More than 2500 men and women received undergraduate and graduate degrees at Washington University's 1974 commencement ceremonies. (The young gentleman in the middle is not included in the total count; he just came along for the ride.)
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**Cover:** Pencil sketch of a carved stone head of a lion on Cupples Hall by alumnus Roscoe Misselhorn. See "Roscoe Misselhorn's Pencil Sketches of Washington University," page 6.

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Higher education is based on the collaboration between teacher and student in the pursuit of knowledge. A time-proven method of attracting and keeping outstanding teachers and scholars is the named professorial chair. Today there are some forty named professorships at Washington University. Many more are needed if the institution is to continue its commitment to academic excellence.

The ideal university has been defined as “Mark Hopkins on one end of a log and a student on the other.” That is an ideal that sadly can’t be realized in this world. There is certainly no shortage of students these days, but finding a Mark Hopkins for each student, to say nothing of supplying all those logs, would be a bit difficult.

Yet, the ideal sums up what is really the essence of higher education: the dialogue, the interplay, the two-way communication between teacher and student. The real purpose of Washington University, like other institutions of higher learning, is the expanding and the expounding of knowledge. Universities are the repositories of man’s accumulated knowledge. It is their function and duty to cherish that knowledge, to add to that heritage, and to pass on that treasure to future generations. It is the university’s function, through the efforts of its faculty and students, to expand man’s knowledge, and hopefully to help sharpen his perceptions, hone his skills, and deepen his wisdom.

Washington University is currently in the midst of a $120 million, five-year development program. Under the terms of a $60 million challenge grant offered to the University in March, 1973, the Danforth Foundation will match, dollar for dollar, up to $60 million, all gifts from private sources received within a five-year period.

Endowment for faculty salaries and professorial chairs is among the very highest priorities of the entire challenge program. The professor, after all, is at the very heart of the educational enterprise. It is the professor who can foster the kind of stimulating intellectual environment that is essential to a first-class university; it is the professor who spearheads imaginative research programs and who can inspire his students to join him in the never-ending quest for new dimensions of knowledge; it is the professor who is charged with the task of inspiring in his students a thirst for knowledge, a respect for wisdom, and a potential for a life of learning and service.

An endowed professorship, or professorial chair, is a time-proven method of attracting and keeping outstanding faculty members. For the university, it undergirds the institution’s most important function; for the faculty member, it is one of the highest academic honors and constitutes visible and tangible proof of the university’s confidence and pride in its faculty. The history of any university, and in fact, much of its greatness, can be measured in the names of its endowed chairs and of the distinguished teachers and scholars appointed to those chairs.

Endowed professorships, however, cost money, and in
Investments In Teaching

these days of spiraling inflation, a great deal of money. Today, to endow a Distinguished Service Professorship at Washington University requires one million dollars. Such an endowment will name the professorship in honor of the donor or of someone whom the donor wishes to honor. A Distinguished Service Professorship endowment provides support for both a leading authority in some academic field and for an outstanding scholar on his research staff.

To endow a named professorship for a leading scholar-teacher and to underwrite the necessary staff assistance for his work requires $750,000 in endowment funds; $600,000 will endow a named professorship in a school or discipline.

The names of the individuals associated with such chairs become an important part of the University’s history, for the donor’s influence is perpetuated for each generation of students by the scholars who successively hold the chair. As is true of nothing else, a named professorship speaks directly to the University’s commitment to maintaining a pre-eminent faculty.

The first named professorial chair in Washington University history was established even before Eliot Seminary became Washington University. It was made possible by the gift in 1856 of a tract of property from Wayman Crow, one of the two co-founders of the University. The Wayman Crow gift established an endowment fund for the Eliot Professorship of Chemistry, to honor William Greenleaf Eliot, the other co-founder of the University.

In 1860, the Wayman Crow Professorship of Physics was created by the Board of Directors as a tribute to their vice president, the public-spirited citizen and generous benefactor who secured the original charter for the school in 1853. Since its inception in 1860, the Wayman Crow Professorship of Physics has been held by five distinguished scientists whose work has brought enlightenment to humanity and pride to Washington University. The five are: Francis E. Nipher, Nobel Laureate Arthur Holly Compton, Arthur L. Hughes, Edward U. Condon, and Eugene Feenberg.

The Eliot and Wayman Crow Professorships were the first in a long line of named chairs. Wayman Crow’s original gift, transformed into an endowment fund that is now well over a century old, is still working for the benefit of today’s teacher-scholars and their students. Since Wayman Crow’s day, many generous individuals have endowed named chairs at Washington University. The continuation of that tradition is essential to the University’s future growth and, in fact, to its continued existence as a center of academic excellence.

The first endowed chairs in chemistry and physics were
Dr. Walter Ballinger is the present occupant of the William Keeney Bixby Professorship of Surgery, established at the School of Medicine in 1910. Followed by the endowment of two professorships at the School of Medicine: the Adolphus Busch Professorship of Medicine and the William Keeney Bixby Professorship of Surgery. At present, the total number of named professorships is more than forty.

Through the years, endowed professorships have enabled Washington University to appoint teachers and scholars of a quality that would have been far beyond reach without such generosity. Present incumbents of named chairs are leaders in a wide variety of fields. To name just a few, Murray L. Weidenbaum, Edward Mallinckrodt Distinguished University Professor, is a world-renowned economist and a former assistant secretary of the U.S. Treasury; Isidore Silver, Rosa May Distinguished University Professor, is among the world’s leading authorities on French renaissance literature; Robert M. Walker, James S. McDonnell Professor of Physics, is a leader in the study of lunar rocks and a pioneer in the application of nuclear fission track studies to both space science and archaeology.

There are many other faculty members equally distinguished. Dr. Walter Ballinger, internationally known surgeon, holds the Bixby Chair of Surgery, and Dr. David M. Kipnis is the Busch Professor of Medicine, a truly prestigious position to which he was named after the death of Dr. Carl A. Moore.

Among more recent named professorships, Lucius Barker, a political scientist of national stature, holds the Edna Fischel Gellhorn Professorship of Public Affairs. Russell R. Pfeiffer, who has developed one of the country’s foremost graduate programs in biomedical engineering, is the Samuel S. Sachs Professor of Electrical Engineering.

It takes great scholars to attract other great scholars. The University’s outstanding Department of Chemistry, for instance, is based on the noted scientists that Arthur Holly Compton, when he was Chancellor, brought to the University from the Los Alamos chemistry group of the wartime atomic bomb project. Among those outstanding scientists who came to Washington University from Los Alamos is Arthur C. Wahl, co-discoverer of the element plutonium and now the Henry V. Farr Professor of Radiochemistry.

If the University is to continue to fulfill its educational mission, it must establish additional named professorships for the best teachers and scholars of the day. There is a critical need to insure that the quality of teaching, research, and scholarship will not be diminished in this period of financial stringency.
Investments in Teaching

Below, left: Eugene Feenberg, Wayman Crow Professor of Physics; right: Isidore Silver, Rosa May Distinguished University Professor.
Misselhorn's Pencil Sketches of Washington University

Roscoe Misselhorn left Washington University in 1928 after two and a half years as an art student. He returned to the campus this spring to do the series of pencil sketches of University scenes reproduced in part here. They were the most recent works in the Misselhorn portfolio of pencil sketches numbering in the thousands, covering a good part of the country and spanning nearly a half-century.

When Roscoe Misselhorn came to Washington University he was twenty-six years old, married, and had been out of high school for eight years. He had spent those eight years working in a clothing store in his native town of Sparta, Illinois. But he did more than sell clothing during that period. Fascinated with drawing from his earliest childhood, he had begun to do political cartoons for the Sparta newspaper and soon attracted the attention of the Meyer-Both Company of Chicago, a firm which furnished syndicated material to 3,000 newspapers throughout the country. Meyer-Both hired the young clothing store clerk to do a weekly political cartoon for national syndication. For eight years, Misselhorn produced a cartoon a week for the magnificent sum of $5 per cartoon.

"I thought up my own ideas for the cartoons," Misselhorn recalls, "and the only restrictions were that they couldn't be Democrat or Republican or Wet or Dry."

When Misselhorn arrived on campus, the art school was still housed in the old British Pavilion building from the St. Louis World's Fair. The School then was as loosely structured as the rickety building in which the life class models shivered in the countless drafts. While not too much attention was paid then to curricula, grades, or credits, the School offered an extremely talented and inspiring faculty. Misselhorn particularly remembers the challenge and inspiration of working under Fred Carpenter, Delos Nicholson, and Ethel Grosskop. In his class were other aspiring artists who went on to fame, among them Fred Conway, Tanasko Milovich, and Al Parker. Misselhorn and Parker, who later won recognition as the dean of American magazine illustrators, collaborated on the art and illustration for the 1928 Hatchet yearbook.

