Genesis

2 Geophysicists and geologists plumb the deep for evidence of the earth's history

Black Studies: Directions and Priorities

10 A director looks at the role of his area in the 1980's

Where There's a Will . . .

13 The tenacious Alice Jones brings new perspectives to Colonial history and economics

The Company We Keep

20 Our 125th Anniversary speakers and a bit of what they said

Freshman Year

25 Sharing the year with an introspective freshman

Margarethe

33 Tributes to a gifted woman by her University community

Accelerating Research

36 Of cyclotrons, scanners and future biomedical research


Washington University Magazine (ISSN 0162-7570) is published four times a year — Winter, Spring, Fall, and November — by Washington University at Lindell and Skinker, St. Louis, Mo. 63130. Second-class postage paid at St. Louis, Mo., and at additional mailing offices. Printed by The Ovid Bell Press, Inc., Fulton, Mo. Direct all communications to: The Editor, Washington University Magazine, St. Louis, Mo. 63130.
In the past decade earth scientists aboard the D/V Glomar Challenger have brought up from the ocean floor evidence substantiating the theory of global plate tectonics, which holds that the surface of the earth is made up of a number of large continental and ocean-floor plates and that the sea floor is in a constant state of renewal and subduction. When the Challenger set sail last year, two Washington University scientists, Professors Dorothy Echols and Rodey Batiza, were aboard helping to study the earth's genesis.

The infamous San Andreas Fault splits California from the northern tip of the Gulf of California to San Francisco, where it dives into the sea. Southwestern California grinds past the eastern part of the state in jolts. The earthquakes along the fault make its location painfully apparent, and the fault itself is sometimes visible as a crack in the desert flanked by mounds of ground stone.

But the cause of the fault lies deep inside the earth. Now, slowly, this mystery and many other geophysical phenomena are being explained, as scientists substantiate a startling theory of the behavior of the earth's surface. Its concepts are as revolutionary for the earth sciences as Darwin's evolution was for biology or Einstein's relativity was for physics.

The theory of global plate tectonics, which first achieved wide acceptance in 1968, proposes the division of the earth's surface into a score of rigid plates that ride a plastic interior. These plates, in a constant state of destruction and renewal, emerge as new rock at ocean floor rifts, edge across the ocean floor like a conveyor belt, and finally slide into the earth's plastic interior at the opposite edges along deep ocean trenches (like the Marianas).

As the plates move, they jostle each other, forming fracture zones or faults, which shoot out perpendicular to the major rifts. Relatively shallow quakes and occasional volcanoes occur along the faults. But volcanic action is more intense at the rift valley and most intense at subduction zones, where the heavier ocean plates eventually slip under lighter continental granitic plates. At the subduction points, the awesome forces spawned by the incredible heat and pressure from the earth's interior and the massive weight of the plates come into full play.

Because plate tectonics suggests constant activity on the sea floor, an understanding of what is happening there is crucial. When such study was technically limited, evidence to substantiate the theory was spare. Proponents piecing together a comprehensive theory from isolated observations lingered on the fringes of respectability for several decades. In 1968, however, the D/V Glomar Challenger, an oceanographic research vessel, began to gather a mass of collaborating research by drilling into the earth's crust beneath the oceans, and by 1971 plate tectonics was accepted as the prevailing orthodoxy.

Last year, two Washington University Scientists were aboard the Challenger when it sailed the Pacific. Dorothy Echols, a WU micropaleontologist, accompanied the vessel on Leg 58 (its fifty-eighth cruise) to study the microscopic fossils frozen into the soft sedimentary rock of the sea floor. At sixty-one, Professor Echols has a world-wide reputation in her field. She has been with the University since World War II.

Rodey Batiza, an igneous petrologist who is also with the Department of Earth and Planetary Science, took part in Leg
Assistant Professor Batiza, who joined the University in 1977, is thirty-one. He has, however, already joined the small number of earth scientists who have themselves dived to the ocean floor to gather and photograph rocks. They use the oceanographer’s newest tool, the deep sea submersible, the largest of which can dive more than five miles into the ocean’s depths.

Although Echols’s and Batiza’s fields are far apart, their disciplines and many others contribute directly to understanding past millennia. On board the Challenger, each helped piece together the history of the earth beneath the ocean.

One of the earth’s larger tectonic plates makes up a major portion of the Pacific Ocean floor. The Pacific Plate, bordered on the east by North America, stretches south into the Antarctic Ocean, west to New Zealand and Japan, and north to the Kachchatka Peninsula and the Aleutians. This entire 42-million-square mile plate (sixty-miles thick) has been creeping northwest three inches a year for 180 million years. Its constant renewal is confirmed by the fact that although the oldest rocks found on earth are about 4.6 billion years old, the floor of the Pacific is a mere 180 million years old.

According to plate tectonics theory, renewal of ocean floors takes place in a narrow zone located at the axis of a 50,000-kilometer-long, two-mile-high system of mid-ocean mountain ridges which are connected world-wide. Against these the Himalayas look like an ant hill. New sea floor for the Pacific is built along two of these ridges — the Pacific-Antarctic Ridge, running along the southern edge of the Pacific Plate, and the East Pacific Rise going north up the middle of the Gulf of California. It is this rise which splits part of California from North America as it turns into the San Andreas Fault and which is slowly and steadily widening the Gulf.

The 700-mile-wide Gulf is actually an infant sea, growing three inches each year. Many earth scientists believe the process of sea-floor spreading (a term coined in 1961 by Robert Dietz, a visiting scientist at Washington University last year who is with the U.S. Navy Electronic Laboratory) is caused by currents set in motion by temperature variations in the plastic rock of the earth’s mantle. This convection-current theory, first proposed in 1928, is steadily being investigated by earth scientists like Batiza and Echols from clues which lie under at least 9,000 feet of water.

The first serious attempt to gather rock samples from the ocean floor was made over a century ago by the Glomar Challenger’s forebearer, the HMS Challenger. Equipped with steam and sail, the Royal Navy surplus vessel Challenger sailed from Portsmouth in December 1872 with all but two of her guns removed to make space for a sea-going laboratory. Nine stormy days out of Portsmouth the six scientists aboard dropped a dredge to the unprecedented depth of 6,750 feet in the Bay of Biscay between France and Spain. They used the ice-cold mud they hauled up to chill a bottle of champagne with which to toast their success. Analyzed later, the mud turned out to be foraminiferal ooze, mushy rock made of the kinds of microscopic fossil shells now used by Echols to calculate the age of sea floor sediment and determine the temperature and environment of the ocean at the time of formation. The findings of the original Challenger’s three-year voyage filled fifty volumes and took twenty years to publish. Some of the sediment cores obtained are still being studied.

Now, 106 years after HMS Challenger set sail, the Glomar Challenger is reaching far beyond her predecessor’s achievements with capabilities never dreamed of on that earlier cruise. In 1967, four U.S. oceanographic institutions formed the Joint Oceanographic Institution for Deep Earth Sampling (JOIDES) and subcontracted Global Marine Corporation of Los Angeles to build the Glomar Challenger. The 10,500-ton ship has a 194-foot drilling derrick, a three-story detachable laboratory, and fore and aft thrusters that keep her within a fixed position despite high winds and strong currents. She can drill in 20,500 feet of water into 4,600 feet of ocean sediment and solid volcanic rock. Since Christmas day 1970, she has also had the capacity to reenter a previously drilled hole in the ocean floor.

