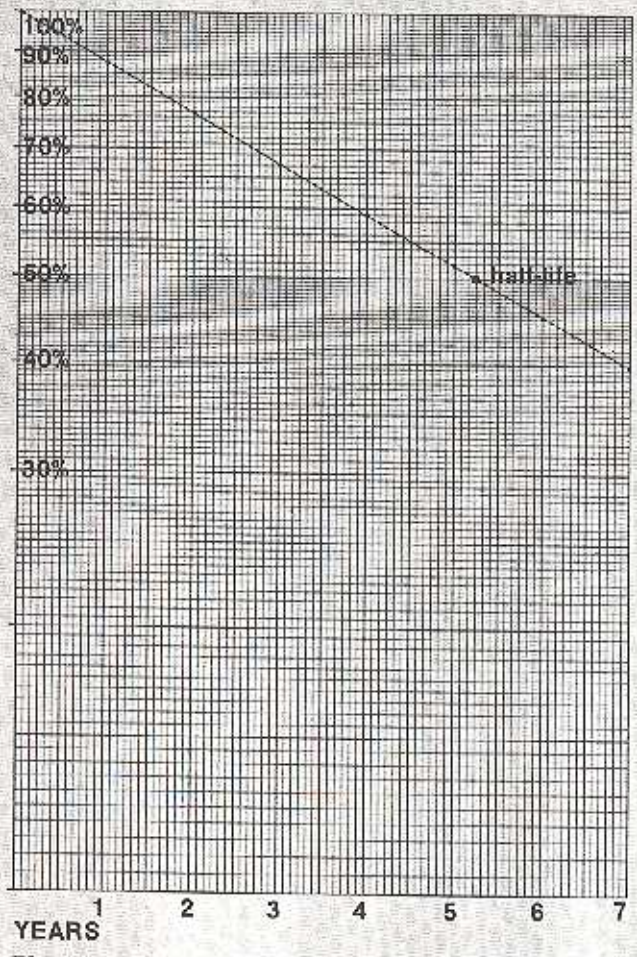
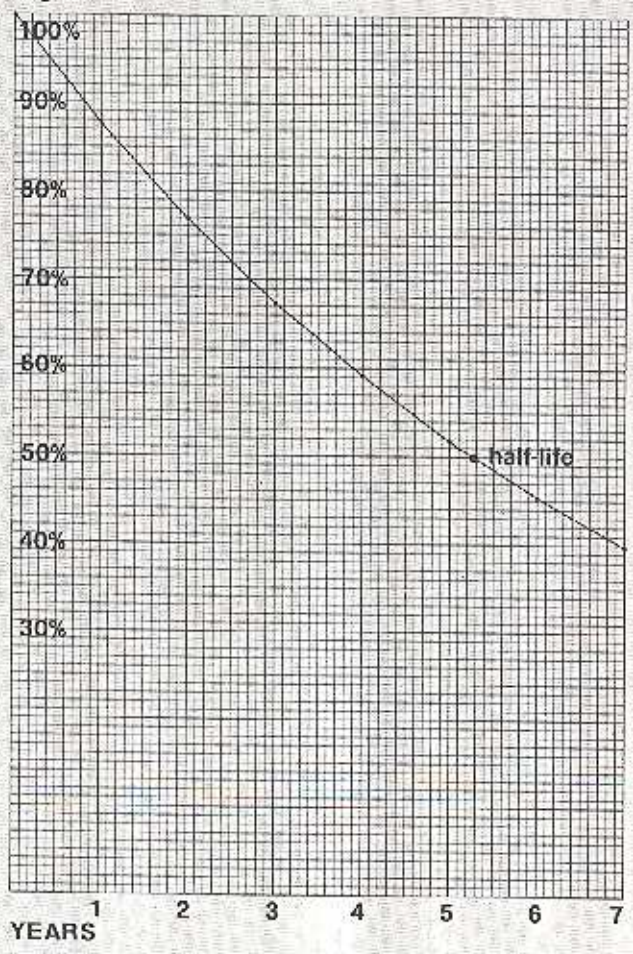


Figure B



Physicists agree that the decay rate of cobalt-60—and therefore the amount of radiation being given to patients—can be accurately measured on either semilog graph paper (figure A) or linear graph paper (figure B). Most experts use semilog, because the decay rate shows up as a straight line and any variation is easily spotted. Anything but a straight line on semilog would immediately alert a physicist that an error exists.

