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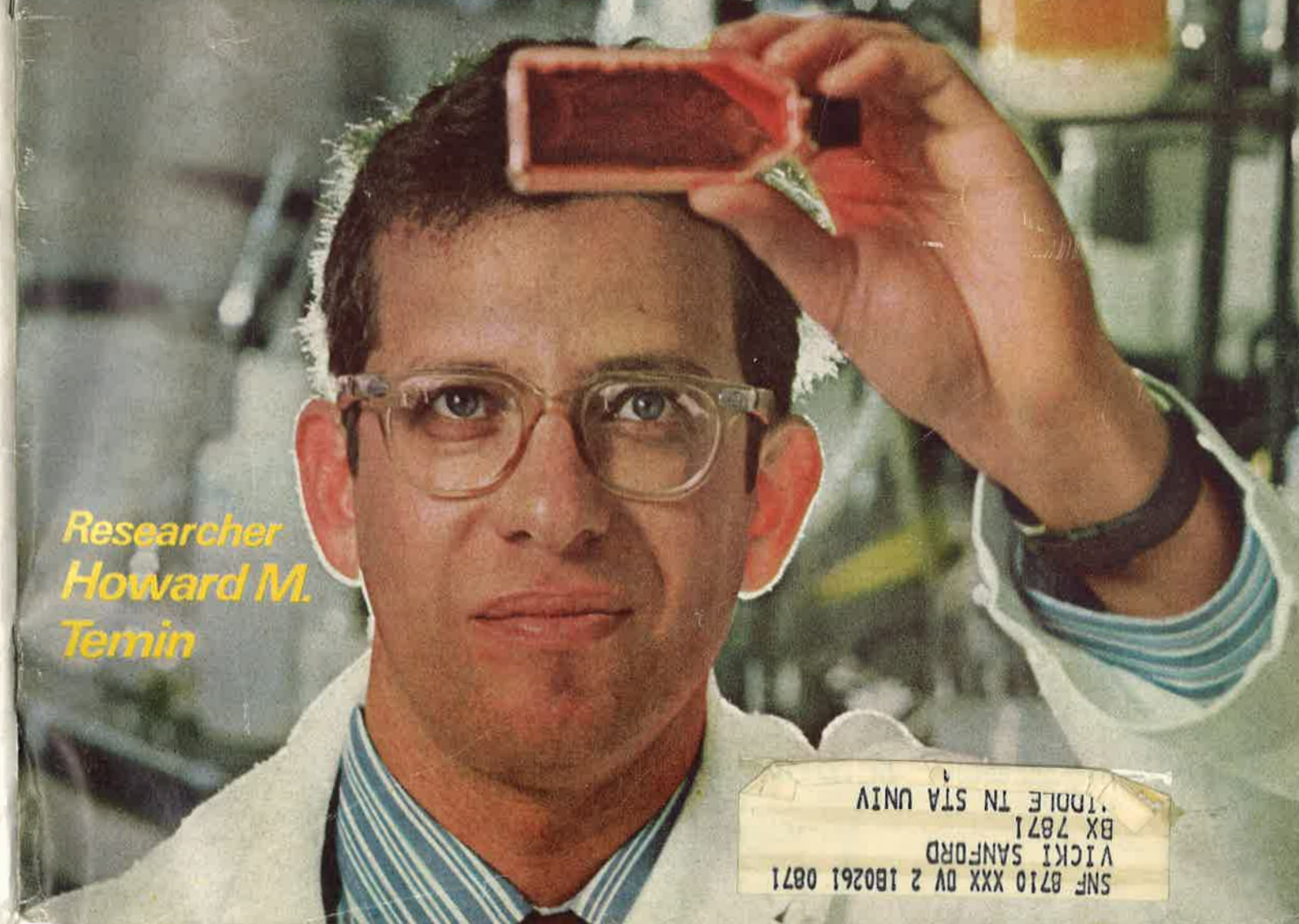
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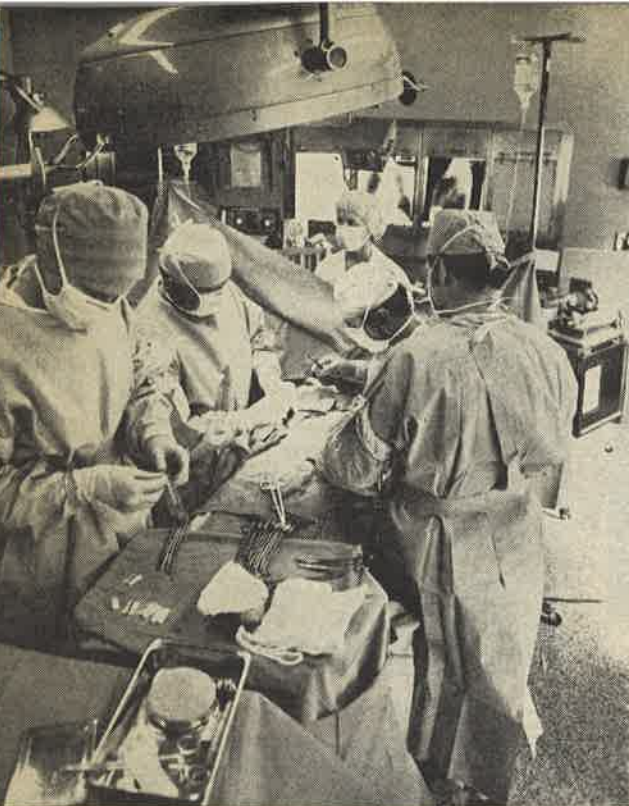
**The War Against
CANCER**

• A PROGRESS REPORT

Researcher
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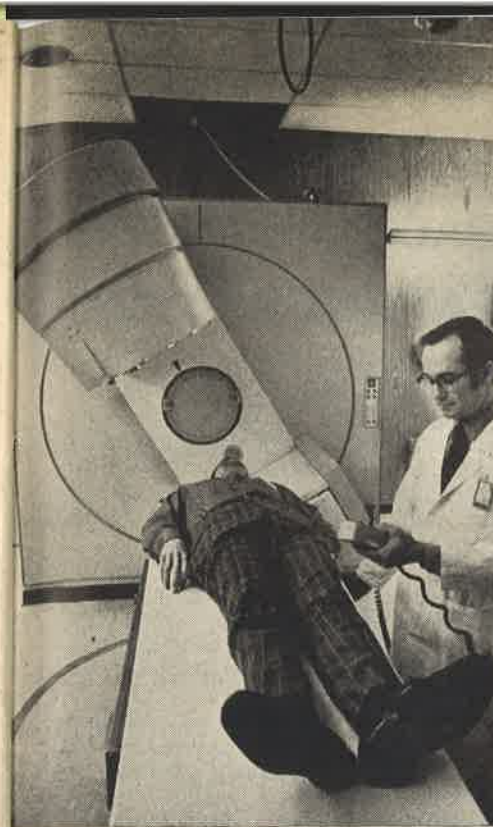


Robert R. McElroy—Newsweek



AP

The combatants: New York surgeons operate on cancer victim; a cancer cell magnified 3,000 times; Johnson with LINAC



Wally McNamee—Newsweek

MEDICINE

The War on Cancer: Progress Report

No affliction that man is heir to is quite so heavily freighted with dread and mystery as cancer. One reason for this is that, to many, the word itself is synonymous with death—and with protracted suffering. For no part of the human body is immune to cancer. The malignancy eats into nerve and muscle, bone and organ, blood and lymph alike; and it acquires an extra measure of terror because of the stealth with which it arises and because its deadly origins are inexplicably intertwined with the secret of life itself.