In August 1968, the Deep Sea Drilling Project (DSDP) got under way with 20 scientists aboard the Challenger for Leg I
in the Gulf of Mexico. Since then, DSDP has entered the International Phase of Ocean Drilling (IPOD), with nine U.S. and five foreign institutions, including the U.S.S.R. Academy of Science, participating and financially supporting the project. By June 1978, DSDP had completed 59 voyages, and the *Challenger* had plumbed the ocean bottom at 451 sites, sailed more than 250,000 nautical miles, and taken more than 170,000 feet of core samples.

The *Challenger* has significantly penetrated the ocean barrier separating the marine geologist from his geology and, according to Echols and Batiza, it has gathered enough material to keep earth scientists busy for untold years to come. Most significant among the *Challenger*’s accomplishments has been confirmation of sea floor spreading and the plate tectonic theory. Like Darwin’s theory of evolution, plate tectonics is a unifying theory which gives a comprehensive picture of its field. But no single flash of insight gave it birth. Rather, several interrelated discoveries and theories brought acceptance of its basic tenets.

Always intriguing has been the jigsaw-puzzle fit of the opposite coasts of the Atlantic Ocean, which caused speculation that the continents once had been joined, then drifted apart. By 1912, the German meteorologist Alfred Wegener had gathered enough evidence to support an extensive theory of continental drift. He showed that rocks and fossils on either side of the Atlantic correlated “as if we were to refit the torn pieces of a newspaper.” He also cited climatic changes, such as subtropical fossils in now-arctic Spitzbergen. The big flaw in his theory was his notion that, when *Pangaea* (Greek for all earth) broke up, the continents “sailed” through solid rock.

Scientific devices developed during World War II raised the continental drift controversy to a new plateau. Particularly important among these devices was the magnetometer, which allowed study of the variations in the sea floor’s magnetic field. Two new areas of investigation then emerged to provide strong support for continental drift. One was the study of the underwater mountain system that winds around the world. The other was paleomagnetism, the record frozen in rocks in the sea floor of alterations in the earth’s magnetic field.

The *HMS Challenger* discovered part of that underwater mountain system, the Mid-Atlantic Ridge. In 1956, two Columbia University professors, Maurice Ewing and Bruce C. Heezen, proved that this ridge and others were connected in one mighty submarine range. Marie Tharp, a Columbia colleague, pointed out that earthquakes and volcanic activity were concentrated along a great rift valley that ran down the center of the range. She also showed that earthquakes and volcanoes centered beneath incredibly deep ocean trenches and young continental mountains like the Andes.

In 1962, Harry H. Hess of Princeton University and Robert S. Dietz postulated that the earth constantly is tearing apart along mid-ocean ridges and new material is welling up from its interior. That sea floor enlargement pushes the plate away from the ridge. At its far side it disappears into ocean trenches and beneath continental mountains. This could account for the concentration of earthquakes and volcanoes in those areas. Two British scientists, Frederick J. Vine and Drummond H. Matthews, compiled more evidence in the early 1960’s. Molten rock forms crystals as it hardens. As rock cools below the Curie point (the temperature below which its magnetic properties cannot be changed easily) the tiny crystals in the rock align with the earth’s magnetic field. For reasons not well
understood, the earth's magnetic field has reversed directions at least 170 times in the past 76 million years. According to Vine and Matthews, volcanic rocks as they solidify become permanent records of the changes in the earth's magnetic field. When a magnetometer is pulled across the ocean's surface, it reads the magnetic reversals. Graphed, these reversals appear as zebra-like stripes parallel to mid-ocean ridges. Vine and Matthews first postulated that the stripes are due to spreading of the sea floor away from mid-ocean ridges — an immensely valuable link in the plate tectonic theory.

When J. R. Heirtzler of the Lamont-Doherty Geological Observatory discovered that the magnetic anomalies (the name given to the striped patterns of magnetic reversals) were not only parallel to ridge crests, but exactly symmetrical on either side of the ridge, a flood of research on magnetic anomalies followed. And in 1968, Heirtzler constructed a time scale for magnetization of the sea floor extending back through the Cenozoic Era to 65 million years ago. Magnetic anomalies not only lend support to the theory of sea floor spreading (and so to plate tectonics theory) but simply by dragging a magnetometer behind a ship anomalies can be used to determine the age of the sea floor.

Today, in addition to evidence obtained during deep sea drilling, a new dimension has been added to oceanography. Between 1973 and 1975, during Project FAMOUS (French-American Mid-Ocean Undersea Study), several deep-sea submersibles sporting hinged arms with pincerlike hands recovered rock samples and photographed the ocean floor two miles below the surface. Working for the first time in a large-scale operation, the submersibles ranged over a sixty-square-mile section along the Mid-Atlantic southwest of the Azores. The value of observing the rock strata of the ocean floor as if it were ordinary land and of recovering rocks with full knowledge of their exact location cannot be overestimated.

Batiza made three dives in the Navy's Deep Sea Research Vessel DSRV Turtle in April of last year on the East Pacific Rise southwest of Mexico. The Turtle's maximum depth is 6,500 feet, so Batiza studied the young sea-mounts on either side of the central rift valley. Batiza recounts that the experience of suddenly seeing the ocean floor after descending in darkness for more than three hours was magnificent. With powerful searchlights, he and a two-man Navy crew photographed the lava on the sea floor and retrieved rocks.

Volcanic rock spews onto the ocean floor all along the rift valley in the mid-ocean ridge system. At such depths, the volatile gases in the lava remain in solution in the rock, and the lava squeezes through the rift like toothpaste from a tube. With no more sensational pyrotechnics than the exhaling of a few bubbles, it cools into ropes and pillows. When it touches the thirty-nine degree sea water, the 2,200-degree lava hardens instantly into basalt with a covering of shiny black obsidian. The obsidian is glass, which is igneous (from Latin *ignis*, meaning fire) rock with the tiniest and finest grains. The basalt is a hard, dense, dark igneous rock made mostly of silicon and iron in minerals of olivene, plagioclase feldspar, and augite.

The basalt Batiza found near the East Pacific Rise was one-and-a-half to two million years old, but had almost no dusting.

Last summer Batiza made three descents to the ocean floor in one of the Navy's new deep-sea submersibles.
of sedimentary material — the fossilized ocean life that drifts to the bottom as the floor moves away from the rift valley. Such sediment stacks up as much as a third of a mile thick to form layer number one of the four layers that, according to plate tectonics, constitute sea floor plates.

**Pillow Basalt** with fine-grained crystals of plagioclase feldspar and gabbro (basalt that has cooled more slowly and so has larger crystals) make up layer two, which can be one and one third miles thick. Layer three is gabbro with even larger crystals; it can be two miles thick. And layer four is mostly various types of a rock called peridotite.

These four layers constitute the solid lithosphere (from Greek *lithos*, meaning stone), which reaches 100 miles into the earth beneath the continents and 60 miles under the sea. It is broken into the various mobile plates that make up the earth’s surface.