On linear graph paper, the decay rate of cobalt appears as a curve, sloping so gradually that an error might be overlooked. Both charts show the cobalt losing half its original radioactivity in 5.258 years.

In his later statements to attorneys, Joel Axt admitted he did three things wrong at Riverside. First, he used linear graph paper when, to be absolutely sure of accuracy in calculating the decay rate, he would have been safer using semilog paper. Second, he inadvertently switched from linear paper with five squares per division to paper with six squares per division, thus making the decay rate appear faster than it really was. And finally, Axt failed, for nearly two years, to make the periodic calibrations—the actual measurements of radiation output—which would immediately have alerted him that something was wrong with his graphic projections.

The result of all this: a gradual but increasing overdose of radiation that reached 40 per cent before being discovered and halted.

—L.S.R.

graph paper, completed before Axt's arrival, and said he would like Axt to follow the same linear format, Axt later told attorneys. Because the decay rate of cobalt is an exponential, rather than a linear function of time, charting its decay on linear graph paper is more complicated than charting the same function on semilogarithmic graph paper, where it will appear as a straight line (see chart).

Who prepared the linear graph which Fahey gave to Axt? Mansfield says the hospital believes Callendine had been using linear paper routinely in his calibrations. But Callendine says he *never* used linear paper, preferring semilog paper or numerical tables because he wanted to do things more simply. "Anytime something is more complicated there is an increased possibility of making a mistake," he says. "You can plot on semilog *or* linear paper, if you do it right."

Unfortunately, Axt did it wrong. By using linear paper and nonlinear calculations together, he laid the groundwork for creating a false predicted output curve for the hospital's cobalt-60 radiation. And in September, 1974, as he was about to run out of graph paper, Axt compounded the initial problem by transferring his decay curve to new paper which had six squares per division instead of the original paper's five squares per division.

The result of these errors was an output curve which indicated the hospital's cobalt-60 was losing its radiation strength far faster than it actually was. As time passed in 1974 and 1975, the gap between the errone

ous chart and the real radiation output increased.

To compensate for the assumed lower output, technicians dialed in cobalt-60 exposure times that were, increasingly, too long. By March of 1975, the resulting radiation overdoses were averaging 10 per cent. And by January, 1976, when the problem was finally discovered, the overdoses were as high as 40 per cent.

As far as anyone knows, neither Fahey nor anyone else at Riverside ever checked Axt's calibrations or instructed him to make a calibration during 1974 or 1975. So two simple mistakes went undetected for nearly two years, while the overdoses climbed.

At first, because the overdoses were marginal and because therapeutic radiation in *any* dosage almost always produces some unwanted side effects, the overdoses went unnoticed. But by late 1975, the number and intensity of complaints from Riverside's cancer patients and their doctors were increasing.

One patient, Ohio Bell telecommunications specialist Jim Baily, says his cobalt treatments left him "weak as a kitten" and produced "incapacitating diarrhea." After receiving two sets of treatments, estimated later at 26 per cent and 40 per cent overdoses, Baily recalls, "I told Dr. Fahey about these effects and his reply was that they were normal.