This year alone some 330,000 Americans will die of cancer. Of the 200-odd million Americans now alive and well, fully 25 per cent, or some 50 million, will one day hear their doctors pronounce the dread diagnosis. Of these, about 34 million will die, and even some of those who are saved may not consider themselves lucky. Thousands will be disfigured by the therapists' attempts to excise or burn away the malignancy. Other thousands will linger on, for months, for years, some for quite a few years. Perhaps the cruellest truth of all is that of those doomed to die this year of cancer, 4,000 are children.

Faced with these grim statistics, it is small wonder that the U.S. Congress almost routinely designates the National Cancer Institute to receive the biggest single slice of Federal medical research funds, or that concerned ordinary citizens last year contributed \$65 million to the American Cancer Society. It is also small wonder that the war against cancer has regularly enlisted the talents and dedication of so many of the nation's most outstanding scientists and researchers. What is new in the war against can-

cer is that this year, for perhaps the first time in memory, there is in the making a dramatic concatenation of major scientific achievement on the one hand, and of massive public commitment on the other.

The result is that despite the picture of almost unrelieved gloom projected by the statistics, the war against cancer has entered a new and hopeful phase. There is no cure in sight. That must be said at once. But scientific discoveries in recent years, months and even weeks have lifted the level of cancer research to a dramatic new plateau. And, coincidentally or not, the White House itself has called for a massive commitment of public funds. "The time has come in America," said President Richard M. Nixon in his State of the Union message this year, "when the same kind of concentrated effort that split the atom and took man to the moon should be turned toward conquering this dread disease."

War: For the moment, the ultimate size and shape—not to mention the efficacy—of this kind of campaign are uncertain; this will probably remain so for some time, while partisans of both political parties maneuver for the credit and the limelight in what is to come. But it seems certain enough that something substantially beyond any past similar commitment will emerge. Meanwhile the war proceeds ever more encouragingly at almost every tactical salient—in the diagnostician's office, in the operating room, in the radiotherapists' chambers and, above all, in the laboratories of the quiet, patient and painstaking men whose researches into the mystery of life itself may one day solve the deathly riddle of the cancer cell that lurks there.

There is no lack of evidence that the

new optimism is warranted. Just three decades ago, only one cancer patient in five had a chance of survival. Today the figure stands at nearly 40 per cent. In some forms of cancer, the survival rate has risen even more dramatically. Now 60 to 80 per cent of the female patients with breast cancer are being saved by the surgeon's knife. New advances in radiation therapy have drastically improved the chances of patients with Hodgkin's disease, a cancer of the lymph glands. Drug therapy is prolonging the lives of children with leukemia, and in some cases doctors are now even going so far as to pronounce their patients cured of this tragic killer.

Dogma: But of all recent therapeutic and research breakthroughs, few have evoked quite so much attention and reaction as the discovery announced almost diffidently in Houston last May by a shy, intense young University of Wisconsin researcher named Dr. Howard M. Temin. What Temin did was prove in effect that the rules for the transmittal of genetic information within the cell (rules generally accepted as dogma since Watson and Crick first elucidated them in their famed double helix theory in 1953) can be reversed by cancer viruses. If these findings can now be applied to the cancer cell itself, the result could not only prove whether viruses are the main cause of cancer in man, but could also lead to new methods of diagnosis and treatment—methods that might go to the very heart of the disease: the cell nucleus.

"This new finding," says Dr. Frank J. Rauscher, a top NCI virologist and administrator, "is as important as the discovery of the first animal tumor virus in

1908." Dr. R. Lee Clark, director of Houston's M.D. Anderson Hospital and Tumor Institute, calls Temin's discovery "the most dramatic thing to occur in virus research in years."

Clark and others agree that the basic nature of cancer is just now being unraveled by molecular biologists such as Temin and his fellows—scientists who study life and growth at the level of the chemicals within the cell. The fundamental object of their interest is deoxyribonucleic acid, DNA, the substance of the genes whose structure Watson and Crick described.

Sequences: DNA's genetic message is spelled out by four chemical subunits, called bases, that can be arranged in an almost infinite variety of sequences along the molecule. Each molecule in a cell nucleus acts as a template, or pattern, for the formation of a closely similar molecule of ribonucleic acid, or RNA. The RNA carries the DNA message into the cytoplasm around the nucleus and directs the synthesis of enzymes and other proteins that are necessary for cell function. During cell division, the DNA molecules replicate themselves exactly, and the duplicate set enters the chromosomes of the daughter cell. To Temin and other researchers, it has long been obvious that damage to any RNA base could alter the chemical activities of the cell; if the defect occurred in the DNA, such an alteration could become permanent in future generations of cells. Radiation and chemicals no doubt induce cancer in just this way. And so do viruses.

Viruses are nothing more than tiny strands of DNA or RNA enclosed in a protein coat. The virus usually causes disease by invading cells, depositing its genetic material and directing the cells to manufacture new viruses. In so doing, it usually kills the cell it invades; cell death and the production of new viruses

account for the symptoms of familiar viral infections like flu and mumps. But in causing cancer, a virus behaves in a more subtle way. After invading the cell, the virus changes the cell's hereditary characteristics by synthesizing new DNA and transforms it into a cancer cell capable of reproducing into a growing tumor.

Since DNA is the master molecule of heredity, it has been easy for virologists to imagine how a virus containing DNA could initiate the cancerous change that would be perpetuated through succeeding generations of cells. But they were baffled as to how an RNA-containing virus (such as those known to cause leukemia in animals, and suspected of causing it in man) could accomplish this feat. According to the "central dogma" that has grown up around the Watson and Crick model, DNA could serve as a template for the production of RNA, or new DNA. But RNA could not be the template for making new DNA, which would be required to make the malignant transformation permanent. At least that's what the virologists believed until the 36-year-old Professor Temin quietly shattered the central dogma last May.

Temin first began to suspect that the accepted theory might be wrong more than six years ago. Working with cultures of Rous sarcoma virus, an RNA-type that causes cancer in chicken cells, Temin found evidence that cells so transformed contained new DNA with a sequence of bases resembling that of the viral RNA. Temin couldn't account for how this new DNA was produced, unless the viral RNA had directed its synthesis. At first his findings were met with disbelief, if not ridicule. Undeterred, however, the self-effacing scientist bent quietly but single-mindedly to the task of confirming his heresy.