After that 1928 year, Misselhorn left the School to work with several St. Louis advertising agencies. In 1932, he went back to his native Sparta, where he and his wife did "chalk-talks" at various schools and civic gatherings throughout southern Illinois, and opened a sign company and commercial studio in their home. During the years in the sign business, Misselhorn kept sketching and began to turn more and more to the pencil sketches that were to bring him national recognition.

His work began to appear regularly in the Greyhound Bus Company's national magazine, Highway Traveler, and shortly after he began to do water color illustrations for Ford Times magazine. Sometimes he worked on commission, but usually he sketched on vacation trips.

As the sketches began to accumulate, different organizations and communities began to request copies. The demand grew until the Misselhorn stationery enterprise business began to overshadow the sign-painting business. Boxes of note pads, each bearing sketches of St. Louis, Ste. Genevieve, New Orleans, Biloxi, Gloucester, and other areas, were produced by the thousands. Soon boxes of note cards and portfolios of sketches were being produced for the St. Louis Art Museum, the Missouri Botanical Garden, and many other museums, restaurants, and tourist attractions in various parts of the country.

While the pencil sketch has become Misselhorn's hallmark, his work in other
Roscoe Misselhorn

media has also won acclaim. His wood engraving, "Ohio River Fishboat," has been exhibited in the Brooklyn Museum, the Library of Congress, Carnegie Institute, and the City Art Museum; his paintings were part of the Ford Times Collection of American Art traveling exhibit, and he has painted several large murals. Examples of his mural work can be seen at the Federal Reserve Bank, the Sparta State Bank, and the Sparta Savings and Loan building.

For fifteen years, Misselhorn taught adult extension courses in art for Southern Illinois University. Until his retirement from SIU eight years ago, he taught painting, sketching, and pastel and water color, as well as his pencil-sketching specialty.

The first Misselhorn book was Sketching With Pencil, which the Bridgman Publishing Company brought out in 1949 as one of its series of art instruction publications. Last year, Misselhorn's Pencil Sketches of St. Louis was published by Harry M. Hagen's Riverside Press and sold out in three weeks. A second edition of the St. Louis book has been published, and this spring a companion volume, Misselhorn's Pencil Sketches of Missouri, was issued. A third volume of sketches, giving Misselhorn's impressions of historical landmarks throughout America, is in production.

Since the two Riverside Press books have come out, there has been what amounts to a Misselhorn revival. As part of the fanfare surrounding the publication of his new books, Misselhorn has been caught up in a round of autograph parties, press conferences, interviews, and television appearances, but it hasn't interfered with his productivity with a pencil. In the trunk of his car he carries always a sketch pad, an assortment of pencils, a portable artist's stool, and a beach umbrella, so that whenever or wherever he sees something that catches his fancy, he can begin sketching on the spot.

The sketches reproduced here are typical of Roscoe Misselhorn's work: detailed without being attempts at photographic reproduction, they are warm and informal essays in pencil that somehow seem to capture the special flavor of the subject.
McDonnell Medical Sciences Building
In planning radiation treatment, Dr. William E. Powers, professor of radiology, studies an X-ray film of a pelvis and a radioactive implant. Near his left hand is a specially designed lead blocking device which will modify radiation to sensitive tissues.
More than 1260 patients with newly discovered cancers are treated each year in the Radiation Oncology Research and Treatment Center of Washington University's Mallinckrodt Institute of Radiology. Highly varied treatment is required because cancer is a complex group of more than one hundred diseases. Effective treatment, utilizing new high-energy radiation machines and sophisticated diagnostic techniques, is provided by some seventy physicians, technicians, physicists, nurses, and administrative aides who staff the center. The center also includes an active and distinguished administrative aides who staff the center. The center also includes an active and distinguished research group which has made significant contributions to improved treatment. This brief article cannot begin to cover the complexity of personnel and equipment at the center. The article focuses on the treatment of one patient and what the skillful application of newly developed technology meant to her.

At first glance, complex radiation machines dominate the Radiation Oncology Research and Treatment Center. Located on the ground floor of the University's Mallinckrodt Institute of Radiology, the center employs several impressive devices to treat tumors. These include: a cobalt machine, a betatron, a new thirty-five million electron volt accelerator (35 Mev for short), and a computer system which is used to chart intricate radiation dosage patterns. It is also impressive for a visitor to learn that members of the Medical School faculty designed the special computer and helped to develop the 35 Mev accelerator, one of the most advanced radiation treatment machines in existence. Funds to build the accelerator were recently donated to the University by the Fred Maytag Family Foundation of Newton, Iowa.

Dr. William E. Powers, head of the Radiation Oncology Center (oncology is the study and treatment of tumors), served on the national Committee for Radiation Therapy Studies which designed the 35 Mev machine. The committee was asked by the National Cancer Institute to design the "ideal" accelerator, one which would produce the most effective unit of radiation dosage for a variety of tumors. The scientists did their job and contracted Varian Associates, Palo Alto, to build the machine. After six years of study, design, and construction, the first 35 Mev machine was installed at the Mallinckrodt Institute last fall. It is now being used in treatment, and preliminary data show that it is meeting the expectations of the committee in a number of tumor-treatment areas.

However—and this is an important however—it is the patient and the therapist who dominate Dr. Powers' discussion of treatment. To put machines in perspective, Dr. Powers pointed out, "Radiation therapy is the practice of medicine, making use of the capabilities of technology. We have a wide variety of devices to use in treating patients. But when looking at a machine, one should keep in mind that treatment does not begin and end with a piece of equipment. A machine is valuable only if it is used skillfully and in the proper context. Keep in mind that there is much teamwork involved. There are therapists, internists, surgeons, physicists, technicians, pathologists, and nurses, all of whom are important to the patient."

It is also critical to the patient, he continued, for a continuing and coordinated effort by therapists and their colleagues in research to gain better understandings of the complex processes of various cancers. For example, it is crucial in radiation therapy to be able to anticipate what pathways a particular tumor will follow in spreading to adjacent, apparently unaffected tissue.

"It is true that new machines, such as the accelerator, are helping radiologists to cure a modest but significant number of additional patients. But the point that tends to be left out of articles like this is that while new machines were being developed, many people were gaining a better understanding of cancer and therefore were in a much better position to put such machines to more effective use in destroying malignancies." Dr. Powers said.

To give an idea of how radiation treatment involves many individuals, not just machines and a few technicians, Dr. Powers described a patient who represents a sizeable fraction of the kind of cancer treatment given the division's practice—about 10 per cent. At the time the patient was referred to Dr. Powers' group, she was forty-seven years of age and the mother of three teenage children. For purposes of this article, the
Dr. Powers calculates radiation dose distribution to a patient, using a small computer, designed by the University's Biomedical Computer Laboratory specifically for the radiation oncology program.

Patient will be called Myra Williams and only her broad medical history will be given.

Although Mrs. Williams had been in good health and had been feeling well, she reported to her gynecologist that she was alarmed about an episode of unexpected vaginal bleeding. After examining Mrs. Williams, the gynecologist diagnosed the cause of the bleeding as cervical cancer; in her case, a tumor about one inch in diameter. Except for her potentially lethal tumor, she was indeed in good physical condition. Aside from the bleeding, she had had no other symptoms; no pain, for example. If Mrs. Williams had had Pap (Papanicolaou smears) tests every year the tumor might have been detected at an earlier stage, thus requiring less radical treatment.

"With a tumor one inch in diameter we know that there is a very high probability of spread of cancer cells outside the cervix into the lymph nodes of nearby tissue," Dr. Powers pointed out.

The Patient was referred to the MallickMed Institute of Radiology by her gynecologist, who recommended radiation treatment. On her first visit, she brought her medical files and diagnostic films and test results, which enabled the Oncology Center to verify the diagnosis and plan her treatment during an intensive two- to three-hour examination. It was agreed that the best treatment for Mrs. Williams would be the standard procedure for the nature and size of her tumor: both external and internal radiation. After studying an atlas of radiation beam characteristics plotted on the previously mentioned computer (designed by the Medical School's Biomedical Computer Laboratory), Dr. Powers and his associates selected the best radiation dosage beam or field for Mrs. Williams' tumor. It turned out that the optimal radiation characteristics for Mrs. Williams could be obtained with the 35 Mev accelerator.

"In other words, with the help of the computer, we can calculate very precisely what the distribution of the radiation field for various energies will be. Then we have to make sure that the known distribution will work, because each patient has his or her own special problem—such as extent of the tumor or anatomical variation," Dr. Powers said.