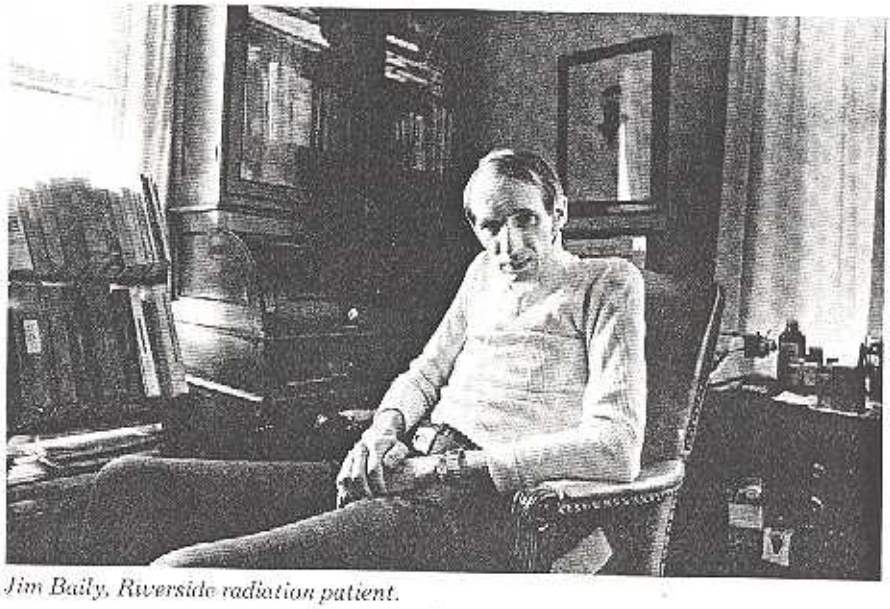
"I didn't know what to expect, and I had no point of reference to judge. They said, 'You'll have a sore throat.' Well, I had a sore throat all right. It was so sore I had difficulty eating. I told Dr. Fahey and he prescribed one teaspoon of xylocane before each meal." Xylocane, according to pharmacists, not only numbs the throat but is effective enough to numb the tongue, the entire mouth, "and all the way down."

Since discovery of the overdoses, there have been rumors that a number of private physicians called Riverside staff members in late 1975 to complain about inordinately severe radiation reactions, such as skin burns and extreme diarrhea. Perhaps because of the pending lawsuits, it's now difficult to find doctors who will say they did complain.

But if the reports are true, at least one national radiation expert thinks Riverside should have responded faster than it did. "Now and then," says Dr. Donald Pizzarello, professor of radiology at New York University's Medical Center and co-author of a book on radiation biology, "you get a patient who has a really bad sore throat or extreme diarrhea, and you can't understand why they're worse than others. If it happens one in 100 or one in 200, that's OK. But if it starts turning up often, and if you're told your patients have burns, that certainly is cause for investigation. And any radiation therapy department worth its salt should begin to wonder what is going on."

Dr. Steven Andresen, a radiation therapist who joined the Riverside staff under Fahey in September, 1975, later told NRC investigators he almost immediately noted more significant patient reactions than he had seen elsewhere. Because the number of such reactions seemed to be increasing, Andresen says, he asked Axt in late January, 1976, when he last "put a meter under" the cobalt-60 teletherapy device to check its output.

When Axt could not give him a specific date for the last calibration, Andresen became concerned and directed him to make one immedi-



Jim Baily, Riverside radiation patient.

Riverside senior associate administrator James Flynn (left) and Riverside Department of Radiology director Dr. Gordon Taylor are shown in this Dispatch *photo of an April, 1976, press conference on the overdoses.*

ately. It was that calibration—the first since May, 1974—which revealed the overdoses.

Fahey and Andresen immediately reported the overdoses to Flynn and Mansfield. A new output chart was constructed, based on the new calibration, and no further overdoses occurred.

But for reasons which remain unclear, Riverside officials did not notify patients or their doctors immediately. In fact, patients did not get word of the overdoses until mid-April, more than three months after Riverside discovered the error. When the executive committee of Riverside's board of trustees met to discuss the problem on Feb. 18, Mansfield says, "All agreed that the first order of business was to determine the extent of the error and the cause. It was agreed that an outside radiation consultant should be assigned to this responsibility. . . . The consultants' first site visit dealt with patient records and the mathematics of the error in order that all patient records could be accurately recalculated and reported."

The team of consultants, headed by Dr. Robert Shalek of Houston's Anderson Hospital, arrived during the first week of March, 1976. By March 23, more than seven weeks after discovery of the overdoses, the consultants were able to report extensively to Riverside officials. They suggested establishing a cut-off date to separate patients who were endangered by overdoses from those who were not. The date later selected was March 1, 1975, when overdoses reached 10 per cent above prescribed levels.

Mansfield says overdoses below 10 per cent are considered within acceptable limits by the NRC. NYU's Pizzarello is not so tolerant. "Personally," he says, "I don't think there should be much of a variation from the prescribed dose. I certainly don't think, in routine practice, it should exceed 2 or 3 per cent over. Ten per cent is rather generous."