Below the lithosphere lies the plastic, partially molten asthenosphere (from Greek *asthenos*, meaning liquid), reaching 300 miles down to the earth’s inner, probably solid, mantle. In the partially liquid asthenosphere, hot magma rises while cooler magma sinks, forming convection currents. When the rising magma pushes up underneath the lithosphere to form a dome, the resultant tension in the hard plate causes it to crack. Molten magma rushes into the seam, some of it solidifying and opening the rift wider.

As the rift widens, the lava escapes onto the sea floor as extrusive pillow basalt. The now separate parts of the plate ride the convection current away from the rift, sliding along the dome-shaped asthenosphere while being pushed on one side by rising magma and pulled on the other by gravity and the downward flow of the convection current. The heavier basalt plates eventually slip under lighter continental granitic plates in an action called subduction.

The solidified magma in the lithospheric shaft beneath the rift and the pillow basalt in and on top of the rift, form a new portion of the sea floor which moves, with the rest of the plate, away from the rift. The shiny surfaces of the obsidian dull with age as they acquire a coat of manganese oxide.

Leg 58 of the Deep Sea Drilling Project (DSDP) took Dorothy Echols to the Shikoku and Daito Basins in the northwestern Philippine Sea. The Philippine Sea covers the relatively small Philippine Plate between the Marianas and Philippine Islands, west of the Pacific Plate.

Echols was a part-time laboratory instructor in micropaleontology at Washington University during World War II. After devoting full time to raising her family, in 1951 she returned as a part-time assistant professor. Being mid-continent representative for the international journal *Micropaleontology* and a fellow of the Geological Society of America and the American Association for the Advancement of Science has contributed to her worldwide professional reputation. Still employed part-time, she is now an associate professor of micropaleontology and biostratigraphy. She specializes in identifying the more than 3,500 species of foraminifera (microscopic fossil shells built in coiling chambers by one-celled creatures). Through this study, and other allied earth sciences, the strata in various regions of the earth can be decoded to determine geologic history.

Magnetic anomalies and drillings in the basement rock (rock which forms at a ridge crest then moves to a new location with the plate) in the Shikoku and Daito Basins suggested they were formed by conventional sea-floor spreading from a mid-basin ridge. Five sites were drilled, three in the Shikoku Basin and two in the Daito Basin and Daito Ridge area.

Cores drilled by the *Challenger* are twenty-nine and-a-half feet long and are brought up in a plastic liner. When the core is removed from the core barrel, it is split in half lengthwise. One is the working half and the other is placed in archives. The working half is cut horizontally into six equal sections.

Using a plastic collar, a technician scoops samples of sediment from sections of the core and places them in white plastic vials the size of medicine bottles. More samples than normal are studied when the material in the core appears to be changing in terms of the characteristics scientists use to determine past environment.

As past environments changed, the sediment formed during successive environments also changed. The process was and still is usually gradual, taking millions of years, but dramatic climatic changes can occur within a few thousand years — a wink in geologic time that can be represented in a fraction of an inch of sediment. Whenever they believe a new set of environmental characteristics was becoming evident, the scientists used the extra samples for more careful analysis.

The cores with which they worked represented, in just a few feet of sediment, the geologic history of millions of years. The rate at which dead and decaying ocean life builds up sediment on the ocean floor varies. One 500-foot drilling in the Shikoku Basin, site 442, contained fossils one-and-one-half-million years old. The oldest sediment found there was formed during the early Miocene Epoch (18 million to 21 million years ago and at least 15 million years before primitive man).
The five sites showed that the basins may not have been formed as assumed, by simple spreading from an extinct mid-basin ridge. Some of the basalt in the basins was the pillow basalt normally formed at ridge crests. While still at sea, the only way to determine the age of such basalt is to date the sediment immediately above and below it. Because pillow basalt can occur only on the surface of the sea floor where the lava has room to form characteristic shapes, the age of the sediment immediately above it will be close to the age of the basalt.

If magnetic anomalies are produced when basalt forms at a spreading center, the age of the sediment above and adjacent to pillow basalt should coincide with the magnetic anomaly time scale for the area. If it does, the pillow basalt is considered basement rock. Such agreement occurred only once during Leg 58, indicating either that the magnetic anomaly is wrong or basement rock had not been reached.

These discrepancies occurred because the area of the Shikoku and Daito Basins is quite complex. Pillow basalt can form not only at ridge crests but anywhere on a plate. If the volcanism takes place after spreading has occurred, this basalt will be younger than basement rock and above it. Such off-ridge volcanism has evidently occurred in the northwestern Philippine Sea.

Dating the basalt also was difficult because the foraminifera and other calcareous (made from calcium carbonate) fossils in the sediment had passed through the carbonate compensation depth as they drifted to the sea floor. In 1971, Wolfgang Berger determined that at a certain depth, which differs within the ocean, the calcium carbonate in calcareous fossils dissolves in sea water. No planktonic (living in water above the ocean floor) or benthic foraminifera are present in sediment formed below the carbonate compensation depth. When the floor is at or near that depth, some foraminifera survive, but these are pitted and puny and, according to Echols, can easily be mistakenly classified.

Other fossils which have silica-based shells, such as radiolarians, are also used to date the sediment. Planktonic foraminifera, however, are well suited for age dating and climate research because they are more widespread and have been extensively studied. They evolved quite rapidly after their number increased dramatically about 140 million years ago.

To study the foraminifera from Leg 58 in her laboratory, Echols has accumulated hundreds of white plastic bottles containing core samples. After boiling samples in pyroxide to break the fossils free, she washes the mixture through a 75-micron screen (a micron is no larger in diameter than a human hair) and dries it in an oven. Then she "picks the bugs" out of the remaining sand and dirt and glues them to a slide to examine the foraminifera at magnifications greater than 100 times their normal size.

In this way, sample by sample and slide by slide, Echols is reconstructing the geologic history of the basins. Certain species of foraminifera lived at certain times in the past. Some species liked warm, shallow water. Others lived on the ocean floor (benthic) rather than in the water closer to the surface (planktonic), and still others coiled one way in warm water and another in cold water. When such information from the Shikoku Basin was correlated with the magnetic anomaly for that area, scientists reasoned that 15 million years ago the basin was an equatorial sea 300 miles south of its present position. "It doesn't seem like much, and it's not too high-powered," Echols says, "but you can really piece together a story when you can recognize the bugs."

Her enthusiasm for the work is shared by her colleague, Rodey Batiza, who has been in love with the sea since he spent two years as a submariner in the Navy. That 1968-to-1970 tour was the result of his dropping out of college during the Vietnam War. He recalls that toward the end of his tour, on a midnight-to-4 a.m. watch, he picked "geology" out of a hat into which he had placed slips of paper representing things that interested him most. Now that he is an assistant professor and a fellow of the McDonnell Center for the Space Sciences, the main thrust of his research is investigation of the relationship between the chemistry of volcanic rocks and their tectonic environment.

He says, "I look at rocks from all types of places — island arcs, ridges, seamounts above and below the sea, fossil..."
Aboard the R/V Melville, Batiza (left) and colleagues prepare to lower a "pinger," which emits sonar signals.