To fit the radiation fields specially to Mrs. Williams, she was examined in the simulator room, which uses conventional X-ray equipment and a special fluoroscope. The equipment permits simulation of the various therapy units for different positions of the patient. This frees the 35 Mev accelerator to treat other patients during the relatively time-consuming task of localizing the therapy fields to the patient. Dr. Powers emphasized that in devising a radiation plan, "You have to treat not only the visible tumor but also the non-apparent extension of it, which we can anticipate on the basis of considerable clinical evidence. The problem in treating any tumor is that probably only one or two cells can cause a recurrence of the cancer. An ounce of tumor, similar in size to Mrs. Williams' cervical growth, has thirty billion cells. So we have to anticipate microscopic extensions. If we fail to account accurately for this margin, our chances for a cure are lessened."

The field characteristics for Mrs. Williams checked out and she was scheduled for a six-week course of radiation. First, she received radiation doses five times weekly for two weeks from the 35 Mev accelerator. This radiation was in the form of photons, units of energy which make up X-rays and all electromagnetic "waves." Having no mass, photons penetrate the body easily, but their primary energy can be focused on the tumor. Energy or radiation delivered by the accelerator to skin and bones is minimal.

The photons irradiated the cervical tumor, the normal tissue in which the tumor was growing, and the adjacent tissue where spread of malignant cells was likely. With a much lesser intensity, the photons irradiated nearby and sensitive organs, such as the bladder. Because of the high intensity and definition of the 35 Mev beam, it was possible to use brief, one-minute daily doses of radiation to Mrs. Williams and still produce significant damage to malignant cells. With the old 250,000 volt X-ray machines used for tumor treatment until the late 1950's, exposures as long as fifteen minutes were required. As a result of the low-energy X-rays (the same as photons), severe skin and bone damage occurred more frequently than now. By 1960, the X-ray treatment machines were supplanted with cobalt machines, the first generation of higher energy units which substantially reduced skin and bone damage.

With daily fractions of short-term, high-intensity radiation, Dr. Powers explained, "It appears that the tumor will grow less rapidly than the irradiated normal tissue. So the net effect is considerable destruction of the tumor cells and minimal damage to normal tissue." By spacing out the intervals of radiation, the patient's normal tissues are given the time they require to recover and to repopulate normal cells.

At the two-week point in her treatment, Mrs. Williams was hospitalized in order for the radiation therapists, working with her gynecologist, to insert an applicator containing radioactive sources into her uterus and vagina. These implants contain radioactive material which give off photons. They deliver a high dose locally with a rapid decrease in radiation proportional to the distance from the implant. Thus, the high radia-
tion dose was restricted almost entirely to the immediate area of the cervix and uterus. A relatively small increase in the amount of radiation dose delivered by the implant could cause serious damage to the bladder or rectum; therefore, radiation characteristics of the implant treatment also are carefully charted with the help of the computer. If this tumor had been significantly smaller, it might have been possible for the implant alone to destroy it. With the moderately advanced tumor, however, it was necessary to use the implant along with treatment from the 35 Mev accelerator in order to cover the probable margin of spreading.

While the implant radiation took place, Mrs. Williams was hospitalized for two days. After her hospitalization, she resumed the daily treatments with the 35 Mev accelerator. Now, another adjustment in the beam pattern had to be made. Because it was necessary to give Mrs. Williams a very high radiation dose with the implant in the immediate tumor area, it was now critical to make sure that the accelerator did not exceed her tolerance for radiation in normal tissue near the tumor. To do this, Dr. Powers used the simulator again to design and position a specially contoured lead block, which, when placed in the accelerator's photon beam, would modify the radiation pattern. This reduced the dose to the tumor area and to sensitive organs such as the bladder, while giving a high dose to other pelvic tissues. This technique, now widely used, was originated by the Radiation Oncology group. "It can be shown with convincing clinical data," Dr. Powers said, "that a 10 per cent deviation from the optimal dosage would be critical. If you go 10 per cent under the required dose on the tumor area, you
Dr. Carlos A. Perez and technician Jackie Horner check positioning of the new thirty-five million electron volt accelerator. The accelerator, funds for which were donated by the Fred Maytag Family Foundation, may be placed at various angles to the patient. It is one of the nation's most advanced radiation treatment devices.
will have a high number of treatment failures. If you go 10 per cent over the desired dose, you may have excessive damage to normal tissue and therefore serious complications. Either situation is intolerable."

Following two more weeks of radiation treatment, Mrs. Williams was hospitalized once again for two days for a second implant treatment, which was succeeded by a third and final two-week period of daily short irradiations at the accelerator. During this time, she had no serious complications; but the minor side effects were decidedly unpleasant. She experienced loss of appetite, diarrhea, and periods of weakness. The physicians and nurses in the Oncology Center were of special help to her in managing these symptoms. Even though the symptoms abated two weeks after her final treatment, they were real and frightening to her during the treatment. Dr. Powers also pointed out that problems arose concerning her insurance policies related to the considerable treatment expense. This problem was resolved by an insurance expert employed by the division, who worked the matter out with Mr. and Mrs. Williams.

"Do you see why it's a mistake to concentrate on machines alone?" Dr. Powers asked. "Those six weeks were a pretty rough thing and the patient needed all the medical and psychological support we could provide."

Several months after Mrs. Williams' final treatment, her tumor appears to have been arrested. If no further evidence of recurrence is apparent at the time of the first anniversary of her therapy this fall, a cure most likely will have been achieved. With five years of no evidence of cancer, Mrs. Williams' risk of developing a tumor would be the same as any one of her age in the population at large.

Fortunately for Mrs. Williams, her chances were better at the beginning of her treatment than for other categories of cancer patients. The survival rate for cervical cancer patients at the Mallinckrodt Institute of Technology is now about 75 per cent; it was 50 per cent before the advent of high-energy betatrons and accelerators. The cure rate, using combinations of therapy, can be as high as 90 per cent for certain cancers of the skin and larynx. Lower survival rates in radiation therapy generally occur where dosage must be sharply narrowed because of the risk of damage to vital structures such as the spinal cord.

Dr. Powers gave an example of a patient in whom radiation therapy was much more difficult because of the proximity of the spinal cord to the tumor. This was a sixty-seven-year-old man who had a fairly large tumor in his parotid gland, the gland which swells during a mumps infection. It was found that the tumor had spread to adjacent tissue and was inoperable. Because the tumor was close to the spinal cord, it would have been dangerous to use higher energies to produce deeply penetrating photons, which would affect the spinal cord and possibly cause paralysis. In this case, electron beams were used alternately with photons at lower energies.

Unlike photons, electrons have mass and will be absorbed in structures closer to the skin, depending on the energy used in accelerating them. In the case of the sixty-seven-year-old man, it was determined that the best radiation treatment would be a combination of irradiations with X-rays from a 4 Mev accelerator (also donated by the Fred Maytag Family Foundation) and electrons from the 35 Mev accelerator. He was given one week of treatment using electrons from the 35 Mev accelerator followed by one week of low-energy photons from the accelerator, with another week of electron irradiation.

After a week's interruption to allow side effects to clear up, the previous three-week treatment pattern was repeated. While destruction of the tumor appeared to be accomplished to a high degree, the prognosis for this patient was not as good as for Mrs. Williams. It is a 50 per cent cure rate at best. The risk of damage to the spinal cord and adjacent structures was simply too great to allow a dose that would destroy all of the tumor; also, the tumor in this case may have contained radiation-resistant cells or it may have spread beyond the usual treatment margins.

Most radiation therapy throughout the world, Dr. Powers pointed out, is done with cobalt machines which emit photons at energies equivalent to 2 Mev accelerators. The rest is done by low-energy accelerators in the 4-6 Mev range and by higher energy betatrons. The University's Oncology Center has one of each of these devices, all of which are still effective in the treatment of various tumors, despite the installation of the 35 Mev accelerator. Precisely how effective the new accelerator will be for a variety of cancers can be determined only by years of clinical use and study. Presuming a high degree of understanding of the nature of a given cancer, it seems safe to say that for certain tumors, like that of Mrs. Williams', increased cure rates can be expected. Despite the advance of radiation technology however, its best practitioners make modest claims and look to other areas of medicine and biology for breakthroughs in cancer.

"Obviously, the ultimate answer," said Dr. Powers, "is prevention or more highly specific methods of therapy than we have today. But we must use what we now have to the best of our ability. If we do, we can still save many lives."
Given a choice, most composers would probably opt for the sylvan glens of Yaddo or the rustic MacDowell Colony as a creative oasis, but Professor Robert Wykes of Washington University’s Department of Music recently composed a portion of a score while London-bound on a 747 jet. Commandeering the bulkhead seat in the tourist section, he wasted no time wishfully waiting for a capricious Muse to inspire him, but quickly whipped out a snub-nosed pencil, a sheaf of vellum paper, and a homemade plywood desk board, cut to size by his son, and went to work.

Once on the ground in Britain, Professor Wykes hastened to the old-fashioned Hyde Park Hotel and proceeded to spend the next four days holed up with a piano, feverishly completing the score for a film which had an ironclad recording deadline of Tuesday, May 7. After scoring some twenty-five films, Professor Wykes is a pro at creating music for documentaries. Nevertheless, he still finds “the pressure unpleasant, but necessary (although I hate to admit it).”