After reviewing the consultants' report, Riverside decided it was time to notify the overdosed patients' physicians. During the week of April 12—10 weeks after discovery of the overdoses—about 250 form letters were mailed to referring physicians, and the hospital staff was told of the problem. A press announcement of the problem was prepared for release on April 20, and plans were made to notify all affected patients before that date.

But 250 doctors and an entire hospital staff don't keep quiet long. On Saturday, April 17, the story was leaked, and reporters began making inquiries. Riverside held an emergency news conference on Sunday, April 18, and some patients first learned of their overdoses from television news reports.

On Monday, April 19, NRC's regional Office of Inspection and Enforcement got *its* first notification in a phone call from a Food and Drug Administration official in Columbus. The NRC began its own investigation the next day and eventually identified six "items of non-compliance" in Riverside's radiation procedures, none of which had anything to do with the overdoses.

The NRC may well have felt it was playing catch-up anyway. Riverside is licensed by the NRC to operate a cobalt therapy program, and the commission seems to be the only agency with authority to inspect and regulate such equipment.

But the NRC's Chicago office is responsible for eight states, and there are some 3,500 licenses in that region for equipment similar to Riverside's. With a staff of fewer than 25, NRC usually makes on-site inspections only once every five years. In Riverside's case, although the cobalt-60 license had been renewed in December, 1975, the last on-site inspection had been made in 1967. Like many others, the NRC apparently considered the cobalt-60 equipment almost mistake-proof.

But Joel Axt had made a bad mistake, and when he figured out what had really happened, he panicked and tried to cover up. Initially Axt told the hospital administration, the Shalek team and NRC investigators that the faulty radiation measurements were caused by progressive, undetected deterioration of the probe used to measure the cobalt-60 output. For weeks after the first public disclosure of the incident, Riverside's officials accepted Axt's explanation and blamed the overdoses on faulty equipment.

But to the consultants from Houston, that explanation never smelled right. Axt had supplied them with written reports of calibrations he said he had made, using the "bad" probe. His calibrations seemed somehow too regular and precise. Moreover, the consultants found the suspect probe was indeed damaged, but they concluded the damage had occurred after the dates of the measurements Axt had given them. That fact and other, more technical errors in Axt's reports led the consultants, during the first week in May, inexorably to the conclusion that Axt had fabricated his calibrations after the overdoses were discovered.

Under close questioning, Axt admitted the attempted cover-up. He had faked the reports, he later told attorneys, simply because he was afraid of losing his job. On May 6, Mansfield suspended Axt and notified the NRC of the new development. NRC investigators returned to Columbus, where Axt told them he had never viewed calibration of the cobalt teletherapy device as a high-priority duty, and in his mind the device's

importance had diminished even further with the purchase of the new linear accelerator.

Neither Mansfield nor the various investigators have yet been able to explain how the calibration probe became damaged. Mansfield told NRC investigators that hospital officials had asked Axt directly if he had purposely damaged the probe, and Axt had said he had not. But suspicions persist. "Axt goes back over his paperwork, and then after a few hours the probe shows up broken," says one attorney. "The temporal coincidence causes one to wonder if he was pinned in a corner. I mean, if I'm on the verge of bankruptcy and my store burns down, one has the right to be suspicious about it." One federal court suit directly accuses Axt of tampering with the probe.

Within a month after his suspension, Axt was formally fired by Riverside, and he hasn't been seen in Ohio since. In revealing his dismissal, Riverside acknowledged that human error, rather than equipment malfunction, had caused the overdoses. What the error was and how Axt tried to conceal it, the hospital has never publicly discussed.

Once the real cause of the overdoses had been determined, lawyers quickly began replacing medical men in what has become a complex legal contest with extremely high stakes. Suits charging Riverside with negligence and seeking extensive damages began showing up in the Common Pleas and Federal District courts in the summer of 1976. As of last Feb. 1, Riverside says, 102 suits had been filed, the bulk of them by about a half dozen attorneys who specialize in such damage actions and work for contingency fees—usually about one-third of whatever they eventually recover for their clients.