Drillers aboard the Challenger hoist overboard a re-entry cone. After the cone is submerged to twenty-two feet, it is keelhauled to the opening mid-vessel, directly under the drilling derrick, and sent to the bottom on the drill string. Sonar reflectors on the cone's edge enable the Challenger to locate and re-enter a previously drilled hole.

ridges, anyplace I can get volcanic rocks — to try to improve our understanding of the volcanic processes in the ocean, and how they relate to plate tectonic processes.

This was his purpose aboard the Challenger on Leg 61 during its trip to the Nauru Basin. Because of its position in the Pacific Plate near a subduction zone, the Nauru Basin northeast of New Guinea in Indonesia should contain some of the oldest sea floor in the Pacific. The basin is one of only a couple of places in the Pacific where Jurassic crust from the Mesozoic Era (just before the extinction of dinosaurs) can be expected to be found. No ocean crust that old had even been drilled before. By correlating the age of the basaltic crust with the magnetic anomaly time scale, Batiza hoped to gain further evidence to uphold the plate tectonic theory.

But the magnetic anomaly time scale for this area was worked out only about five years ago, and the basin is surrounded by volcanic activity which over the eons had covered it with various forms of basalt. What was to have been a simple job of analyzing a few feet of basalt turned into something quite complex. In fact, Leg 61 was extended by three weeks and with drilling costs of $22 million a year, the extension indicates the site's importance.

Only one hole was drilled. After boring through 1,640 feet of sediment, some of which was 70 to 100 million years old, the crew hit a massive basalt structure, with occasional layers of sediment interspersed, which continued to 3,319 feet. The deepest sediment recovered was 125 million years old, too new according to the magnetic anomaly time scale for the basin for the basalt structure to be basement rock. However, it possessed some characteristics of the type of basalt formed at mid-ocean ridge spreading centers and so presents a fascinating problem.

Its chemistry showed it to be tholeiitic basalt, with the low potassium and titanium content normal at ridge crests. According to the alteration pattern, that is, how its appearance had changed with age, the basalt looked younger than the expected 155 million years. Fifty percent was extrusive, like that formed on the sea floor at ridge crests; the rest was intrusive, squeezed into
layers between the tholeiitic basalt. Some of the rock also lacked the pillow structures normally found at ridge crests, even though the lava had erupted onto the sea floor.

Batiza doubts that this is basement rock for two reasons: the magnetic anomaly age does not match the age determined from the adjacent sediment; in addition, some clues from the appearance and chemistry of the basalt point to off-ridge volcanism. Off-ridge volcanism could account for the former discrepancy. Off-ridge volcanism would have covered the basement rock, as scientists assume happened in the Shikoku Basin. But the evidence of relatively fresh, ridge-crest volcanic rock cannot be dismissed.

Answers to such puzzles may lie in research Batiza has recently published in a paper about Isla Tortuga in the Gulf of California. Tortuga is a small, young (less than two million years old) oceanic volcano composed of the tholeiitic basalt found at ridge crests. It is part of an active spreading trough in the Guaymas Basin.

The significance of Tortuga and other seamounts of the same type is that, if they remain active as they move with the sea floor away from the ridge crest, the chemical content of their lavas may give clues to the transition from tholeiitic ridge-crest volcanism to alkaline off-ridge volcanism. The alkaline basalt has more sodium and potassium and less silica than tholeiitic basalt. This could help determine the changes in the chemical composition of the upper mantle under the sea and the other processes responsible for the chemically different types of lava. Much could then be deduced concerning the tectonic environments of volcanic rocks found at different places on oceanic crust, such as an explanation for the mixture of basalts found during Leg 61. Batiza will continue analysis of the basalt in his laboratory.

While he was still at sea, Batiza’s examination of the basalt was limited to a few tests. Visual inspection is a quick way for the petrologist to determine the kinds of basalt formed at specific depths in the core. Examination of a 30-micron thin section of rock under a microscope tells the petrologist the mineralogy of the basalt and the rapidity with which it hardened (the larger the crystals, the more slowly the basalt formed). On-board X-ray fluorescence spectroscopy analyzes the chemistry of the basalt by picking out the particular X-ray frequencies emitted by each of eleven common elements. But the exact age of the basalt must wait for a landside laboratory with radiometric dating equipment, which measures the radioactive elements in the basalt.

Detailed laboratory analysis of the core samples from Batiza’s and Echols’s DSDP adventures is still being performed. Meanwhile, the Glomar Challenger continues to drill, bringing up more unanswered questions from the sea floor. While plate tectonic theory is now widely accepted, it will be refined by the growing evidence.

Next year, however, when the JOIDES contract with the National Science Foundation, the major funding agency for the DSDP, runs out, Challenger may stop drilling. The relatively shallow drilling done by the Challenger may be reaching a point of diminishing returns. A decision must be made whether to continue using the Challenger, or to invest in a large drilling operation. The ship which looks most promising for such an operation is the Glomar Explorer, the salvage ship used several years ago by the CIA to pull up a Soviet submarine from the ocean bottom near Hawaii.

This research ship would cost more to operate, but possesses vastly increased capabilities, with a hull volume five times greater than the Challenger’s and ten times the lifting capacity. Risers and blow-out preventers enable the Explorer to drill where there might be oil. The decision to invest in the operation of the Explorer, to continue with the Challenger, or to use both, will be made by balancing the cost of operation of each ship with the expected returns, scientific and economic, and the wishes of oceanographic researchers and politicians.

Whatever the decision, no dearth of material for scientists to analyze will plague any future research project. Dorothy Echols says she recently read a new article on evidence recovered from the sea floor during Leg 3 of DSDP, a cruise that took place more than 10 years ago. With continued funding, deep sea drilling undoubtedly will unearth many unsolved and many more unsolvable mysteries about the earth’s behavior.
Two questions underlie these remarks: What are the special concerns and priorities of the black college student of the eighties? What can Black Studies do to address these concerns? Perhaps the paramount concern of the black student is educating himself or herself for meaningful employment. That concern is justified, because the eighties, like the late seventies, will present real employment problems. The black student will be caught between the squeeze of shrinking work opportunities in the public sector and continued discrimination in the private sector.

While Eleanor Holmes Norton, Chair of Equal Employment Opportunity Commission, is increasingly more effective in getting the business community to comply with equal employment opportunities, the private sector still deals basically in tokenism. And even the token jobs are low-level positions. Andrew Brimmer, former governor of the Federal Reserve System, informs us that the increase in black employment is "much slower in the upper reaches of the occupational scale than it is among job categories at the lower end. Thus, the task of occupational upgrading for blacks remains considerable."

That puts it mildly. With the rise in political and fiscal conservatism there is little likelihood that a rise in the percentages at the higher end of the employment scale will occur, thereby decreasing the number of job opportunities for blacks in the private sector. It takes little imagination to conjure up the very stiff competition for the "nonexistent" quota for blacks. In fact, the black student of the eighties is presently being groomed for this fierce competition.