It matters not whether the subject is the St. Louis Post-Dispatch, as was Dr. Wykes’s 1965 score for A Tradition of Conscience or, as in this case, The Journey of Lyndon Johnson. The music simply cannot be written until the composer gets what is called in the trade, a shot sheet. Such a manuscript gives a detailed description of each sequence in the movie and stipulates the precise running time for the segment of music needed to accompany it. A shot sheet, unfortunately, becomes a reality only after all of the footage for the documentary has been assembled and the film put together in a semi-permanent shape.

By arranging to have room service deliver his meals and leaving his hotel only long enough each morning for a brief constitutional in what Professor Wykes recalls as “incredibly beautiful Hyde Park, misty in the early hours,” he brought the music in on time. But his job was not yet done. Ahead of him were ten straight hours in the London recording studios of Cine-Tele, where a small, select group of musicians played the Wykes score for the first time.

In charge of this crucial recording session was engineer John Richards. “An engineer,” Professor Wykes explained, “can make or break your music. Richards is sensitive to musical values and also knows how to read a score. It is because of his exceptional talent that we chose to record in London. Among other things, Richards is able to bring in a ‘clean
tape' in which all the parts are quite separate from each other and yet blend much as herbs do when a chef uses them in a special dish. I have come to realize more and more that recording in the twentieth century is indeed an art, and, therefore, you need an artist to do it."

Professor Wykes has equally strong convictions about the function of music in a film. He observed that there is no such thing as "film music." "A whole new style of music evolves with each new type of film. In the kind of documentary films I've worked on, music tends to create a mood. My goal is to enable the viewer to experience a feeling about the movie which the maker wants him to have."

The maker of the Lyndon Johnson documentary was Guggenheim Productions, Inc., an Academy Award-winning firm founded in St. Louis some years ago by Charles Guggenheim and now based in Washington, D.C. Wykes has been a frequent collaborator on Guggenheim films, and has often worked with the executive producer of the Johnson film, Robert Pierce, and writer T. Iglehart.

Before flying to London, Wykes conferred with these men several times to see how the film was progressing. "It was especially important," he stressed, "for me to understand what Robert was trying to do. He had a point of view which he described to me. I had a musical point of view. Usually, we tried to reach a compromise. Sometimes I am able to help bridge a difficult spot in the movie. Very frequently a musical transition is quite necessary to carry the visual line."

Wykes went to London convinced that the Johnson documentary is a very beautiful film. "Generally speaking," he said, "it does not treat Lyndon Johnson as either a hero or a villain. It tries to give a direct appraisal of his entire life." Because Lyndon Johnson, the thirty-sixth President of the United States, was a complex man, it was difficult to compress his life into a fifty-minute film. LBJ himself once wrote: "I am a free man, an American, a United States Senator, and a Democrat, in that order. I am also a liberal, a conservative, a Texan, a taxpayer, a rancher, a businessman, a consumer, a parent, a voter, and not as young as I used to be nor as old as I expect to be—and I am all these things in no fixed order." Some 80,000 feet (forty hours) of network and U.S. Navy film were culled for the final 2,000 feet which went into production of the $150,000 film, funded privately with assistance from the LBJ Library.

Now that the movie has been premiered at the Lyndon Johnson Library in Austin, where it will be shown regularly at hourly intervals, and in Washington, reaction is coming in fast. The majority seems to agree with Lady Bird Johnson that "it is a deeply moving film." Wykes added that she seemed especially pleased that he had taken the trouble to hunt up some folk songs identified with Cotulla, Texas, the town where President Johnson taught elementary school before going into politics.

For the wiry, intense Wykes, the Texas premiere was the second in two days. The evening before, his new work for high school band, commissioned by the Barrington, Illinois, High School Performing Arts Department, was played for the first time under the direction of Washington University alumnus Donn Bearman. It tells a great deal about Wykes the man that, in recalling the two events, he equated both as significant milestones in his life.

While searching for a title for the band composition, a chore Dr. Wykes usually finds difficult, he remembered a sixteenth-century folk song, "The Western Wynde," used by church composers as the basis for writing masses for sacred music. "I decided to call it that because I was writing for a wind ensemble playing in the Middle West," he said. Professor Wykes consulted a standard anthology of music and found to his astonishment that the notes he had used for his musical intervals were those selected in precisely the same sequence by a composer, John Tavener, who arranged the "Western Wynde" music some three hundred years ago. "I nearly fainted," he exclaimed. "It was really spooky."

And what of the future? Dr. Wykes is now at work on a new symphonic work for chorus and orchestra commissioned by the National Endowment for the Arts. I've never had any desire to specialize as a composer. I enjoy making films now and again if they are quality films, which is the only kind Charles Guggenheim makes. But I wouldn't want it as a steady diet. The people I know who specialize in film and TV music live rather hysterical lives and are truly jet age people." Wykes' versatility prompted Frank Peters, St. Louis Post-Dispatch critic, to observe that Wykes "is not classifiable except as eclectic. Because he can do so many things well, Wykes is St. Louis's most sought-after composer.
The Quiet Bunch

By DOROTHEA WOLFGRAM

In the fifty years Marion Bunch has been associated with the University, he has helped shape its future and makes its Psychology Department learned and lively.

AGE SITS LIGHTLY on Marion E. Bunch, and one wonders if the compliment is but a return of respect.

There is a wondrous continuum in the life of this spare man of seventy-one years, which the fall of calendar leaves seems merely to brush. He retired in 1969 as chairman of the Department of Psychology after twenty years in that position. In 1971, he retired from full-time teaching, a career he pursued at Washington University with only one interruption in forty-eight years. At the end of this spring semester, he retired from his remaining teaching responsibilities. But none of these events has affected the basic commitment to teaching and research which Marion Bunch undertook when he was twenty-three years old, had completed the master's degree at Washington University and was undertaking summer work toward the Ph.D. degree at the University of Chicago.

If he were to begin again today, he would be as fascinated with the mysteries of how beings learn and remember as he was then and has been ever since. "These two processes underlie virtually all of the complex mental activities in which man is engaged," he said recently, "and I think that is why I have found studying them so interesting and so satisfying."

To measure Professor Bunch by the citations of his work which appear in psychology textbooks or by the positions he has held in professional societies and on federal commissions is to recognize his considerable reputation. By his own reckoning, however, his major contributions to experimental psychology have involved his studies on transfer of training, experimental extinction of habit, motivation, the role of punishment in learning, the effects of anoxia on learning ability, and the effects of aging on learning and memory in both human and animal subjects.

Each has contributed in varying degree to the general understanding of the role of some major conditions of learning and memory. For instance, Dr. Bunch and collaborative research students are frequently quoted for a series of studies beginning in the late 1930's on transfer of training. These studies provided evidence that in both humans and animals the transfer ability, the process whereby the learning of one problem aids in the learning of a similar problem, is independent of a considerable amount of forgetting of the first task. These results were contrary to the position that the beneficial effect of learning one problem upon later learning decreases with time in step with the progressive forgetting of the first problem. In fact, in complex problem solving with human subjects, the transfer of training was found to be as great several months later as when measured immediately after the original learning.

Professor Bunch's work and that of the department he fashioned have been foundation blocks carefully shaped of bits and pieces of empirical data to underpin theory. Theoretical flamboyance is as indecent to this meticulous scholar as disorder in research. Probably no elementary psychology student who studied under Professor Bunch—and he taught that course sometimes even as chairman of the department—could fail to recall his constant admonition to evaluate every concept on the basis of the evidence behind it.

Although flamboyance is not his style, Marion Bunch could never be considered styleless, nor fail to be considered. His dark hair and full brows have greyed much, adding to an appearance which surely was distinguished at age thirty, when he must have looked as though he stepped from the pages of an F. Scott Fitzgerald novel. His dress has a studied casualness, but is not studied; his manner is gentle and gentlemanly, bearing a trace of his native Kentucky. To those who know him well, this tall dark man is most remarkable for a characteristic that a writer once described as "indestructible aplomb." His secretary of many years says, more simply, "He just never gets excited, no matter what goes wrong."

D R. BUNCH admits that like the rats of his countless maze studies, he and his students have been up many a blind alley, yet to him, and thus to them, no alley is really blind if it produces solidly researched data. He cherishes one such project, begun with the idea that the mental retardation associated with Mongolism might be produced by anoxia either in the fetus or in the infant at birth.

"While we were about this work with cats and white rats, it was discovered that Mongolism is caused by a trisomy aberration and is an hereditary condition, but we carried our studies to conclusion and discovered that oxygen deficiencies suffered by the fetus did affect later learning ability. That was the end of it for us, but our findings aroused interest in the Department of Pediatrics at the Washington University School of Medicine. Their follow-up studies on children suffering severe anoxia at birth have had interesting results."