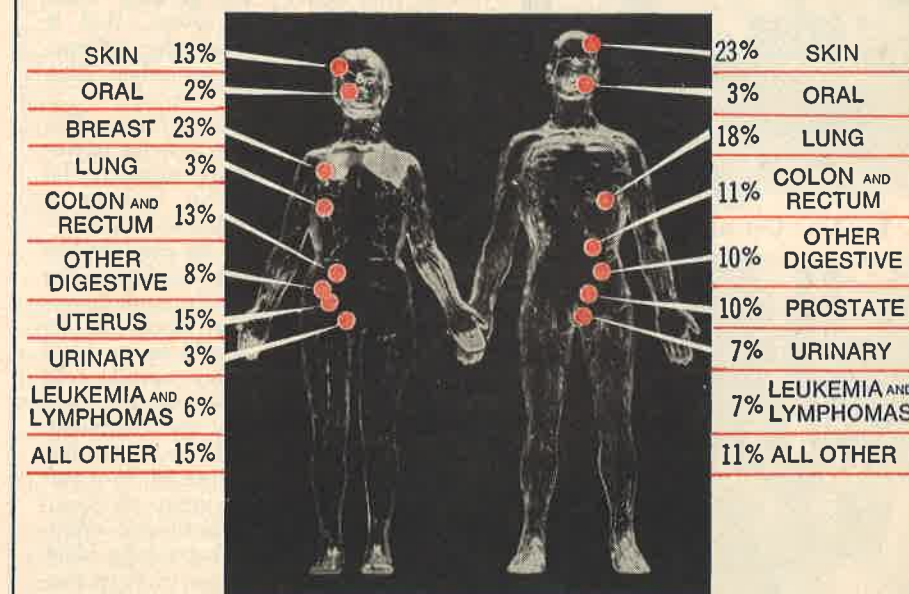
Last winter, Temin and Satoshi Mizutani, a post-doctoral fellow who had just come to Temin's lab, began looking for an enzyme, or chemical catalyst, in the Rous virus that would be capable of transcribing the RNA virus message into DNA. "We expected it would take two years, since we weren't biochemists," Temin recalled last week. But he and Mizutani methodically checked the scientific literature to learn the methods for detecting enzyme activity in viruses and adapted them for their use. They concentrated the virus particles in a centrifuge and then treated them with a detergent to expose the cores containing the viral RNA. Then they mixed the disrupted viruses with chemical building blocks of DNA that had been labeled with radioactive hydrogen. When the reaction was over, to Temin's delight, the radioactive ingredients could be detected in molecules of new DNA. "The scintillation counter showed an increase in counts," he recalls. "As soon as we saw that, we knew what we had." It was now clear that an enzyme from the virus had produced the long-doubted RNA-DNA transcription.

Surprise: Temin and Mizutani kept the news from even their closest associates until they had done more experiments to double-check their initial results. "We knew," says Temin, "that if there was any hint, everyone around the world would know in a couple of days." But in the end, he did include a brief report about his discovery in a talk in Houston.

Then came a major surprise. No sooner had Temin returned to Madison than he got a phone call from David Baltimore, a 32-year-old MIT biologist who had known Temin since they had spent a summer together in a program for high-school students at the Jackson Laboratory in Bar

WHERE CANCER STRIKES

The rate of incidence of major kinds of cancer by site and sex.



Source: THE AMERICAN CANCER SOCIETY

Robert Ritter



Pollard: Many causes, many cures



Baltimore: Follow the virus



Kaplan: Get to the nodes



Ketcham: Unstick the cells

Harbor, Maine. Baltimore was calling, he said, because he thought Temin would be interested in knowing that RNA viruses do contain an enzyme that makes DNA. "I know," Temin replied, "but where did you hear?" "I did it," said Baltimore. "You did it," Temin exclaimed. "We did it," Baltimore hadn't heard a word about the Houston report.

Working independently, the MIT researcher had been looking for an RNA-to-RNA enzyme in certain viruses. And in testing a sample of RNA leukemia viruses for this enzyme he had found the RNA-to-DNA enzyme that his old friend had postulated. Both Temin and Baltimore quickly sent their reports to the British journal *Nature*, where they were published back-to-back in June. For his part, Baltimore is not at all put out that Temin got priority on the finding by presenting his verbal report first. "Howard's whole life has been devoted to the understanding of the replication of tumor viruses," he said last week. "I was very much a newcomer to the field."

Activity: Further developments followed in rapid succession. Dr. Sol Spiegelman, a widely respected geneticist at New York's Columbia University, heard about the Houston report and ran some tests of his own. In a few days, he had detected the Temin enzyme, called RNA-dependent DNA polymerase, in eight different cancer viruses, but in none of several viruses not known to produce tumors. Three months later, Dr. Robert C. Gallo of the National Cancer Institute, collaborating with Drs. Sue Yang and Robert C. Ting of Bionetics Research Laboratories in Bethesda, Md. found an enzyme activity closely resembling that of the Temin enzyme in the cancerous white cells of three acute leukemia patients. Significantly, it could not be found in cells from control subjects who did not have cancer. Meanwhile, Spiegelman went on to test some 120 leukemia patients. He found that the enzyme activity was greatest when the disease was most severe, that it tended to diminish when the patients improved and disappeared when they went into remission.

All this has immense importance. Detection of the polymerase activity in human cancer cells strongly supports the contention that cancer in humans is caused by a virus. In addition, measurement of the enzyme can be employed to diagnose certain cancers and follow the course of treatment. Finally, some investigators think a drug that blocks the activity of the enzyme would be an ideal anti-cancer chemical; since normal cells don't seem to have the enzyme, they would be unaffected by the treatment, but the cancer cells would be vulnerable. Indeed, Dr. Maurice Green of St. Louis University has tested a group of chemicals derived from the antibiotic rifampicin and found some that totally block the activity of the enzyme in virus particles. At NCI, Gallo and his colleagues

(Continued on Page 88)

ONE WHO CAME BACK: A CANCER PATIENT'S STORY

NEWSWEEK Washington correspondent William S. Gray fell sick in 1967. A few months later, his doctors gave him the diagnosis: cancer of the lymph nodes (Hodgkin's disease), a malady until recently almost invariably fatal. Gray is alive and at work today. This is his report.

My doctor, Joe Wallace, called unaccountably early that hot June morning in 1967. "You'd better come down to my office soon," was all he said. My mouth went dry.

For over a year I had been running a fever sporadically hitting 104 degrees. Because this is a primary symptom of malignant lymphoma, a family of invariably fatal lymphatic cancers, Joe had ordered repeated surgical biopsy of two lymph nodes since January. Five times I sweated out the results, and five times the pathology reports came back negative—not only from local hospitals but also from the Armed Forces Institute of Pathology and the prestigious National Cancer Institute.

But I knew Joe had asked another pathologist, Dr. Lauren Ackerman of Barnes Hospital in St. Louis, Mo., to review slides of the node removed in January from my right armpit, and maybe Ackerman's verdict was in. And maybe it was cancer.

Ritual: In the empty waiting room the gloom was a palpable thing. Mrs. Buckley, the normally cheerful nurse, averted her eyes at my feeble jokes. Then Joe came out of the inner office, so slow, so sure, his face heavy with concern. He beckoned me in and I knew what I was going to hear so I lit another cigarette and dragged out the ritual, focusing my eyes far away to keep his voice from coming. But there was no stopping it now. "We've been through a lot together. I'm sorry, but it's Hodgkin's disease. I'll try to find the best place for you to be treated. Don't worry Bill, I'm not going to let you die soon. We'll keep you going, maybe for a couple of years."

So there it was, truth starker than the vague fears that had long roiled my mind. I knew medical literature listed the average time from diagnosis to death as two years, and I had already surrendered one. I had all the symptoms of advanced disease—fever, night sweats, rash and itching. Radiation or surgery would be useless, and the current mode of chemical therapy, using single violent anti-tumor agents, would relieve symptoms for no more than a few months.

When you have a fatal malignancy, the prospect of death cannot be regard-

ed with the pragmatism of the soldier who says "It won't happen to me" or with the "perception" of those who tell you with a shrug "You might have been run over by a milk truck." Because they're talking about sudden and accidental death, and you're brooding about protracted and inevitable death, with no possibility of the mercy of surprise.

Hodgkin's disease had started stalking me in the spring of 1966 with mild undulating fevers and backaches and soon I had forgotten what it feels like to be healthy. In August I found a swollen lymph node on the left side of my neck, and the back pains grew unbearable.