The depressed black-American economy and the worsening of the American economy make for hard times for the black worker and strict times for the black middle class. This middle class, enlarged as a direct result of the sixties, is counseling its sons and daughters into the professions—any profession other than education. And these people are giving wise counsel. According to a Bureau of Labor
Directions & Priorities

Statistics employment projection to 1985, most of the demand for workers will be in the professions—health occupations, social services, urban improvement and protection, social science, scientific and technical areas (with the exception of chemistry), computer areas, banking and finance, the legal profession—all of these look good as employment opportunities.

Our purpose in giving this relatively simplistic economic background is to provide a backdrop for the question: Where and how does Black Studies fit into the preprofessional trend in education? There is some merit to the argument that Black Studies should continue its present directions and ignore the preprofessional trend. For, as Professor W. E. Abraham argues, one must not confuse a liberal undergraduate education with preprofessional training. Education, Professor Abraham says in The Mind of Africa, helps one to form human values and to develop the sensitivity of mind and spirit required to solve value conflicts. On the other hand, preprofessional education is designed to help a nation solve questions of a particular and contemporary need: developments in health, communications, industry, and so forth. Value training (through the study of literature, history, philosophy) is for the most part coincidental in preprofessional education.

Understanding, appreciating, and advancing Abraham’s point about value training makes more urgent, however, the question of the place of Black Studies in the curriculum of the eighties. One useful answer concerning its place is for the Black Studies departments to continue what they are doing and to begin serious studies of ways to develop curricula which prepare the preprofessional for work in Africa, in the black community, and throughout the Third World. We must design courses, organize colloquia, and call conferences on the preprofessionals’ interests. If, as I understand, two thirds of the blacks and one half of other freshmen chose Washington University because they hoped to get into its Schools of Medicine, Business, Engineering, or Law, then Black Studies might reflect this fact. Early, students need not only the history of blacks in medicine (or in other professions), but courses which survey the special medical needs of black America and Africa. The premedical student should be given opportunities to spend a year, or a semester, or a summer studying the traditional healing methods in Africa.

Students with interests in banking and finance, areas which Brimmer highly recommends for future black employment, should be given opportunities through Black Studies to study the history and practice of banking and finance in the black community. Not only could black experts be brought into the classroom, but students could study in financial institutions in Africa and black America. Why not study international finance in Africa? The same applies to dentistry, medical technology, architecture, urban planning, and economics. It may even apply to communications: editing, reporting, and radio and television broadcasting are all areas which the Occupational Outlook Handbook says look bad for the eighties.

But we in Black Studies must remember that these are projections for the U.S. Black Studies must educate the student to the very real needs for these professionals in Africa. I shall never forget an experience in Ghana during my rhetorically black days. Talking with the assistant director of Radio Ghana, who was the only African in a policy making position, I asked him why were not more blacks making policy decisions. He answered: "Because people like you are over here asking such questions instead of helping us to find trained black Americans and to send Ghanaians to your country for such training." The U.S. Bureau of Labor Statistics’ projections about education do not apply to Africa, which is expanding its educational system tremendously. We must answer their inquiries for help.

For the eighties, Black Studies must explore ways of making black culture (which Charles A. Frye calls the ideational mode of being) more operational. In an article on the definition and administrative model of Black Studies, Frye defines operational as concerned with “the practical application of ideas and the expansion of mankind’s physical/material possibilities through action.”

Making culture operational is not a very difficult task if, as Professor Abraham says, culture is viewed as a “source of solidarity” of the complex mechanism, symbols, and ideologies of social integration and common belongingness. The African interest in culture, Abraham notes, is not historical or archaeological, but directed towards the future. “It helps importantly in solving the question not of what Africans were like, but of how we can make the best of our present human resources... This emphasis makes the development of African cultural education not only theoretically, but also pragmatically satisfying.”

Abraham concludes: “The development of cultural education calls, however, for tremendous and widespread effort. This effort will be geared to moulding our cultures into something articulate in a literate way to meet the challenges of the modern world.”

Black Studies must carefully mix its cultural education with the theoretical and the pragmatic, making sure that they are mutually supportive. That cultural education, however, must be more than...
celebratory education, festivals, or periodic productions. We must pattern ourselves after the Africans by making black cultural education a mode for moral training, teaching responsibility, and even the history of our people. Consider John Wilson’s explanation in *Education and Changing West African Culture* of the uses of African cultural artists, specifically, the drummer: “Long genealogies have to be learned, the stories of the great figures of the past, the battles, the famines, the triumphs, and the disasters enshrined in ballad form, the wise sayings, the proverbs, the spells, incantations, and slogans. This all has to be learned by memory, together with all the ritual surrounding it.” Wilson continues: “The telling of all this has to be rendered in drum patterns following the rise and fall, stress, and intonation of the language used, reinforcing it, and carrying it over long distances. To achieve this, the drummer must go through the long discipline required till he is perfect, and until he eventually becomes a virtuoso in his own right. He must acquire skills by observation, imitation, continued practice, rigorous discipline, and the most assiduous cultivation of the memory. These drummers,” concludes Wilson, “are the high-fliers, the very elite of the educational system.”

**Under the Umbrella of These Ideas, We Might Now Make Some Specific Proposals for Immediate Attention:**

Let us begin a critical analysis of our curriculum. We might even want to have a moratorium on new courses until we are assured that they fit a realistic plan for the eighties. And without decimating the present curriculum, we can systematically create a methodology for proposing, designing, and testing the viability of a course before making it a part of our curriculum.

Let us study ways and means of standardizing our curriculum so that our regular and occasional students, black and white, receive an ordered and engaging exposure to the black experience. And let us find ways to help the student use the black experience to develop questions about the meaning of human existence.

Let us study ways and means of making our curriculum commit the student—especially the preprofessional—to work in Africa, the black community, and throughout the Third World.

Let us now discover academically supportive ways to help the preprofessional benefit from the expertise and experience of black professionals who are committed to helping their community.

Let us increase the number and variety of travel opportunities for our students within the U.S. and the Third World. Most of our present students—and even the students of the eighties—should be beneficiaries of education gained from empirical investigations.

Let us now begin studies for the creation of a graduate program in Black Studies. From a thorough investigation of present graduate programs throughout the country, we should, by 1980, have before the Graduate School a really new and imaginative proposal.

Let us continue to increase our efforts to make our Black Studies program a department. Not only are funding agents interested in investing in stable, University-approved departments, but national and international scholars are far more interested in being a part of conferences and institutions which are sponsored by developed academic units.

Let us in the cultural arts cease our preoccupation with song and dance and theatre and focus instead on designing cultural educational systems that help black people improve life. Let us begin next semester with imaginative plans—realizing all the while that we have much hard work ahead.

Let us as a faculty find creative and enjoyable ways to improve our teaching, research, and community service skills and activities. We can do this through seminars; through participation in national and international conferences; through publication of our findings and ideas on important issues in the black community; through senior faculty’s taking an active interest in our junior (or untenured) faculty by offering even unsolicited advice and help; through debating public issues concerning the black community with whomever—even among ourselves; and through helping each other apply for grants and internships in important federal agencies. In these and other ways we can ensure not only our professional and personal growth, but we can undoubtedly attract and hire faculty who, without a single doubt, are excellent scholars and teachers.