Publication of Dr. Bunch's anoxia studies began in 1950...
Marion Bunch

and culminated in 1960 in a monograph with Gilbert Meier, Carson Nolan, and Charles Scheidler, who were graduate students under Dr. Bunch. In 1948, Dr. Bunch accepted a professorship at the University of Illinois. "I really intended to stay there permanently," he says with a smile. With that intention, he took with him Meier and another student, Kenneth Moyer. Before the year was out, Dr. Bunch was invited to return as chairman of the department at Washington University, and both students returned with him.

To Drs. Meier and Moyer and to many others, a mentorship under Marion Bunch was a marriage to teaching and research. Dr. Meier returned recently from a post at the U.S. Public Health Service Primate Laboratory in Puerto Rico to join the University of Nebraska Medical School and to edit a journal of developmental psychobiology. Dr. Moyer is with Carnegie Institute of Technology and last year published a book on the physiological basis of aggression. Dr. Melvin H. Marx, a faculty member at the University of Missouri at Columbia who has contributed to research on memory and learning for three decades, has been Dr. Bunch's close friend and collaborator. Dr. J. C. R. Licklider of Massachusetts Institute of Technology, who did his master's degree work at Washington University, is a leading researcher of communication between man and computer. Dr. Sally Schumaker, a recent graduate, worked with Masters and Johnson's Human Reproductive Research Foundation, of which Dr. Bunch was a charter board member, and has joined the Long Island Jewish-Hillsdale Medical Center to head a special therapy program with the aged.

Under Professor Bunch's chairmanship, the psychology department's teaching faculty trebled and its doctoral program in gerontological psychology was the first offered in a psychology department in the United States.

Although Marion Bunch is not an opportunist, he seldom let an opportunity slip by to expand his graduate programs in quality and in quantity, and he seldom failed to anticipate those opportunities. He has a penchant for meticulous preparation and then bold action. In the middle 1950's, it became apparent to Dr. Bunch that the federal government might be interested in encouraging a doctoral program designed to prepare individuals for careers in teaching and research in the psychology of aging.

"We were well prepared to enter the field. The need for such a program was recognized and the teaching and research interests in the aging process were not new to the department. The University's first doctorate in psychology, Dr. Winifred Magdsick's in 1934, was based upon a dissertation
on the problem of learning and age carried out under my direction, and she was with us throughout her teaching career. Research investigation on aging continued intermittently until the formal establishment of the doctoral program in 1958 with grant support which provided for expansion, including additional faculty personnel, traineeships, and other forms of instructional aid.

"I returned in 1949 because I saw that it was possible to expand the graduate program with federal support, and I immediately sought funds of training grants, first in clinical psychology, later in gerontology, and finally, in 1967, in physiological psychology with Dr. Richard Sandel as director of that program. Now, although there have been noisy threats to close grants down, ours have not been interrupted. In fact, all have been strengthened.

"My concern has been to make sure that we had a strong basic program in the areas of experimental psychology, which I feel constitutes the best preparation for advanced study in the areas of specialization for the doctorate. We were traditionally an experimental psychology department and, although we have expanded our programs in selected areas, we have never left that tradition."

Although Dr. Bunch had little leeway in his commitments during the mid-1950's, when in addition to his administrative, teaching, and research work, he served as president of the Southern Society for Philosophy and Psychology as a participant in a national conference directing graduate training in psychology, and, a little later, as president of the Midwestern Psychological Association, he accepted the chairmanship of a University-wide committee to study and to outline long-range goals and objectives. "Individual deans and chairmen had undoubtedly been engaged in long-range planning, but no one had taken a look at the whole University structure in many years," he said. "We were given unlimited access to all materials we would need and a commission to formulate a plan which, if accepted, would guide Washington University in its growth and determine its character."

After fifteen months of concentrated labor, the committee submitted a report which was hailed then for its judiciousness and in retrospect has proven its astuteness. With characteristic modesty, Dr. Bunch attributed its virtues to the cooperation of the administration and the hard work of committee members; one of them, in turn, remarked, "There were many questions on which members did not see eye to eye. Thorny issues, unresolved for years, had to be threshed out. Marion worked hard in organizing the material and in writing preliminary drafts. With great good nature, he always managed to see where the evidence pointed and to follow it regardless of personal preferences. His tact and persistence in keeping us on the question improved the report and saved us days of labor."

The report cited a new library as the priority building need and increased salaries as the priority faculty need and recommended a change in the composition of the student body to a national geographic basis. "Although we suggested only a modest increase in the undergraduate population, we felt that the graduate school had not received the support and recognition it deserved and should be greatly strengthened. Without strong graduate programs, a university is a terminal operation for its best students; they go elsewhere. We also felt that 90 per cent of our best faculty members wouldn't be here without a good graduate school.

"I've always enjoyed undergraduate teaching, but the challenge of students working in your own field and the satisfaction of seeing them develop, continue, and, often, expand on your work is most gratifying to a teacher."

The report was immediately and almost unquestionably accepted by the University's Board of Trustees as a blueprint for the University's growth and direction as it entered its second century. In the twenty years since the Bunch report, almost all of its recommendations have been implemented, including its recognition of a need for a student center. "That's taken a long time," Dr. Bunch commented this spring, "but then some things do."

Dr. Bunch is writing a book with Dr. Marx which is also "taking a long time," he sighs, "but we intend to publish in 1975, perhaps in the fall." Entitled *Foundations of Learning*, it is formulated as a text for a junior-level course in the psychology of learning. He will also continue his research in learning and memory, which he says has taught him that, although researchers believe that an individual reaches his peak of learning ability between the ages of twenty-five and thirty-five, most persons are capable of building upon their stock of knowledge in any area almost life long. "A person may continue to develop in his own field and to contribute at a very advanced age. By some accounts, Justice Holmes wrote an opinion at the age of ninety that many persons would have been pleased to claim as their own at age seventy. Chronological age is just a rough index as to how old you are. Someday, hopefully, when we achieve greater understanding of the aging process and are able to measure an individual's functional efficiency in his area of work, we will have in that measure a better index of his intellectual and professional competence than the arbitrary figure of chronological age."

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WASHINGTON University this spring was graced by the appearance on campus of a gracious and graceful woman: the incomparable Ella Fitzgerald.

Miss Fitzgerald, or Dr. Fitzgerald as she can be known from now on, was one of ten outstanding leaders in a wide variety of fields who received honorary degrees from Washington University at this year's commencement. Imposing and impressive indeed were the careers and accomplishments of the other honorary degree recipients who shared the stage with Ella Fitzgerald. Yet, it was Ella who received the most enthusiastic and prolonged applause from a record commencement crowd that filled the quadrangle to overflowing. It was Ella who brought forth a spontaneous demonstration of appreciation and affection that was as warm as the weather at a ceremony held on a muggy late May day in St. Louis.

Ella Fitzgerald has been the hit of just about every show she's been in, from Apollo Theatre amateur hours to concerts with the world's leading symphony orchestras (with quite a few Jazz at the Philharmonic sessions and Newport Jazz Festivals thrown in). It was fitting that she should stop the show at a Washington University commencement.

Ella Fitzgerald has finally become a doctor. In an interview on campus after commencement, she confided that her first ambition in life was to become a doctor. While it is beyond the University's capabilities to give her an M.D., despite the happy therapy her music has furnished for people throughout the world, we all hope that the Doctor of Fine Arts degree she did receive will go part of the way toward realizing her ambition.

NEXT TO becoming a doctor, Ella's dream was to be a dancer. It was as an aspiring dancer that she made her first stage appearance at an amateur contest in New York's Harlem in the early thirties. Ella didn't make it as a dancer, but it was on that occasion that she first sang in public. Chick Webb, leader of one of the early big bands, heard about her singing. Soon, Ella was singing with the band regularly, and managing even then to project sentimental ballads with a
unique style and to swing in a fashion that hasn't been heard from by any vocalist, before or since. It was while she was with Chick Webb's band that Ella made a recording of a nursery rhyme set to swing tempo. "A Tisket, A Tasket" became a runaway best-seller and Ella became an instant celebrity.

Reminiscing at Alumni House after commencement, Ella remarked, "I was not a jazz singer in those days, I was a pop singer." In the many years since "A Tisket, A Tasket," Ella has become both the leading woman pop singer of our times and one of the leading jazz singers of all times.

Many critics have written of the clarity of Miss Fitzgerald's perfect diction; of how she can give such meaning and understanding to the lyrics of a song. She can also use her voice like an instrument, converting the lyrics to wordless swinging choruses that can match the greatest jazz instrumentalists.

Ella came to Washington University after a three-month tour of Europe, where she appeared everywhere from symphony halls to jazz clubs. She left the campus to return to her home in Los Angeles before opening at Caesar's Palace in Las Vegas with Frank Sinatra and Count Basie. A week later, before she opened at Caesar's Palace, however, she flew back to New York to sing at Duke Ellington's funeral services.