By January 1967 I was on the operating table, wide awake because anesthesia is dangerous for feverish patients, and Dr. Luther Gray was hacking his way to the swollen node in my right armpit. "Does it look malignant? Does it look malignant?" I kept asking and Luther just drawled, "I don't know much about these things, Mr. Gray. I'm just a mechanic who gets paid to cut 'em out." But old Luther knew.

Concern: My one most vivid memory of that month in the hospital was the night I got two calls, the first from a relative who suggested that if it turned out to be Hodgkin's, the only practical concern was how long it would take and how painful it would be. I found this view obnoxiously sterile for a 32-year-old man with a 3-year-old son. Minutes later Dessa, my wife, phoned that our son, Billy, whom I hadn't seen for a month, had been looking at the wedding pictures and said, "Daddy's all gone."

Joe let me go home in February, and the following months were a blur of pains in the liver, spleen and gut and long soaking night sweats when my wife had to change the sheets three times and then try to sleep through my shaking chills.

Then it was May, and Luther was cutting me again, down deep this time into the groin by the pelvis, and there was only procaine to numb the pain, and he just kept saying quietly how sorry he was to have to be hurting me like this. But once again the pathology report was negative, and it was only the new gentleness in his voice that worried me. Ackerman's death sentence came not long after that; and although we had subsequent negative pathology reports, my condition steadily worsened.

September was hot that year, but I was constantly cold and no longer gave a damn about what the pathologists said. The awesome malignancy was killing my red blood cells faster than transfusions could replace them, and I was so weak with anemia that it took me an hour to walk 100 yards. On Sept. 22, 1967, I was admitted to the fourteen-story red brick Clinical Center, the 500-bed research hospital that serves the National Institutes of Health.

My notes from those first days describe an abounding sense of faith in these

tough, professional NCI doctors and the unruffled way they probed my malignancy with million-dollar machines while planning their attack. First I had a complete physical, including X-rays of almost every part of the body, liver function tests, blood counts and chemistries. Then they ran a needle deep into my hip bone to suck out bone marrow for pathological analysis, and the next day a long needle seemingly as large as a soda straw was plunged into my liver to withdraw tissue from this key organ so they could tell if the cancer had spread there.

Radioactive isotopes with an affinity for tumor tissue were injected, and I lay on a table while inches above me a 1-ton stainless-steel radioisotope scanner tracked up and down, relentlessly mapping my body, and radiation counts buzzed out on an oscilloscope. The ma-



The Grays: Help from a little boy

chines took my measure with omnipotent wisdom; they pinned me naked under cold unfeeling eyes that defined only the infirmities of my flesh, and my spirit shriveled in their gaze. In the end the doctors decided the Hodgkin's had spread to my liver, spleen and spine so I was classified as a 4B, the worst and most advanced stage. But Doctors Vincent De Vita and Paul Carbone knew the measure of this enemy better than I, and they took their time.

Shrunken: By October I was down to 119 pounds from the 190 pounds I once weighed and I found constant pain a demanding and obscene absorption. I didn't need a mirror to know that my shrunken body had become some grotesque and loathsome thing—I could see it in my wife's eyes, no matter how hard she tried to hide it.

Long ago Job asked: "What is my strength that I should hope?" I found perhaps more than anything else it was those superbly trained NIH nurses who made me want to live long enough to get

the horrible drugs and then keep coming back for more. And the drugs the doctors gave me were horrid indeed—nitrogen mustard, a derivative of the war gas; vincristine, a potent plant alkaloid; methyldiazine, a variation of the rocket fuel, and prednisone, a powerful steroid.

The nitrogen mustard and vincristine were injected directly into the main veins of the arm—called an IV—where they sizzled like dry ice. Within half an hour they burned out the entire outer lining of the stomach and intestinal tract, which was then disgorged by hours of paroxysmal vomiting. The doctors only had to warn you once about eating before your weekly dose of these horrors. Since the drugs destroyed cancer tumors and healthy tissue indiscriminately, you hurt everywhere for days, and invariably the veins turned bluish black. The methyldiazine and prednisone were taken by mouth; and while the former produced tremendous gas, cramps and gut pains, the steroid boosted your spirits and appetite at the minor expense of disorienting your mind. The side effects of the drugs were endless: loss of hair, loss of feeling in hands and feet, anemia, weakness, violent nausea, gastric and oral bleeding, pain, loss of muscular control and possible birth defects in children conceived during therapy. I was flattered by that final cautionary note.

Home: Two days before the first course of IV, I was burning up at 106 degrees, but one day after the drugs my temperature returned to normal for the first time in six months. A week later I was home, and the notebook entry reads: "Weight 124, all-time high! Going out to NIH to show the girls."

There is no question that in any other hospital I would have died. That I did not was partly because NIH, unlike most private institutions, lets patients see their children. I needed that little boy, and I needed the bravery of Drs. De Vita and Carbone who threw their whole armament against my cancer when most doctors would have been too timid to use even two of those drugs simultaneously.

Almost three years have passed since my last belt of cancer drugs, and I am still free of Hodgkin's. Some 35 per cent of my fellow patients have died. But almost 40 per cent have lived longer free of disease than any comparable group in medical history.

But five years more must pass before this treatment can honestly be called a cure, and hope comes hard when you've been where I've been.

I know, too, that I cannot ever go back all the way to my old self because the sounds, the smells of those malignant nights are still as real as yesterday. And so is my one knotty and abiding terror, not of dying itself, but of losing life. Never again to hear a voice or feel the sun. Instead to go to "a land of thick darkness, of darkness itself; a land of the shadow of death, without any order, where light is as darkness."

MEDICINE

(Continued from Page 86)

are testing rifampicin derivatives in human leukemia cells, and other researchers are testing them in laboratory animals. A trial in humans may be some time away, however.

Despite the excitement sparked by Temin's discovery, a cautionary note has been sounded in the wake of other recent research results. One young NCI investigator, Dr. George Todaro, has now found the polymerase activity in normal human tissues grown in culture, suggesting that its presence isn't necessarily indicative of viral activity or malignancy, after all. Thus for the moment, the Temin enzyme has triggered so much feverish investigation that clear interpretations are difficult. Even so, the original consensus holds. "I still believe," adds Spiegelman,

to this hypothesis, the polymerase might help embryonic cells differentiate during early development into the specialized cells, such as those of muscle, nerve and skin. RNA molecules, the theory holds, could carry information from cell to cell, and, using the enzyme, make DNA that would bring about generations of cells with new features. "The theory was originally proposed as more of an intellectual exercise," Temin notes, "and the more I thought about it, the more sense it made. So we are now looking for a similar enzyme in normal cells."