And finally, let us study imaginative ways to make our students feel a responsibility to their race and community; to help them master the fine art of being intellectual without arrogance and detachment; and to help these students not only establish fine academic records, but develop the skill of arriving at sound judgments through critical thinking.

Let us begin serious studies of these and other ideas concerning the direction of Black Studies. And as we debate, let us be mindful of Tanzanian President Julius Nyerere’s comments about the purposes of formal education: “to prepare young people to live in and to serve the society, and to transmit the knowledge, skills, and values and attitudes of the society. Wherever education fails in any of these fields, then the society falters in its progress, or there is social unrest, as people find that their education has prepared them for a future which is not open to them.”
Where There's A Will...

In a recent article on prominent women economists, Time magazine ran mini-profiles of some of the best-known — most of whom hold policymaking posts in government — and the author observed, "Women have had a harder, slower climb in universities." That fact may have been news to many, but it came as no surprise to Alice Hanson Jones of Washington University.

Professor Emeritus of Economics Jones, now a spry and spirited seventy-four years of age, was warned early on that she would find it difficult to take root — much less to flourish — in the groves of academe. In 1977, only 3.3 percent of all full professors were women; there were even fewer when Jones was a young student, first in the Northwest and then Chicago.

Jones knew several of these hardy pioneers — Theresa S. McMahon, her charismatic mentor at the University of Washington at Seattle, where Jones earned her bachelor of arts degree in 1925 and her master's degree three years later, and the brilliant Hazel Kyrk, with whom Jones studied as a doctoral candidate at the University of Chicago. These women, however, were not only exceptional, but exceptions, and they knew it.

While packing off Jones (a Phi Beta Kappa with a full fellowship to Chicago), McMahon told her former teaching assistant bluntly, "You probably won't be able to get a teaching job when you graduate, but maybe you can do research." And that's precisely what Alice Hanson Jones did from the early 1930's through World War II, working mostly for the government. Instead of testing McMahon's prediction, Jones dropped her graduate studies when an attractive nonacademic job turned up. She did not so much fear never finding a suitable faculty position; she simply found the opportunities elsewhere more tempting.

It was not until three decades later that she returned to the university, and by that time, the old barriers were beginning to crumble. In 1963, at the age of 59, she accepted an invitation to teach economics at Washington University. Here, encouraged by her male colleagues, she completed the dissertation she had laid aside. The feat earned her a Ph.D. degree from the University of Chicago and international recognition as an economic historian of the first rank.

Of her accomplishment, Charles Leven, chairman of the Department of Economics, observed, "I don't think that anyone can really appreciate how remarkable it is for someone to write a dissertation forty years after passing her 'prelims.' " Jones's dissertation topic was "Wealth Estimates for the American Middle Colonies, 1774." The title is not imposing, but the work itself is a milestone — the result of indefatigable scholarship based on methodology devised by Jones. She transferred data — much of it squirreled away in musty old county courthouses — into tabulations which could be analyzed by a computer.

The colonies she studied were Pennsylvania, New Jersey, and Delaware. Two years after completion, this dissertation was published by the University of Chicago in its journal Economic Development and Cultural Change. Its impact on economic history was comparable to an important discovery in the world of medicine. In unearthing and shaking out new primary research sources, Jones shook up old precepts and estimates and provided a revolutionary research technique which, she has written, "gave a reasonably clear picture of wealth and its composition for one important colonial region on the eve of a new nation."

Its enthusiastic reception encouraged Jones to extend such estimates to the New England colonies, and, ultimately to all of the Thirteen Colonies. This final, all-inclusive study was published in three volumes entitled American Colonial Wealth — Documents and Methods by Arno Press, New York, in 1977. Now in its second printing, it sells for seventy-five dollars. In a perceptively written foreword to this opus magnum, Stuart Bruchey, Allan Nevins Professor of History at Columbia University, assessed its value succinctly. "This work of Alice Hanson Jones," he wrote, "has changed and will continue to change the course of history as we understand it."

What Jones did was to apply modern statistical sampling techniques to probate records to analyze American colonial wealth patterns. She believes she is also "the first to attempt to analyze such data by age and class, and the first to fit American colonial wealth into the conceptual framework and categories of our present-day wealth analysis." Thus, she sums up, "It became possible to compare the structure of the preindustrial era with that of later periods."

To accomplish this tour de force, Jones based her estimates on an unbiased statistical sample drawn from all probate inventories in the Thirteen Colonies in the year 1774. She ferreted out of county courthouses and state archives some 919 probate inventories from twenty-two counties and groups of counties. The initial sample was drawn up with the expert guidance of Jerome Cornfield, a brilliant statistician who is now professor of statistics at George Washington University. As her study progressed, Jones sought additional advice from two experts now with the Department of Applied Statistics at the University of Minnesota, Stephen E. Fienberg, professor, and chairman, and Kinley Larntz, associate professor. Discussing their assistance, Jones explained: "I always knew enough to know what I didn't know. You've got to have the sense to go to the experts and ask questions. That's a quality I had. With this help, I was able to do something that nobody else had done before."

Having made clear in her tripartite Arno publication...
Where There’s A Will

precisely what documents and methods she used, Jones is now preparing a companion book in which she will distill the essence of her findings and conclusions. To be published next year by Columbia University Press, it will be called *The Wealth of a Nation To Be: The American Colonies on the Eve of the Revolution*. This text will give accurate estimates of the amount and character of the wealth and lifestyle of all strata of American society within a population of nearly 2,400,000 white and black inhabitants.

Based on Jones’s calculations, aggregate private physical wealth of all Thirteen Colonies is estimated for 1774 at approximately 110 million English pounds, or about $5.25 billion in 1976 American dollars. This includes a valuation of $21.5 million in nonfree human capital (slaves and indentured servants) predominantly in the South. That sum is roughly equal to $1.027 billion in 1976 dollars. The average value of a slave was £34, or more than $1,600 in 1976 dollars.

Total private nonhuman tangible wealth in the colonies was about £88 million, which is more than $4.2 billion in 1976 dollars. This sum includes the value of privately owned land and improvements, which formed nearly seven tenths of the total. It also includes the value, as determined by contemporary court-appointed appraisers, of livestock, farm, business and household equipment, and stocks of consumers’ goods.

Jones states, “For the entire colonial population, man, woman and child, whether free, slave, or servant; white or black, private nonhuman tangible wealth averaged about £37.4 in 1774, equivalent to about $1,780 in 1976 (as shown on the accompanying table). In the colonies, that amount of money would buy about 310 bushels of wheat, 1600 pounds of rice, a Negro man, eleven cows, or six horses. If one counts only white men, the figure rises to about £218 per capita, the equivalent of approximately $10,400 in 1976 dollars. This figure represents a substantial stock of real wealth per white family, achieved 200 years ago in this newly developed part of the world.”

Jones’s study includes a plethora of comparative figures and tables which may boggle the mind of all but mathematically gifted readers. On the basis of these estimates, she concludes, “The colonists in 1774 were relatively well off in comparison with most of the population of that day in Europe and in comparison with much of the world’s population in today’s less-developed countries. In terms of real wealth per capita, they had attained a level one twentieth of that of the highly industrialized and complex economy of the United States in 1973.”