"Within a month after his suspension, Axt was formally fired by Riverside, and he hasn't been seen in Ohio since."

By their own accounts, the principal attorneys for Riverside's patients have had substantial problems in collecting information to prepare their cases. Axt was virtually unreachable for nearly a year after his firing, rumored at various times to be in several different places. Finally, after considerable pressure from plaintiffs' lawyers and a stiff order from U.S. District Judge Joseph Kinneary, Axt was located in Miami, where lawyers obtained a lengthy deposition from him on June 11, 1977.

In that deposition, Axt again admitted his responsibility for the error and the subsequent cover-up. But he often seemed vague and only dimly responsive to questions, at times almost disoriented. Russell Volkema, an attorney representing a number of the over-radiated patients, implied in a court filing nine days after the deposition that Axt may have been purposely uncooperative.

"Defendant, Joel Axt, seems to want to live in a vacuum," Volkema said. "When his deposition was taken he could not remember what school he attended when he was in the eighth grade. He could not remember what junior high school he went to. He did not know the present address of his ex-wife and his children, even though he receives periodic telephone calls from his children. There is a lot of

mystery about this man, and plaintiffs need every advantage possible to locate any witnesses who could have heard statements by the defendant relative to his blunderous, willful and wanton misconduct. . . . Many people have died because of his utter disregard for human life."

Since his deposition was taken, Axt is rumored to have left Florida and relocated again, perhaps somewhere on the East Coast. His availability as a witness in the upcoming trials remains in doubt.

But the availability of Lawrence Fahey, who as Axt's former boss would have been the second most important witness in any radiation trial, is in no doubt at all. Fahey died at his home, apparently of heart disease, on Aug. 16, 1976. He was 37 years old, his medical career was in jeopardy because of the radiation overdoses, and it's not hard to find other doctors who will speculate that the intense pressure of the Riverside cases contributed to his untimely death.

A third major witness, Fahey's former assistant Steven Andresen, has also left Riverside and Ohio, but is expected to be available to testify at the upcoming trials.

Because of a legal doctrine known as *respondeat superior*, Riverside will defend Axt, Taylor, Andresen, and Fahey's estate (all defendants along with the hospital in some or all of the pending suits).

Although neither the hospital administration nor its lawyers—principally Bruce Lynn and John Eckler of Bricker, Evatt, Barton & Eckler—will discuss pending litigation, other lawyers speculate that the hospital's main defense tactic will be to admit liability for Axt's negligence, thus preventing trial juries from hearing detailed testimony about the flagrancy of the conduct which caused the overdoses. In effect, juries would be asked only to determine the amount of damages to be assessed.

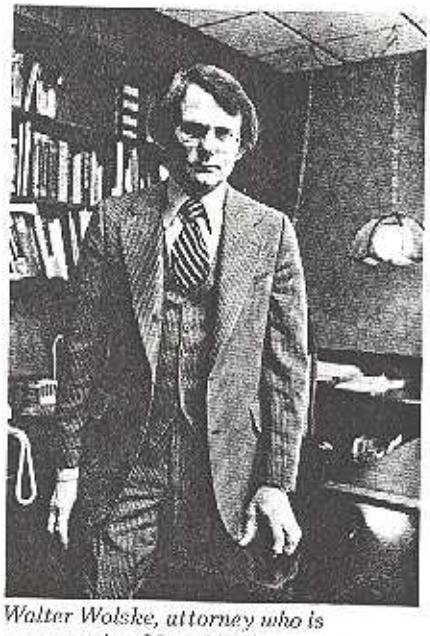
Some patients' attorneys intend to counter this tactic by seeking punitive as well as compensatory damages, claiming that the misconduct of Axt, other employees and the hospital itself was "wanton and willful" rather than merely negligent. Suits have also charged the hospital with misrepresentation and recklessness—any of which can be grounds for punitive damages if proven.

Even if they are not awarded punitive damages, some attorneys reason, they will be able to present full testimony about what happened at Riverside to the jury. They think the grossness of the case will at least sway juries toward higher compensa-

tory damages. And although malpractice suits in Ohio no longer specify the amount being sought, the lawyers clearly believe the awards in some of the worst overdose cases could be substantial.