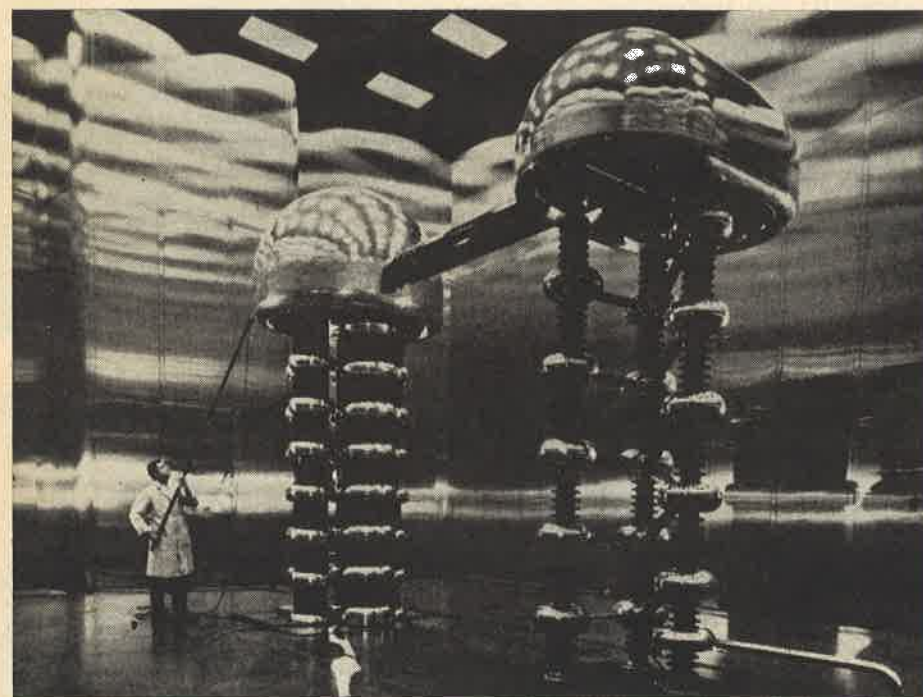
Temin is also in vigorous agreement with another expert consensus on the implications of his discovery—namely, that there is no reason whatever for any suggestion that the Temin enzyme might somehow lead to the development of a

While the debate over the Temin-Baltimore discovery reverberates in the research laboratories, improvements in cancer therapy are proceeding apace. One area of intense current interest is immunology, and some of the most recent evidence for the importance of immunity in cancer has come from the field of organ transplantation. Recipients of donor organs must take drugs continually to prevent rejection, and researchers have recently observed that such patients have an unusually large risk of developing cancer. Normally, rejection of foreign tissue occurs because lymphocytes, white blood cells produced by the spleen and lymph nodes, respond to proteins called antigens on the surface of the "foreign" cells and attack them.

Sentinels: Recently, research has suggested that many types of cancer cells have unique antigens that should trigger an immune response. No one knows why this response fails. It may be that the cancer patient cannot produce enough lymphocytes for all the tumor cells in the body, or that the cells themselves may have ways of concealing their antigens from the lymphocyte sentinels. At Atlanta's Emory University, Dr. Loren Humphrey has tried immunizing pairs of terminal cancer patients by inoculating them with fragmented tissue from tumors similar to their own. After eight weeks, the patients are given injections of each other's lymphocytes, which presumably have been sensitized to the tumor antigens. Although the effectiveness of such treatment is far from proven, Humphrey notes that one patient with bowel cancer has remained free of disease for three years, and a number of other patients he has treated have shown definite reduction in the size of their tumors.

A more direct method of arousing the immune response against tumors is being worked out in animals by Drs. Fritz Bach and Richard Hong of the University of Wisconsin. They inoculate an animal with dinitrochlorobenzene (DNCB), a chemical that sensitizes lymphocytes so that the animal will respond with a strong allergic reaction the next time it receives the drug. Then they chemically link DNCB to an antibody prepared in another animal to the tissue of a certain organ. The DNCB-antibody compound, injected into the sensitized animal, would hopefully target on that organ and destroy it. The same technique, they hope, may work in cancer.

Killer: While immunologists may have far to go in providing an effective way actually to treat cancer, at least one immunological technique seems close to providing an excellent way of diagnosing one form of the disease. At Montreal's McGill University, Dr. Phil Gold has found a specific antigen in tumors of the bowel, one of the leading killers, that can be detected in the blood. Tried in 1,500 patients so far, the blood test has proved 95 per cent reliable in detecting cancer of the colon and rectum—in many



Los Alamos proton accelerator: For cancer cells, an atomic bomb

"that what we're finding is central information about the nature of the cancer cell."

Temin himself has serious doubts about the quick applicability of his finding to the treatment of cancer. Even if the same enzyme exists in the cancer cell as in the virus, he notes, it may not be essential to the growth of the cancer once it has accomplished its job in DNA synthesis. A drug to counteract the enzyme might therefore be of little use. "It would require fantastic luck for a useful therapy to come immediately," he says, "and people shouldn't count on it. What is important is that this gives us entirely new tools to look at human cancer and ask questions about causation."

Sense: For his part, Temin wouldn't be surprised if the polymerase is proven to exist in normal tissues. In fact, he welcomes the notion because his "provirus" theory envisions a role for his enzyme in normal development. According

one-shot, "magic bullet" type of cure for cancer. The main reasoning behind this view is simply that cancer is not a single, specific malady, but rather a group of nearly 200 different diseases, each with its own particular characteristics. Dr. H. Marvin Pollard of the University of Michigan puts it this way: "Cancers originate for different reasons, develop for different reasons, and their treatment involves totally different approaches." But even though skin cancer, for instance, may be as different from lung cancer as a hangnail is from athlete's foot, all cancers nonetheless do have one deadly common denominator: all are normal cells that have lost their growth controls. The most common result of this runaway growth is a tumor that invades normal tissues, saps nutrients from the patient's blood to nourish itself, and emits more cancer cells into the bloodstream and lymphatic channels to establish further malignancy throughout the body.

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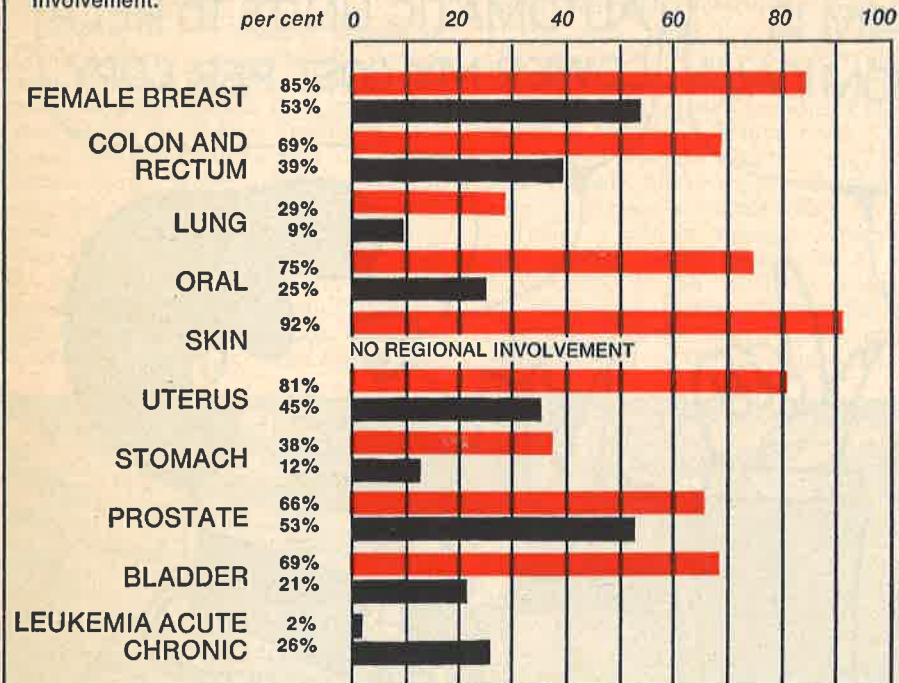
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FIVE-YEAR CANCER-SURVIVAL RATES FOR SELECTED SITES*

Many patients alive five years after major therapy are classified as cured. This chart shows rates of survival after ■ localized cancer and ■ cancer with regional involvement.



SOURCE: End Results Group, National Cancer Institute

*Adjusted For Normal Life Expectancy

Robert Kitter

cases long before it is visible by X-rays. Currently, half a dozen institutions are studying the test in the hope that it could become as effective a mass screening test as the famous Pap smear that has made possible the sharp reduction in deaths from cancer of the cervix.