There were important regional differences. If the aggregate wealth is considered to be owned only by free persons, and the value of slaves is included in the wealth total, the South was the richest region by far. Its total wealth per free capita was double that of the Middle Colonies, with New England the poorest of the three. Jones adds, however, that the wealth advantage of the South over other regions disappears completely when only the nonhuman wealth is considered. Then, the per capita figure for the South equals that of New England and trails behind that of the Middle Colonies. Jones observed: “The evidence . . . suggests that, in many ways, divergent regional economic interests and social structures which were later to culminate in the Civil War had already taken deep root in the Colonies by 1774.”

Her study shows similar inequalities among the population as a whole. “There were many poor, but also many who were well off. In all regions, the share of aggregate wealth held by the poorest thirty percent of free wealthholders was very small, less than three percent, while the shares of top wealthholders were much larger.”

Those who hope to find in Jones’s study wealth estimates for the founding fathers will be disappointed. In the scientific sample which Jones devised, none of the probate documents examined included the last will and testament of a Washington, Jefferson, or Paul Revere. Perhaps the best known person whose probate inventory is included in the study is Thomas Gerry, the richest merchant in the New England sample. Father of Elbridge Gerry, who later signed the Declaration of Independence, he left an estate valued at £5,786, or roughly $276,800 in 1976 dollars. It included such sundry items as “his wharf and land thereto adjoining with the warehouse thereon situated in said
Where There's A Will

Marblehead, Massachusetts, and a pew in the old Meeting House in Marblehead."

Wealth in land, slaves, and goods of the free wealthholders, judging by the cases drawn in the sample, ranged from the £27,960 (roughly $1.3 million) estate of Peter Manigault of Charleston, South Carolina, to that of the unfortunate William Janney, a 64-year-old man of unknown occupation in Kent County, Maryland, who died with absolutely no such assets.

Among the sundries valued in the inventories in 1774 were such curiosities as an "old spade, ax & hoe," "one horse called Merry Tom," "five hives with bees," "eighty bushels of India corn," and "one old pinn tabol." ("The spelling in Colonial days was fearsome and wonderful," Jones explained with a smile.)

That problem was relatively minor, however, compared with others she encountered. Bruchey noted that these included "laboriously deciphering eighteenth-century handwriting, with its curlicues and flourishes . . . written on paper sometimes faded and crumbling, [and] seeking the help of others . . . [including] genealogists able to supply information that was essential to the age adjustment and critical to movement from an estimate of wealth of decedents to the wealth of the living of the corresponding class."

Even more difficult were the calculations necessary to arrive at a common value for the money of each province. "The colonists," Jones explains, "measured their wealth in local or provincial pounds, shillings, and pence." It was necessary to reduce these to the common denominator of British sterling, then to translate the pound sterling in 1774 may be considered, in recent wealth purchasing power, equivalent to $47.84, or roughly $50.00 at the price level of 1976." Jones makes it seem deceptively easy; it wasn't.

In collecting and assembling this research, Jones was aided by a covey of student assistants and genealogists and supported by grants totalling $152,970 from the National Science Foundation and the National Endowment for the Humanities.

For these and many other reasons, Jones's University colleagues regard her accomplishment with a sense of awe. Perhaps her friend Professor David Felix expressed it best: "She is going to be immortal in the sense that nobody in his or her right mind is going to redo all that calculation. Her data and results will be a kind of benchmark among quantitative historical studies of the American economy."

To express their admiration, fellow faculty members and the administrators of the University Libraries invited the University community to a lecture and reception in December honoring her effort. In conjunction with this occasion, the library staff mounted an exhibition of Jonesian memorabilia. Some weeks later another female with the same given name, Alice as in Wonderland, was saluted in the same exhibition space. The coincidence struck many as appropriate because the two have something else in common — worldwide recognition.

Nearly all of her colleagues mention her fame abroad. Harold Barnett, a former chairman of the department, observed: "Overseas she is one of the best known of this University's faculty. Her set of data, which had never previously existed, is useful to economic historians and historians all over the world. If you walk into a history department in Bonn, or Vienna, or wherever, and mention Washington University, someone is likely to say, 'That's where Alice Jones is.'"

At her Olin Library lecture, Jones briefly sketched the origins of her research. She traced its beginnings to a sophomore course taught by the woman educator who influenced her most — the inimitable McMahon. Jones's three-volume compendium is dedicated to her former professor "who first interested me in 'social and economic standards of living.'" Another McMahon offering, the economics of consumption, proved equally stimulating. "These twin interests in consumption and living standards have run as a persistent thread of interest throughout my

1774 Pounds Sterling 1976 Dollars

<table>
<thead>
<tr>
<th>1774</th>
<th>1805</th>
<th>1850</th>
<th>1900</th>
<th>1929</th>
<th>1950</th>
<th>1973</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>150</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>200</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>250</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>300</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>350</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>400</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>450</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>500</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>550</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>600</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>650</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>700</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>750</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>800</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>850</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>900</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>950</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,050</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,150</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,200</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,250</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,300</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,350</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,400</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,450</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,500</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,550</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,600</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,650</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,700</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,750</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,800</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,850</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,900</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,950</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Per Capita Private, Nonhuman, Physical Wealth United States, Benchmark Dates 1774-1973

SOURCE: 1774 data from Jones's study. Other dates from studies by other scholars, arranged for comparability by Jones.

NOTE: This figure makes clear that physical real wealth per capita was twelve times greater in 1973 than in 1774. Limitation to nonhuman wealth means that value of privately owned slaves is excluded from wealth shown for 1774, 1805, 1850.
Jones described the weaving of this thread into the pattern which has characterized her work. The sparks of interest which McMahon ignited were fanned to enduring flame at the University of Chicago. Jones learned more about consumption from Hazel Kyrk and was profoundly impressed by Professor Chester Wright, seminal economic historian. He stressed that you can judge the performance of an economy by the standard of living produced for the common man.

To emphasize this point, Wright asked his students to write two papers demonstrating the relationship of consumption to history. One of these assignments required comparison of the standard of living in 1770 with that of the current day, which was 1932. It was a task tailored to Jones’s talents and interests. Upon completion, she asked Kyrk and Wright to constitute a committee to sponsor her dissertation based on a more exhaustive investigation of this subject. They agreed and, in the winter of 1933-34, the enterprising Jones began to accumulate notes about the standard of living in the late colonial period. Wright suggested that as a start she ought to examine the colonial wills collected at the Library of Congress.

Jones wasn’t excited about that advice at the time, because “I was interested in the common man rather than someone rich enough to bequeath a velvet suit to his son.” Nonetheless, she followed the suggestion and discovered a cache of papers — most of which showed only the disposition of such effects. What Jones needed was an evaluation. To her delight, she discovered that a few of these documents provided such information in the probate inventories appended to them.

Attractive job offers, family responsibilities, and illness caused her to stash these notes away until the 1960s when Barnett suggested that she dust them off and write the dissertation she had set aside. “I really didn’t know on what fertile soil this idea would fall,” he recalled. “I didn’t know that when she gets hold of an idea she never lets go.”