DR. FITZGERALD can look back on a long and thrilling career of performances with most of the big names in jazz and show business. She speaks with particular appreciation and fondness of Duke Ellington (who received an honorary degree from Washington University in 1967) and of Count Basie and Louis Armstrong. The great Louis Armstrong, she confides, would "break me up at recording sessions." During their duets on record, Louis was constantly clowning, making inside jokes, and in every other way trying, without success, to upset Ella's always polished and professional delivery.

Asked how she feels about other women singers in jazz, Ella says that Sarah Vaughn, Billie Holiday, and Mildred Bailey are "already in the Hall of Fame." She speaks highly of Peggy Lee and Kay Starr and regards Cleo Lane as the best of contemporary female vocalists.

To Ella Fitzgerald, the commencement ceremony was a rewarding and touching experience. "I feel honored and flattered to be here," she said, "and I loved seeing all of those young people on such a happy day." All of those young people loved seeing Ella Fitzgerald, too. It was indeed a happy day.
The 1974 Annual Report of the President's Council of Economic Advisers is both an examination of the state of the economy and a statement of what can be expected. It contrasts sharply in tone with the reports not only of earlier Nixon years but of the Kennedy-Johnson era. Where the earlier reports were confident—if not arrogant—in their assertion of what can be accomplished, the 1974 report was most humble in tone and content. This is fitting, for given the state of the economy and the obvious failures of our attempts to manage it, economists have much to be humble about.

Over the past decade, and most particularly in the past few years, the economy has behaved in ways that are difficult to reconcile with standard economic theory. Policy actions that presumably are consistent with the advice of leading professional economists who have served as officials have often seemed to make matters worse, not better.

As a result of the disarray of the economy and the apparent inconsistencies between facts and theory, economists now have to question the validity of the standard economic theory, which reached its present form over the first decade after World War II and held sway as a guide to economic policy during the long expansion of the early 1960's. The apparent success enjoyed by economic policy based upon this theory at that time prompted members of the Council of Economic Advisers in the mid 1960's to announce that our new knowledge and policy skills made the business cycle obsolete. In fact, it was asserted that economic science and the technology of economic policy were now so sophisticated that presumably are consistent with the advice of leading professional economists who have served as officials have often seemed to make matters worse, not better.

The standard economic theory which is contained in almost all text books, the validity of which is now (or should be) questioned, is known as the neoclassical synthesis. This theory is the result of integrating some of the special insights and particular formulations introduced by John Maynard Keynes in the mid 1930's with the older so-called classical economics.

Keynes wrote his seminal work, The General Theory of Employment, Interest and Money, in the early 1930's—at the very bottom of the Great Depression. At the time, the accepted statement of the classical economics was that of Alfred Marshall in his Principles of Economics. Marshall's principles, either directly or indirectly in various textbooks, dominated the teaching and practice of economics from about 1870 until the late 1930's. Marshall's statement was generally accepted as the culmination of the line of economic thought that descended from Adam Smith, David Ricardo, and John Stuart Mill. Although governments were not prone to use economists either as policy advisers or window-dressing in the period before the 1930's, the generally "hands off" policy of the 1920's was validated by the weight of economic opinion.

The Great Depression of the 1930's was an anomaly to the ruling economic theory: the theory could not explain what was going on. In any discipline, an anomaly is the signal that the theory needs to be reformulated. The Great Depression and the years that followed witnessed exciting battles of ideas among economists, as they first had to accept the facts of the Great Depression and then develop a coherent theory that explained them.

Keynes, a student and protege of Marshall, was the key figure in the development of the new theory. His career up to the 1930's had been marked by some great public successes and by rather more modest success as a professional economist. His Economic Consequences of the Peace, written in 1919, was a huge popular success and had a considerable influence upon the rejection of the Versailles Treaty by the United States. He was active in British public life during the 1920's, but as a Lloyd George Liberal, he was more of a gadfly than an effective influence upon policy. His major effort in economic theory before the Great Depression, A Treatise on Money, written in the late 1920's, received a lukewarm reception and was adjudged a failure by its reviewers.

Keynes, in A Treatise on Money, attempted to improve upon the way in which money and finance were handled in the classical economics of Marshall. Classical economics emphasized the real exchange and production attributes of an economic system. The argumentation begins with the exchange at a "village market," and builds a model of exchange and production on the basis of simplified barter relations. The world of finance, speculation, and long-lasting capital projects; and of banks, stock markets, and corporations was added to this picture in quite artificial and abstract ways. The typical conclusion of the theory was that these complicated institutional details really did not change matters; the propositions developed in the formal analysis of a barter economy remained valid in a sophisticated, money-using economy.

The fundamental propositions of the Marshallian or classical theory are that free markets are self-equilibrating, that the equilibrium is at full employment, and that the equilibrium achieved by such free markets is, in some significant and meaningful sense, the best that can be obtained. These
Because of flaws in standard economic theory and the broad strategy of postwar economic policies, Economist Hyman P. Minsky maintains that the nation seems to be faced with a choice between accelerating inflation and a serious deflation of debt, historically associated with deep depressions. The conclusion is that the time has come for serious reforms in the strategy of economic policy.

propositions are derived as a result of arguments based upon an abstract simplified exchange and production model, i.e., the economy of the theory barely resembles the economy of the real world. Nevertheless, it is an article of faith of the classical economics, more than the result of logical demonstrations, that results of abstract theorizing are valid for the world in which we live.

Perhaps the most famous proposition in the classical economics about the irrelevancy of institutional detail is that "money is a veil." It was held that money, banking, and finance—the institutions that are essential to capitalism—do not truly affect the workings of the economy. These institutional arrangements may obscure our perception, but they do not really affect the underlying barter-like exchanges of commodities for commodities or labor. For all the complexity and sophistication of the world, the reigning economic theory at the time of the Great Depression maintained that the significant behavior of the economy could be explained and understood by assuming that the propositions derived for a primitive barter economy are relevant.

As long as the economy functioned well enough, the heroic assumption that money, finance, and speculation did not really matter was not a serious defect. Once the Great Depression began, with the initial shock apparently coming from the stock market crash, and with recurrent blows from the breakdown of the banking system exacerbating the decline, it became quite evident that classical economics could not explain what was happening. It was evident that what had been assumed to be irrelevant—money, finance, the valuation of capital assets—was of major importance, and the economy, instead of seeking out a satisfactory equilibrium level, was often in transit away from the full employment of theory. The need was for an economic theory which made variations in employment, prices, and income normal at-
tributes of the system, not aberrations foreign to the theory.

Keynes filled this need by constructing a theory of capitalist economy which recognized the importance of institutional details and usages. In Keynes's new theory, money and finance instead of being a veil really mattered. His theory gave primacy to the essential speculative nature of decisions that involve the future, i.e., investment and holding of capital assets. He recognized that in a modern capitalist economy, investment and the holding of capital assets involved external finance. The major institutions involved in external finance are banks—thus the behavior of banks and bankers, instead of being peripheral to the operations of the economy, become of central importance. Instead of starting his economic theorizing with village barter in mind, Keynes, very much the twentieth-century man, started his theorizing about how a modern economy works with London's City and New York's Wall Street in mind.

Because the capital development of a country always involves present decisions made on the basis of future prospects, and because the future is always uncertain, Keynes emphasized the essentially speculative nature of investment decisions. In Keynes, the particular form of speculation becomes the way in which investment and holdings of capital assets are financed. He constructed an investment theory of employment in which deviations from full employment resulted from variations of investment and a financial theory of investment. Because of uncertainty, the speculative nature of decisions, and the behavior of financial institutions, the economy in this theory was essentially cyclical. Free markets could not guarantee full employment and the achievement of the best that is obtainable; in fact, free markets lead not only to regular mild business cycles, but also to occasional inflationary booms and deep depressions.

**ONE RESULT** of the analysis of The General Theory was the development of economic policies which would lead to a better result than was possible with free markets. What is now known as fiscal policy, the active use of government expenditures and taxation to steer the economy, is the novel policy device that came out of The General Theory. What is known as Keynesian economics in the popular press and in presidential speeches is not the sophisticated analysis of the behavior of an economy with a complex financial system, rather it is the active use of fiscal policy to stabilize income.

It is worth noting that Keynes in The General Theory did not promise that policies based upon his theory would guarantee sustained full employment. All that he asserted was that the apt use of monetary and fiscal policies would lead to a closer approximation to full employment than had hitherto been obtained. Fine-tuning, as promised by successive sets of presidential advisers, was foreign to his views of the economy and of man; not perfect but better was all that could be promised.