While the promising new tools of treatment and diagnosis are being forged in the laboratory, the foot soldier's war against cancer is being waged by the surgeon, the radiotherapist and the physician with his drugs. The surgeon can rightly claim credit for most of today's cures, since a large proportion of cancer patients end up in the operating room. Obviously, the extent of a surgeon's success depends on the ability to excise all the cancer. Thanks to better knowledge of physiology and advances in anesthesia, he can now perform more radical surgery than ever before. Moreover, new techniques in plastic surgery can remedy much of the gross disfigurement that radical procedures may entail.

Future: At the same time, surgeons are doing their best to spare patients from disfigurement whenever possible. Many now question whether radical mastectomy—removal of the breast, underlying muscle and the lymph nodes of the arm and chest—is really necessary to maintain the present cure rate for cancer of the breast: in the near future, NCI plans to launch a study involving some 1,000 patients to find out whether simple removal of the breast, perhaps augmented by X-ray treatment of the lymph

nodes, will not do the job just as well.

On balance, the major reason for surgical failures is the spread of the cancer elsewhere. To try to prevent tumor cells in the blood stream from establishing colonies in other parts of the body, the NCI's Dr. Alfred S. Ketcham is giving patients anticoagulants. The rationale for this has come from animal studies suggesting that tumor cells in the blood get stuck to the walls of blood vessels and form clusters that become tumor growths. "By anticoagulating," says Ketcham, "we hope to decrease cell adhesiveness."

In radiotherapy, cure rates have improved steadily through the development of more powerful hardware. The 200,000- to 250,000-kilovolt X-ray machines of the 1950s have given way to 1.3 million-volt cobalt bombs and 4 million- to 8 million-volt linear accelerators (LINAC). Such devices hit tumors with a high intensity X-ray and gamma ray energy with a minimum of "scatter" radiation to normal tissues. Says Dr. Ralph E. Johnson of NCI: "As a result of this escalation in power, some 90 per cent of early cancers of the larynx can be cured by radiation, sparing the patient from disfiguring surgery and the loss of his voice."

Most dramatic has been the improvement for patients with Hodgkin's disease. At Stanford Medical Center, patients afflicted with this form of cancer receive high-intensity radiation to every node, notes Dr. Henry Kaplan. Over the past decade, 50 to 60 per cent of patients with advanced Hodgkin's dis-

ease have become long-term survivors.

To hit tumors with even higher doses, Kaplan and other radiotherapists hope to replace the X-ray with a new subatomic particle, the pi meson. A \$64 million proton accelerator that will generate these particles is under development by the Atomic Energy Commission at the Los Alamos Meson Physics Facility. The pi meson is a negatively charged particle whose beams can be "focused" by means of magnets and brought to bear at any depth of the body. As it travels, it emits low-intensity X-rays that can be read by the radiologist, enabling him to guide the beam to the target. On its way through the body, the meson is harmless. But when it enters the target cell it collides with atoms of oxygen, carbon or nitrogen and produces a minuscule atomic explosion within the cell.

Chemotherapy, an experimental frontier just a few years ago, has also come into its own. Some 30 drugs are now available which, used alone or in combination with surgery and radiation, can shrink tumors. Formerly, acute leukemia, the most common cancer in children, was uniformly fatal within weeks or months. Now, nine out of ten children with the disease go into remission after drug therapy, half are alive and well after five years and a few have been pronounced cured. One reason for the improvement is that doctors have learned to administer drugs in combination or in sequence, thus preventing the cancer from developing a resistance to any one drug, a common cause of failure a decade ago.

Hopeful: Equally effective drugs against solid tumors such as breast cancers have yet to be developed. Most of the presently available drugs interfere with the synthesis of DNA, which means that they exert their killing effect only during cell division. They are therefore least effective against cancers in which relatively small numbers of cells are dividing at any one time. Now, researchers are screening some 15,000 compounds a year for drugs that will act on cells at a different stage of the life cycle. Ideally, they would like to find a drug that would arrest abnormal cell division altogether, stopping the cancer in its tracks.

Taken all in all, the advances made in cancer research and therapy in the past few years add up to the most hopeful view of the future that has ever been possible. What now remains to be seen is how quickly the latest breakthroughs may lead to yet more dramatic and productive ones so that, as some cautious physicians and researchers envision, the war against cancer may be won by the end of the century. NCI's Frank Rauscher sums up his own feelings this way: "I think the prospects for even greater strides into prevention are so great that our target of reducing the incidence of mortality by one third by the year 1980 is very real. I think that with additional information, the target of a two-thirds reduction by the year 2000 is also a very real one."

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THE CITIES

The Mayors' Complaint

For the better part of a decade, the nation's mayors have engaged in a constant and sometimes bitter battle with Washington over the politically sensitive issue of how much Federal money should go to the hard-pressed cities. Last week when the U.S. Conference of Mayors met in San Francisco, it renewed the fight with a vengeance. Not only did President Nixon's 1972 budget come under severe criticism as shortchanging the cities all across the board, but the mayors saw fit to challenge Mr. Nixon's much vaunted revenue-sharing plan as well. Far from offering the plan the mild endorsement expected by the White House, the mayors charged the proposal would end up giving the cities less than they got before and petitioned the President for a special meeting at which to air their gripes. "In the past few weeks," said New York's Mayor John V. Lindsay, "we have heard hopeful statements from Washington promising major new assistance for local governments. But behind the rhetoric, there is a consistent pattern of cutbacks and reductions of urban programs and a lower priority for funds for cities in the budget."

For its part, the White House made no immediate reply. But hardly was the mayors' statement sent over the press wires when the U.S. Department of Housing and Urban Development called a news conference of its own back in New York. Charging that New York City had failed to find adequate housing for some 5,000 slum tenants who must be moved out of buildings slated to be torn down for Federal urban-renewal projects, HUD announced it would freeze \$25 million in slum-clearance money until the city began doing something about it.

Poor: To some New York officials, such precipitous action smacked suspiciously of retaliation by the White House for the Lindsay-led mayors' statements in San Francisco. To others, however, the notion of such a conspiracy against the cities seemed somewhat farfetched. For one thing, the Federal government is already mightily irritated over the huge bureaucracy existing in New York and the way Federal money seems to disappear there with little tangible result. For another, even New York housing officials admit confidentially that many slum tenants simply cannot be relocated into housing that is any better than what they had before, and that the city's housing crisis is such that the poor become victims of what is now a vicious circle: the old housing cannot be knocked down until new housing is built, yet the new housing cannot be built until the old housing is knocked down.

New York's special problems with HUD, however, had little to do with the mayors' criticism in San Francisco of Mr. Nixon's revenue-sharing scheme. Thus

they like part of the plan—a \$5 billion proposal to help cities take care of the cost of such things as police, fire and sanitation services. But they dislike the second part, dubbed "special revenue sharing" by the White House. This would replace most existing urban programs such as the model cities and job training plans with across-the-board community-development grants. And here, the mayors fear not only that the money available will not be enough to replace that spent on the old programs, but that it will be funneled through the states, thus preventing the cities from getting their fair share. "Most mayors of big cities," said San Francisco's Mayor Joseph L. Alioto, "are not only capable of setting priorities for their cities but more capable than anyone else."