Walter Wolske, a partner in the law firm of Wolske and Blue, is probably the most active plaintiffs' attorney. "I've got a job to represent some 26 people who got injured," he says, "some horribly and others not so horribly. And I intend to see that my clients are compensated for what I consider to be a medical catastrophe." Wolske doesn't mention it, but he and his fellow plaintiffs' attorneys are also likely to be rather well-compensated themselves. If the average damage award for each of his 26 clients is $10,000—and some lawyers think that figure is too low an average for the cases which haven't already been settled—Wolske's fees would likely be around $80,000. If the average award were $25,000, Wolske would receive perhaps $200,000. There's a lot of work and considerable expense in such cases, but the ultimate payoffs can be extremely lucrative.

Who's going to pick up the tab for what may run into millions of dollars in settlements and court awards? Neither Riverside nor the



Walter Wolske, attorney who is representing 26 patients.

patients' attorneys are talking much—at least for the record. At the time the overdoses occurred, Riverside had liability insurance coverage from at least three different carriers: Buckeye Union, Home Insurance, and Aetna Casualty & Surety. The three policies were used in combination with the hospital's self-insurance to create a complicated, multi-tiered total coverage.

Some of that coverage has already been used to pay for out-of-court settlements in a number of the less serious overdose cases. These settlements, rumored to be mostly under $10,000 each, have already cost several hundred thousands of dollars.

How well can Riverside withstand a series of large damage awards? Privately, some hospital officials say the pending suits could pose grave financial problems despite Riverside's extensive insurance coverage. But some plaintiffs' lawyers say, also privately, that Riverside is overstating its financial problems as part of a concerted effort to get their clients to accept lower settlements.

Mansfield will say only that Riverside's attorneys have advised him against any discussion of the hospital's insurance coverage or financial condition before all litigation has been settled. He does say that Riverside is *now* self-insured, but contends the decision to move to self-insurance is common among large hospitals and had nothing to do with the radiation cases. Whether even as large a hospital as Riverside, with an annual budget of about $160 million, is financially capable of total

self-insurance remains an open question.

As of last Feb. 1, the hospital said, only 159 of the patients who had been over-radiated remained alive. Given the grim statistics of long-term cancer survival rates, it's likely that by the time most suits have been tried or settled two or three years from now, only a few dozen of the patients will survive. Patients who have died since the over-radiation was discovered have been extensively autopsied. Dr. Robert Zipf, a Riverside pathologist who is also a deputy county coroner, created something of a flap last June by reporting to a group of coroners that 10 patients had died from the effects of excessive radiation, rather than from cancer.

Zipf now will not elaborate on his earlier statement or release subsequent findings, but if his initial statement was accurate, Riverside may be facing some tough court battles and potentially very large damage awards in those cases where radiation can be shown to have caused or hastened a patient's death.

For most of the other patients, the sad fact is that the desperate illness which brought them to Riverside for cobalt therapy also will limit the amount of damages they or their heirs can expect to collect. A cruel but necessary part of Riverside's legal defense will be that because the patients were in many cases going to die from their cancers in any event, over-radiation at worst caused only marginal pain and suffering.

However the legal actions are settled, those patients who remain alive are in a tenuous and awkward position in their relationships with the hospital. Mansfield says the hospital's staff is available for consultation or follow-up, but that most patients "are seeking follow-up through their own attending physician or the specialist of their choice." He adds that the "relationship between the hospital and the patient has been complicated by the course of legal action some have elected to pursue."

"However the legal actions are settled, those patients who remain alive are in a tenuous and awkward position in their relationships with the hospital."

Has Riverside changed its radiation policies since the incident? Mansfield contends the hospital's radiation department "is without question one of the safest in the country today.

"Additional written protocols have been established for calibrating all radiation therapy devices. Riverside's new protocols exceed those now required of all hospitals by the NRC and contain a check and balance system which calls for a second opinion by another physicist and a different set of equipment."

The new procedures sound somewhat like the double-checks George Callendine developed less formally during his 17 years at Riverside. And perhaps they have assured that nothing like Riverside's radiation tragedy can happen there again. The ultimate irony, of course, is that it never *had* to happen in the first place. □

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