Keynes, while working on The General Theory, wrote to George Bernard Shaw, "... I believe myself to be writing a book in economic theory which will largely revolutionize ... the way the world thinks about economic problems." Although it is true that his conception of economics as a policy science and the view that active policies are necessary if the economy is to perform satisfactorily have achieved broad acceptance, today's dominant economic theory is more classical than Keynesian. The revolution of which Keynes wrote was aborted. His formulations dealing with finance, speculation, and uncertainty have been lost. Certain tools and formulations introduced by Keynes have remained in economic theory but they have been modified in a manner which makes them compatible with the older classical economics.

**ALMOST BEFORE** The General Theory was published, a process of assimilating the advertised radical reformulation of theory to the older classical economics began. The formulations and the tools of analysis that were most compatible with the old theory were emphasized and the radically different constructs and ideas were played down. This means that the real production and exchange facets were emphasized and uncertainty, money, and finance were either ignored or treated in a most cursory fashion. In academic interpretations and in textbook expositions, Keynesian economics became another, somewhat different description of the economy in equilibrium. Keynes's view that it is in "the transition that we spend our lives" and his belief that he was showing how any equilibrium bred the "seeds of its own destruction" were lost.

By emphasizing the equilibrium facets of Keynes's analysis, the academic interpreters were able to show that a situation where less than full employment exists contains various forces which tended to lead to full employment. Whereas the monetary, financial, and speculative elements emphasized by Keynes may dominate in determining a temporary equilibrium with less than full employment, economists in the 1950's and 1960's developed theories in which this temporary equilibrium was succeeded by full-employment situations. Furthermore, it was demonstrated that the full-employment situation exhibited the "best possible" characteristics of the classical economics. In fact, the "money is a veil" doctrine was resurrected as a characteristic of dominant full
equilibrium situations, i.e., as between positions of equilibrium, the proposition that variations in the quantity of money relative to production capacity result only in variations in the price level was once again accepted as valid.

The end result of the academic interpretation of Keynes's work was the view that in principle pre-Keynesian classical economics was valid. We may state today's standard economic theory as asserting that the pre-Keynesian classical economics had arrived at basically the correct conclusion, but that their analysis had not gotten the story quite right. Nevertheless, it was held by many that even though the market mechanism would lead to the best attainable full-employment equilibrium, in fact, the path taken by the economy and the time that would be spent in undesirable depressed circumstances if market processes were relied upon implied unnecessary and too great burdens upon the economy. Apt policy could achieve what the market would in time achieve, but do it more quickly and with smaller costs in the hardships of unemployment. Keynes's contribution in this view was not to economic theory but to economic policy.

The basis of Keynes's General Theory is not only different from the view that is known as the neoclassical synthesis, it is also more relevant for our understanding of our current economic problems. The inflation of our time is an outgrowth of the very success we have had in avoiding a serious depression since World War II. In fact, our success in avoiding even a mild recession in the years 1960-1968 may be considered a proximate cause of the current disarray.

Keynes built an investment theory of economic activity and a financial theory of investment in which investment and capital asset ownership are financed to a greater or lesser extent by debts. Furthermore, in our sophisticated financial system, specialized organizations exist—such as banks, insurance companies, savings and loan associations, mutual funds, and pension funds—which issue their own liabilities in order to acquire financial instruments. There is a vast layered debt structure alongside the production and consumption oriented units of the economy. The basic fact about liability structure of firms, households, and financial institutions is that they depend more upon conventions, hopes, and expectations than upon any technical constraints. Thus, the extent of liability structures will evolve in response to changing views about the future of the economy.

The postwar period began with the trauma of the Great Depression fresh in the memory of all—bankers, ordinary businessmen, and households. Private liabilities relative to income were very low, and business and banking finance were "conservative." As the economy went through the 1950's and the first part of the 1960's without any financial strain and with only mild recessions, the conservative outlook in balance sheets was eroded; in fact, those who "stretched" their liabilities to acquire capital assets turned out to be winners. The payoff from speculation on the whole turned out to be favorable.

The government policies to accelerate growth first adopted during the Kennedy years took the form of increasing the payoff to capital asset ownership and investment, i.e., the payoffs from speculative finance were increased by government actions. As a result, the financial structure became increasingly fragile and more prone to disruption. The first time the viability of the liability structure was seriously threatened in the postwar era was in 1966. At that time, the Federal Reserve System intervened to protect banks, savings and loan associations, and mutual savings banks. The Federal Reserve validated the debt structure. Thus, after a slight pause, the expansion of debt-financed asset acquisition resumed.

The period of 1966-1970 was the period of "conglomerates." The conglomerate movement resulted in refinancing the ownership of capital assets so that the debt-financing used to control capital assets increased. This debt expansion era culminated in the Penn-Central crisis in the commercial paper market. Once again, the Federal Reserve intervened to halt the liquidation of debt. Once again, after a slight pause, the expansion of the economy continued. At this writing (June, 1974) another embryonic financial crisis is emerging in the plight of the Franklin National Bank.
It is interesting to note that in the four to five years before 1966, inflation, as measured by the broadest index, was in the 1.5 per cent range; in the years between '66 and '70, it was in the 3 per cent range, and in the years '70-'73, inflation averaged around 5 per cent per year. Each time an embryonic financial crisis is prevented from escalating by Federal Reserve intervention, the rate of inflation moved to a higher plateau.

We now seem to be faced with a choice between accelerating inflation and a serious deflation of debt. Historically, deflations of debt—as in 1929-33—have been associated with deep depressions. The current economic malaise may reflect a view that the accelerating inflation cannot go on forever, combined with the fear that there is no way short of a serious depression by which we can get off the back of the inflation tiger. The current dilemma in policy and in the disarray of the economy were born out of the apparent success in avoiding any serious depression in the period since World War II.

The apparent conclusion that the country is faced with either accelerating inflation or a debt deflation is quite dismal. Economics was labeled the dismal science in the nineteenth century because it articulated the limits of what is possible. Keynes in the twentieth century moved the frontier of what is possible forward; although he did not promise perfection, he showed how the most dismal of economic prospects, deep depressions, can be avoided.

In many ways, the lesson about policy preached by Keynes has been perverted in the economic policy techniques that have been adopted. Keynes viewed deep depressions as the result of too little investment, given the propensities to consume. His solution was to raise consumption—both private and public. Public consumption are those items—parks, schools, health, safety of person, and “culture”—which in a civilized community are the birthright of all. In the Roosevelt recovery period, these public consumption and public employment thrusts took the form of W.P.A., C.C.C., etc.

During World War II, the public employment of the recovery period was replaced by a government contract system, which has continued after the war. Ostensibly, private firms exist which in fact are no more than modern high-cost substitutes for government arsenals. To government contract spending, two items were added in developing today's policy strategy: a growth orientation, which took the form of tax and subsidy devices to induce private investment, and an enormous increase in transfer payments, in particular, social security.

The tax and subsidy devices for private investment, together with the success in avoiding serious depressions, meant that an accelerating pace of investment was being increasingly debt-financed. Furthermore, debt was built into the ownership of the inherited stock of capital assets during the conglomerate boom. To sustain this debt, the profits of business had to keep pace with the growth of debt. Thus, economic policy took various forms which tend to increase profits—and if profits can no longer be increased as a share of income, the dollar volume of profits can be increased by inflation.

Transfer payments—social security, government pensions, medicare, food stamps, etc.—increased by some 70 per cent the past five years. These attempts to transfer an increased proportion of total output from the active to the inactive members of the population are inflationary. Our entire social security and retirement system was built in the pre-Keynesian depression era, where one way in which unemployment could be decreased was by getting people out of the job-seeking class. Now that we know we can create jobs for all, we should rethink our social security and retirement philosophy. The contract, growth through private investment, and transfer payments strategy of policy to achieve full employment has sired our current predicament where accelerating inflation or a deep depression seem to be the alternatives before us.

To increase the range of alternative outcomes that are possible, we will need to abandon the contract, investment, and transfer payment policy strategy. The thrust of the present strategy is to get employment by making it profitable for firms to hire—first profits, then employment, is the logic of this strategy. In the 1930’s, when unemployment was the dominant problem, the government used a number of devices which directly attacked unemployment by creating jobs. A strategy of job creation, for the direct production of useful public facilities and services, is a way in which we can break away from the vicious circle of inflation and embryonic crisis, followed by an increase in the pace of inflation as the crisis is resolved by Federal Reserve action which does not allow that crisis to trigger a serious depression.

The time has come for serious reforms in the way we manage our economy. Unfortunately, it may turn out to be true once more that it will take an even more serious economic crisis than we now face to trigger these reforms. Meanwhile, we may well go through another cycle or two of accelerating inflation as the Federal Reserve floats off a debt structure that is crisis-prone.
The late Irv Utz coached eleven Washington University baseball teams to a lofty winning percentage of .714. But that statistic is a very narrow measure of Mr. Utz, who won the respect of hundreds of students and colleagues in his fifteen years on campus as a baseball and football coach. His career was tragically cut short in 1963 when he suffered a fatal heart attack at the Bears' annual fall awards banquet.