Where the Blacks Are

It has long been almost an article of faith among Negroes that the white suburbs act as a tight barricade to keep them penned up inside city slums. Last week, however, the U.S. Census Bureau released statistics suggesting that blacks now are moving into the suburbs even faster than whites. Since 1960, some 750,000 blacks have moved to the suburbs, increasing their number by about 42 per cent. And in some areas, the flow has been even greater. Suburbs around Cleveland, Ohio, for instance, have seen their black population increase by 460 per cent—from a mere 8,000 in 1960 to 45,000 last year.

Despite their apparently successful escape, however, many of the new migrants are often little better off than be-

fore. For one thing, many Negroes now counted as "suburbanites" actually live in badly rundown sections and are merely slum dwellers listed under a new name. For another, some of the migrants live in extensions of the same slums as before—slums whose boundaries have now pushed out beyond city limits. And despite their increase, the new black suburbanites are dwarfed in number by the 12.5 million whites who moved to the suburbs during the same period. As a result, the black share of the suburban population is only 4.5 per cent, little changed from a decade before.

Gainers: The flight of blacks to the suburbs is also dwarfed by the flight of other blacks from rural areas to the cities. Since 1960, for instance, 2.5 million whites fled the cities while blacks arrivals increased the Negro total there by 3.4 million, thus raising the black percentage of the population from 17.7 to 23.3. In some cities, the black growth was meteoric. Detroit's Negro population increased by 177,000, or 37 per cent, while the number of whites decreased by 29 per cent, or 345,000. Thus, 44 per cent of the city's population is black.

For many blacks, however, the flight from rural areas in the South to overcrowded cities in the North produced distinct financial benefits. The biggest gainers over the decade were young black families in the North and West, headed by a husband and wife; those 35 years old and younger averaged incomes of \$8,870, or 91 per cent of comparable white families; black families under 24 achieved virtual parity with whites. Not surprisingly, the case was hardly so bright for the 1.5 million black families headed by women where 53 per cent ended up with incomes below the poverty line of \$3,745.

LIGHTS OUT, AGAIN

In the living room of Charles Luce, chairman of New York's Consolidated Edison Co., the television set showing "Journey to the Center of the Earth" suddenly frizzed up and went blank. Down on Broadway, the first-run movie showing of "Love Story" died on the screen and the theater fell into darkness. In Times Square the lights sputtered and went out. And in Grand Central Terminal, bewildered travelers stumbled around in the blackness in a real-life game of blind man's buff.

For New Yorkers, it was blackout time again. This one, however, lasted four hours and darkened Midtown Manhattan—including the city's TV transmitters. And because it occurred on Sunday night with few suburbanites left in town, it resulted in only moderate inconvenience on stalled trains. The cause: overloaded transmission lines that automatically knocked out a main generator, preventing major damage to the entire system.



Blackout victim: What, no TV?



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THEATER

Morality Play

Robert Brustein's new book, "Revolution as Theatre," is devoted entirely to examining, not plays or playwrights or actors, but the various new forms of radical political activity which have an essentially theatrical force and structure. Brustein, as a drama critic and a liberal, is dubious about the effectiveness of such activity either as politics or theater. The question is difficult and important, and nowhere more so than in the activities of the remarkable brotherhood of radical Catholics whose most dramatic figures are the Berrigan brothers.

THE TRIAL OF THE CATONSVILLE NINE, by Father Daniel Berrigan, is thus a play about a play—the original play being the destruction, by means of homemade "napalm," of 378 draft files at Catonsville, Md., by Daniel and Philip Berrigan and seven other Catholic priests and laymen, and the subsequent trial at which all nine were found guilty of interfering with Selective Service and most were given sentences of three years. The theatrical character of such events as the Catonsville raid is underscored, as Francine Gray points out in her article on "The Ultra-Resistance," by the fact that within the movement they are called "actions," and their participants are called "actors."

Miss Gray calls such actions as Catonsville "morality plays," and certainly if there is a valid tradition of theater as moral action it is in the church. What the Berrigans did at Catonsville, therefore, is in the oldest theatrical tradition that we have. Beyond that, it is a primal form of civilized behavior, in which human beings act as creatures religious, ethical and esthetic, summoning the state with decisive but humane force to the recognition of unrighteousness in the body politic. It is this that makes the radical Catholics perhaps the most attractive and potentially effective part of the radical movement.

Passion: What, then, can be said about "The Trial of the Catonsville Nine" as a dramatic event? Can it be "bad," or "good," or something in between? Only in the most trivial sense. For example, Father Berrigan's text has been prepared for its current production in New York by Saul Levitt, author of "The Andersonville Trial," and it seems to me that it does not have the strong dramatic shape and rhythm that it might have—the witnesses and testimony of the trial proceed in an often erratic and clumsy way, and the play, which should be a crystal prism refracting the original event, is now and again like a roughly edited movie.

Then there is the acting. The hardest thing in the world to act is virtue, righteousness, the passion of righteousness, and Gordon Davidson's direction has not solved that problem, although, for example, the clear-eyed toughness of Mar-



Kane, Flanders: Face to face

jorie Melville, the former nun, is well caught by Gwen Arner. As Daniel and Philip Berrigan, Ed Flanders and Michael Kane have a hard job—especially Flanders—capturing the quality of men who are such powerful and self-aware presences in their own right.

Sacramental: In the context of this unique theatrical event, these are small points, although I must admit I wish that the power of art had been unleashed upon this material in something like the manner of Dreyer's great film about Joan of Arc. For me such plays as this in no way erase the need for what great art can do. But we do not have great art, and to redeem the time we have great spirits like the Berrigans and their friends.

The Good Shepherd-Faith Church, transformed into a courtroom, also becomes the sacramental place where all of us in our manifold citizenships play out the secret dramas of our painful responsibilities. For some people, like the Berrigans, those dramas can no longer be secret—the question of responsibility must now be fought out face to face between the citizen and the state, between the communicant and the church. Here the "actor" is the individual of goodwill, who accepts the need for commonwealths both social and spiritual, but who is convinced out of the evidence of his good senses and good faith that these commonwealths are trying to preserve their spiritless shells through bad faith and the perversion of the original covenant.

The structure of democracy is meant to allow the operation of virtue without the necessity of virtuous leaders. Something has happened to that structure, and it is the purpose of such "theater" as that of the Catonsville Nine to shock it back to life.

—JACK KROLL



Robert H. McElroy—Newsweek

Gustav, Ludwig, Rocky: 'Heavy stuff'

Newsweek, February 22, 1971

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of cut films, have cheerfully exploited a loophole in existing censorship laws which permits private showings of all films (except pornography) to adults in groups of twenty or less. As a result, enterprising film importers have built up a brisk business distributing uncensored 16-millimeter editions of U.S., British and French feature movies for home projectors (current rental fee for the full-length print of "M*A*S*H": \$100 per showing).

With the opening of a new parliamentary session in Cape Town this month, the ruling Afrikaner Nationalists moved to strengthen Jannie Kruger's hand by introducing a stiff new Entertainments Amendment Bill. If it passes, the new law would prohibit any public discussion whatever of a banned film or of any film still awaiting the censor's clearance or even of any section cut out of a film. Foreign newspapers and magazines sent into South Africa carrying reports, pictures or comments on a film not yet approved by the government censors would be subject to seizure or mutilation. Moreover, private showings of banned or excised movies would no longer be permitted, and special investigators (dubbed "the snooper corps" by parliamentary wags) would ferret out cinematic scofflaws, who then could expect a fine of \$430 and/or six months in jail on conviction.

Howls: But if Jannie Kruger thought he had gotten in the last word on the subject, he soon learned otherwise. South Africa's film buffs and English-language press reacted to the proposed law with howls of outrage. In Parliament itself, Etienne Malan, speaking for the opposition United Party, skewered the new bill as "the most vicious form of censorship since the Spanish Inquisition. This bill is akin to the burning of books in the Middle Ages—except that people then at least knew which books were being burnt." Malan further pointed out that the proposed law would amount to a kind of double censorship, since under its terms the Publications Control Board could not only ban and cut films but could also forbid public comment on its bans and cuts.

The South African Government, clearly chastened by the public uproar, retreated last week into tight-lipped silence. Somehow, the proposed new censorship bill was quietly shuffled to the bottom of the legislative hopper, perhaps for later reintroduction in a modified form. Thus, for a while longer at least, Jannie Kruger's board will have to make do with the censorship laws it already has. But never short on ingenuity, Kruger's board last week scored another first in the censorship game when it decided that "The Christine Jorgensen Story" was unfit for viewing by South African men and women seated in the same audience. The movie is now making the rounds in separate showings to segregated audiences—the early show for women, the late shows for men.



BY ZBIGNIEW BRZEZINSKI

PURPOSE AND POLICY

Senator Mansfield has indicated recently that he intends to press for major American troop withdrawals from Europe. In his view, it should be the major objective of the Democratic opposition to cut American forces in Europe by approximately one-half.

His views deserve serious attention. Senator Mansfield is a responsible statesman who commands wide respect and whose views doubtless reflect sentiments more broadly felt. Moreover, American-European relations are of the utmost importance to international stability; and an alteration in the American posture of such great magnitude presumably must be designed to accomplish major and positive goals.

THE QUESTIONS TO ASK

With American lives not at stake, four major questions come to mind in this connection: 1. Will such withdrawals reduce the financial drain on American resources? 2. Will they consolidate or improve American-European relations? 3. Will they make for more rapid progress toward East-West accommodation? 4. Will they accelerate European unification and increase Europe's constructive involvement in world affairs?

These questions are complex. Though estimates vary, it seems that the deficit involved in U.S. defense expenditures and receipts in West Europe is somewhere in the vicinity of \$3 billion. However, if that is the problem, then the response should be to keep pressing for higher European contributions; in fact, the Europeans have been considering ways of reducing the financial burden on the United States.

Answers to the next several questions have to be somewhat speculative. It is likely that a major U.S. pull-out would strengthen the European feeling that America is disengaging politically from Europe; thus it could have the effect of reducing, rather than intensifying, the intimacy of Atlantic ties. Europe would then probably turn inward and, uncertain of its security, it might begin to seek accommodation with Moscow on Moscow's terms or, alternatively, try to develop its own nuclear arms. Nei-

ther a Europe divorced from America and increasingly neutralist nor one that strives to become a major nuclear power would be likely to enhance international stability.

Nor are better East-West relations likely to be the outcome of such major American withdrawals. Such withdrawals will reduce the chances of reaching eventual agreement about reciprocal East-West troop reductions and other mutual security arrangements. I have long favored more initiative along these lines by Washington, but I do not see why the Soviet Union should reduce its forces in Central Europe, if the American forces will be leaving anyhow.

THE PROBLEM OF STABILITY

A major premise of the Mansfield proposal is that Europe is stable and secure. But this is hardly so. Recent events in Poland indicate persisting, and potentially explosive, instability in Central Europe. Though American forces are not likely to intervene across the Elbe, their very presence does compel the Soviet leaders to calculate their own moves somewhat more carefully.

Europe, moreover, is part of a larger international complex. During the Jordanian crisis of September 1970 it was the U.S. forces in Europe that were poised to strike if the situation became desperate. According to reports I trust, even these forces were hard-pressed to provide the necessary manpower for the action designed to prevent a new Middle Eastern war. With the Middle East likely to remain a volcano, a reduction in the American presence in Europe will directly affect the American capability to offset the power of the Soviet Union in the Mediterranean.

After his recent conversations both with Mr. Brandt and with Mr. Kosygin, Senator Muskie indicated that he now harbors some reservations about massive U.S. withdrawals from Europe. There is, of course, nothing sacrosanct about present levels, but a major, truly qualitative change, such as proposed by Senator Mansfield, should be designed to accomplish something very constructive. It is hard to see what that might be.

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EDUCATION



Image and reality: Campus riots notwithstanding, most college students cling to the Protestant ethic

The U.S. Campus Mood, '71: A Newsweek Poll

Last spring, as U.S. troops fought in Cambodia and the home front reeled under the assaults of inflation, recession and a soaring crime rate, the Gallup poll asked a representative sampling of Americans to name their country's biggest problem. Surprisingly, the trouble most often cited was unrest on college campuses. As many adults see it, today's college students have become a breed apart—and one whose behavior is both unfathomable and menacing. To measure just how different the younger generation really is, NEWSWEEK recently commissioned The Gallup Organization to find out exactly what today's college students are thinking. The results—obtained from 1,061 interviews on 61 campuses across the country—contained an even bigger surprise than the earlier poll of the general population. For despite the far-out image that young people project in newspaper headlines and television news clips, it turns out that, by their own testimony, most of them are not so different from their elders after all.

For one thing, the vast majority of college students appears to be firmly wedded to the traditional American values; student criticisms of society might easily have issued from older mouths. Fully seven out of ten students believe that there is too little emphasis today on family life. Six out of ten perceive a need for stronger national leaders, and half of the students interviewed feel that society pays too little attention to the individual's economic security. This pattern, the poll found, varies little by class year, major field of study, type of school attended or father's occupation.

Similarly, in an era when students are

said to be "turning off" society and searching for self-fulfillment through drugs or communal living, the overwhelming majority of the college population still endorses the Puritan ethic as the best route to the good life. Asked whether "hard work and effort are necessary for you to achieve personal fulfillment and satisfaction," a stunning 85 per cent answered "yes."

Martyrs: In their choice of personal heroes, students verge on Establishmentarianism. Asked to name the public figure of the last decade they most admired—whether artist, politician or philosopher—only a barely countable handful of the students polled mentioned pop idols or such revolutionaries as Che Guevara. Instead, the man who topped the most admired list was John F. Kennedy, with 34 per cent, and second was the murdered apostle of nonviolence, Martin Luther King (18 per cent)—both of whom are heroes to many members of the older generation. The most admired living per-

son was President Nixon (9 per cent), who was listed fourth, after the late Robert Kennedy.

Student taste in reading matter also turns out to be quite different from what might have been expected. "Hemingway is out, gone, forgotten," Pulitzer Prize-winning author Robert Penn Warren, who teaches at Yale, told The New York Times recently. "So is J.D. Salinger, whose name I don't hear mentioned from one end of the year to the other." But Warren's impressions appear to reflect only contact with a select group of Ivy Leaguers. Asked by the NEWSWEEK Poll which of a group of well-known authors they respected the most, a preponderant 63 per cent of the students selected Ernest Hemingway, along with such familiar names from college reading lists as George Orwell, who ranked second (41 per cent), and Salinger, third (34 per cent). But Kurt Vonnegut Jr., one of the most imaginative of contemporary writers and a man widely held to be

Priorities of Youth: The Homely Virtues

The Question: In your opinion, is there too much or too little emphasis in the United States these days upon:

	Too Much	Too Little	About Right
Family Life	11.7%	69.7%	14.8%
Strong Leaders	21.7%	61.0%	13.2%
Economic Security	29.9%	49.6%	16.0%
Science and Technology	41.8%	26.6%	28.6%
Individual Freedom	25.7%	50.7%	21.0%

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