In memory of Coach Utz's many contributions, the University's baseball field—formerly known as Ligget Field—has been renamed in his honor. Present for the dedication program on Saturday, May 4, before a doubleheader with St. Louis University, was major leaguer Dal Maxvill, who played for Coach Utz from 1957-60. Maxvill is Washington University's most accomplished professional baseball player. An
Len Mazel, trying to score from third, won the "Bear Glove" trophy for his work in center field and was named the team's honorary captain.

The late Irwin (Irv) Utz. As baseball coach, his winning record was a remarkable .714. But his players recall best his concern for the individual student.

Leo Kelly, the Bears' baseball coach since 1969, possesses many of Coach Utz's qualities. He is low-key and dedicated. On May 4, his team responded to his fine coaching by keeping its cool and winning two close, exciting games from the St. Louis University Billikens.

It was a perfect afternoon for baseball, with clear skies and the temperature in the low seventies. But other factors contributed to the good turnout of students in the stands: winning the double-header over St. Louis University would virtually assure the Bears of an invitation to the National Collegiate Athletic Association's regional college playoffs. It also would surpass the record of total victories in one season, 19, set by Coach Utz's 1954 team.
Coach Kelly said, "In Coach Utz's record year, his team was 19-2. I should point out that it took us thirty-six games to break that record."

The coach praised both Fowler and Mazel after the doubleheader. Fowler, a junior, "has the batting and throwing ability to make him a potential major leaguer," Kelly said. Mazel, who graduated this May, threw out nine base runners during the season and played centerfield in the style of Willie Mays, the idol of his high school days.

Despite their heroics on May 4, the Bears did not receive an invitation to the National Collegiate Athletic Association playoffs. Undoubtedly, a big factor was that the heavily favored Bears lost the final two games of the season on May 6 to Westminster College, giving the Bears a final 20-18 record, instead of the 22-16 mark which the NCAA selection committee probably had expected. On May 13, when Coach Kelly received the bad news from the NCAA committee over the phone in his office, something happened that made up for the disappointment. Despite the fact that finals were still in progress and there was little hope for an NCAA invitation, he found many of his players seated on the steps outside.

"They knew I was expecting the call and came by between exams to be on hand," Kelly said. "It was a pleasant surprise." It also was reminiscent of the fine relationship that existed between Coach Utz and his students of another era.

Bears' catcher Dave Fowler, shown guarding home, was named Most Valuable Player and set a new record for hits with 48.
Above, from left: Fine Arts students Kathy Goldring, Celeste Kocot, and Marjorie Joffe assemble and wire the "sound floor" at the Missouri School for the Blind. At right, Ronald Kaffen, left, and Steven Giggar try out the teaching toy.
A few copper wires, some foam rubber, and the kind of square tiles you might find on a kitchen floor are commonplace materials, but three ingenious fine arts students have turned them into an extraordinary and effective teaching device. Fern Tiger, assistant professor in the School of Fine Arts, gave her second-year design class an assignment that required the students to utilize the audience as an essential element in the creation of an art work.

One student, Marjorie Joffe, decided that she wanted to create a sensory learning experience for an audience who would interact with her object. After some study and research, she focused on a teaching toy for blind children. Kathy Goldring and Celeste Kocot joined her in the project and together they contacted William Miller, principal of the Missouri School for the Blind, for any ideas he might have. Together, they decided that because blind children have a difficult time walking a straight path, stepping up and down, and making turns, a "sound floor" would help them with these tasks.

The main concept of the floor is that the pathways are silent. A wrong step or turn evokes a sound, thereby immediately letting the child know his error. The floor contains two basic parts: an electrically wired grid that is extendable and collapsible; and forty-eight square-foot tiles. The tiles consist of two slabs of wood or mortarboard with a layer of foam rubber between (so that they sink when stepped on). The bottom layer contains pegs which fit into the grid. The modular pieces are interchangeable, removable, and storable in boxes.

The original floor had three sounds: a high and a low sonalert and a buzzer, but the girls later expanded it to include eleven sounds by adding six organ notes and a fast and slow metronome. Professor Howard Jones, head of the School's multi-media area, provided the basic electrical knowledge needed.

What had started out as a two-week assignment quickly turned into a six-week project. Over spring vacation the girls had a chance to try it out at the Missouri School for the Blind. Two students at the school, Steven Giggar and Ronald Kaffen, were eager and enthusiastic participants. "I thought it was a unique idea," said principal William Miller, "and the kids seemed to enjoy it. It would be a good teaching vehicle for other exceptional children as well. I see many possibilities for its use."

The students agree and are currently working with an attorney to have the device patented. They plan to donate the original model to the Missouri School for the Blind.
THE EXAMINED LIFE

It was Socrates who said, “The life which is unexamined is not worth living.” Institutions also have lives; they are born, they grow, unfortunately they can wither and die. An unexamined institution, like an unexamined life, can never profit from its mistakes, never learn where it is, never determine where it is going.

No one can accuse Washington University of leading an unexamined life. Periodically, throughout its history, its faculty, administration, and trustees have subjected the institution to thorough and vigorous examination. At regular intervals, formal bodies have been appointed to take a good hard look at the institution and its operations, functions, and objectives. The University has been assessed and its efforts carefully measured against the yardstick of its stated goals. Strong and concerted efforts have been made to answer the questions: Where is the University going, where does it want to go, and what is it doing to get there?

In this issue of the Magazine, a profile of Professor Marion Bunch, chairman of a committee that was charged with examining the institution in detail and proposing both appropriate goals and practical ways of reaching those goals.

The Bunch Committee, as it came to be known, made recommendations that led directly and indirectly to Washington University’s transformation from a good but primarily local institution to a national university of recognized academic stature. The results of the Bunch Committee’s examination of the University and its recommendations are still with us and may be with us forever. New faculty members were attracted, and the financial base of the institution was expanded and reinforced.

In 1970, a University Committee on Goals and Objectives was formed and charged with the same responsibilities. Chairman of that committee was William H. Danforth, then Vice Chancellor for Medical Affairs and now Chancellor. The Danforth Committee followed the same path as had its predecessors. It looked into the entire University operation and tried to relate each activity to the University’s long-term goals of quality education, significant research and scholarship, and meaningful service to the community. It, too, made a series of recommendations that have profoundly affected the institution’s operations.

Washington University is again at a crucial point in its history. Over the past decade, while its central purposes have certainly not been neglected, the people charged with guiding the institution’s destiny have at times been concerned with other immediate and urgent problems.

In the late 1960’s, Washington University, like most other institutions of higher learning, was deeply involved with student unrest, protest, and occasional violence. These were real problems, and while similar problems could occur again, the period of constant crisis is past. In the wake of the student protest movement came the realization of the financial bind in which all education, and especially private, higher education, found itself. The financial problems are still with us and may be with us forever, but the acute crisis stage has passed.

The leaders of higher education cannot ignore these problems even though their severity may have abated somewhat. But neither can they neglect to keep constantly in mind the true goals of higher education and how well those goals are being met.

The Bunch Committee, the Passonneau Committee, and the Danforth Committee all contributed immeasurably to today’s Washington University. A new committee, which no doubt will be known as the Coor Committee, has just completed a detailed examination of the University and has released its preliminary report after many, many months of hard work.

The Chancellor appointed the new planning committee last fall with a charge “to review the University’s objectives, seeking out ways by which we can develop and implement improvements and new programs to better accomplish our objectives within the financial constraints of the 1970’s.”

The Committee was further charged “to stimulate and collect ideas from all elements of the campus community, to review these ideas systematically for feasibility of implementation, resources required, and potential sources for the support required, and to see that promising ideas are brought to the attention of appropriate campus bodies for implementation.”

Chairman of the latest Planning Committee is University Vice Chancellor Lattie F. Coor. Other members are: Carl A. Dauten, executive vice chancellor; Merle Kling, dean of the faculty of arts and sciences; Lucian Krukowski, dean of the School of Fine Arts; William H. Kurth, University librarian; James M. McKelvey, dean of the School of Engineering and Applied Science; Joseph Schraibman, chairman of the Department of Romance Languages; Vice Chancellor Robert Virgil; Murray Weidenbaum, Edward Mallinckrodt Distinguished University Professor, and Guido Weiss, professor of mathematics. David Luecke, newly appointed assistant vice chancellor for admissions, is secretary.

The Coor Committee report is a detailed document running to more than 130 pages. We hope to be able to summarize the Committee’s findings and recommendations in future issues. From a first reading, we feel that it will rank with the Bunch, Passonneau, and Danforth reports as one of the major signposts marking the University’s progress.
It's not only the graduates who find commencement a happy occasion. Here, part of the record crowd of more than 12,000 who filled the Quadrangle for the 1974 ceremonies enjoy the spectacle.