“I had always wanted to finish the study on the standards of living,” Jones reminisced, “but after so much time I no longer thought of it as material for a degree.” Barnett’s prodding, however, spurred her to action.

In fall 1964, she made an oral presentation before Robert W. Fogel (then at Chicago; now Harold Hitchings Burbank Professor of Political Economy and Professor of History at Harvard). He listened intently and then asked, “How good are the wage and price data?”

On the basis of previous research which she had done, Jones admitted: “Terrible.” But then she told him of the data she had found on probate inventories. “They give everything, from the value of a horse to some worn pots and pans.”

“Fogel’s eyes just glistened,” Jones recalled, “and he asked where these things were. I told him I believed they were in county courthouses. That was all he needed to know.” It was he who proposed that she do a statistical sample of counties and probate inventories in order to come up with wealth estimates. He admonished her not to begin, however, without first locating a sampling expert. Their conversation that day changed the focus of her dissertation from a study of standards of living to that of wealth estimates.

Jones was particularly well qualified to make such a study, because during the years between her early studies at Chicago and her conversation with Fogel, she had accumulated through a variety of on-the-job experiences a vast amount of useful knowledge.

She had honed her writing talent as assistant to Alvin Johnson, editor of the Encyclopedia of Social Sciences, who hired her in 1930. The salary of $3,600 a year seemed a windfall in those depression days and sufficient reason for chucking her graduate studies, which were financed by what was then considered a generous $700 fellowship and money earned at part-time work. Moving to New York, she began writing on economic consumption for the scholarly Johnson, and after three months on the job married Homer Jones, whom she had met while both were studying at Chicago.

Homer Jones, who also became a distinguished economist, saw his bride only on weekends that first year; he taught at the University of Pittsburgh. Meanwhile, his wife — who continued to call herself Alice Hanson through 1947 — accepted another fascinating job offer on the East Coast.

Her supervisor was the late Robert S. Lynd, author with his wife, Helen Merrell Lynd, of the famous sociological study, Middletown, based on research done in Muncie, Indiana. Then secretary of the Social Science Research Council, he was asked to serve on the President’s Committee on Recent Social Trends. Lynd hired Jones to help him write a chapter on the consumer for this study. Their work, done in New York in 1931-32, was eventually published as part of the two-volume Report of the President’s Committee on Social Trends, with Jones listed in the credits as assistant to Lynd.

Meanwhile, Homer Jones found a teaching job at Rutgers University in New Jersey and commuted from the couple’s apartment near Columbia University.

Completing her work for Lynd in 1932, Jones and her husband planned to return to the University of Chicago, where she had been offered a research position by Frank H. Knight, eminent economic theorist. Before heading back, however, they sailed for Europe to bone up on French and German, which they needed to

Washington University Magazine
pass their doctoral language examinations. There, they studied at the University of Vienna and at the Sorbonne.

They separated briefly, with Homer Jones going on to the University of Heidelberg while his wife headed home. He returned in the winter to find her enjoying economic theory discussions with Knight, although her work consisted largely of typing papers. The following year, she joined Kyrk as a research assistant on consumption economics. Meanwhile, both Joneses had discussions with Knight, although her work consisted largely of typing papers. The following year, she joined Kyrk as a research assistant on consumption economics. Meanwhile, both Joneses had passed their examinations.

Her husband accepted a fellowship at the Brookings Institution in Washington, D.C. Of two prospective employers, she chose the Bureau of Labor Statistics' Cost of Living Division, where what is now called the consumer price index is constructed, because it sounded interesting and was only supposed to last four months. After that, she reasoned, she would resume work on her dissertation. Quickly promoted, she stayed for ten years (1935-1945) as assistant chief of this division, directing surveys of workers' family incomes and expenditures, which she reported in the Monthly Labor Review and in monographs as government bulletins.

While there, she accepted three special assignments. During the summer 1935, she was loaned to the National Resources Committee to help plan a nationwide study of consumer purchases. Three years later, she was sent to Geneva for six months' work on a report on workers' standards of living for the International Labor Office. During the first half of the 1940s, she was asked to make periodic visits to Puerto Rico to serve as an advisor on the first island-wide survey of incomes and expenditures of families of wage earners.

Meanwhile, the Jones family was growing. Their first son, Robert, now an economist with the United Nations in New York, was born in 1939; a second son, Richard, now an Episcopal minister in Enterprise, Alabama, arrived in 1943; and a year later came their last child, Douglas, now a financial analyst for a Minneapolis bank.

For a short time after Douglas's birth, Jones stayed home, but because of World War II, she joined the Division of Statistical Standards, United States Bureau of the Budget, working on a part-time basis for three years.

Then tragedy struck. During the winter 1947-1948, she was diagnosed as having tuberculosis. A specialist recommended six months of bed rest at home. Because the disease was contagious, she was isolated from her children. "It was just awful," Jones recalled with a shudder. "My dishes had to be boiled and my children were upset." There seemed nothing to do except enter the tuberculosis sanitarium at Trudeau, New York, where she might have to stay for years.

While there, she learned to paint, but her lessons ended when it was discovered after two months that she did not have tuberculosis. Discharged as having recovered from a mysterious viral pneumonia, she spent several months in Canada recuperating. During this period, she spent her happiest days with a farm family outside Quebec, regaining her health by walking and painting.

Upon returning to Washington, D.C., she resumed art studies and continued painting, but spent the better part of the next eleven years raising her family. In choosing to become a full-time housewife, she herself does not believe she made a tremendous sacrifice. "I think that today with the recognition of equal rights for women, no female need apologize for being a homemaker. It is an important, rewarding, and fulfilling job. If a woman elects to do it when her children are small, she is probably very smart. It is, moreover, probably a good thing for her children and society. But," she added, "if a mother resents this role, then she should make the best arrangements she can for good child care and pursue her professional career. Otherwise, her resentment will affect her children adversely."

Jones believes that women should collect social security as homemakers, and she now supports the Equal Rights Amendment (ERA). She had feared that the equal wages provision might result in fewer jobs for women. "But times are changing," she said with evident satisfaction, "and the opportunities for women today are tremendous. I've been won over. I still firmly believe, however, that women should not be given jobs because of their sex, but rather because they are fully qualified. To the women's libbers, I say, play it with a light touch! Don't overstress; don't overpush. Prove instead that you can do the job. It is perfectly evident that we can."

Alice Jones comes from a family of enlightened females. Born in November 1904 to deaf parents, she is the second of three daughters, all of whom graduated from the University of Washington at a time when higher education for women was still looked upon with suspicion. Illness (spinal meningitis in her mother's case and probably overexposure to severe weather in her father's case) left her parents deaf while still children. Their handicap led them to Gallaudet College (an institution of higher learning for the deaf) in Washington, D.C., where they met. Agatha Tiegel, Alice's mother, was the first woman to earn a bachelor of arts degree from Gallaudet, graduating first in a class of twelve in 1893. Olof Hanson, Alice's father, graduated from Gallaudet in 1886. He supported his family in Seattle as an architect.

At Presentation Day Exercises in April 1893, Tiegel...
deliver a stirring address on “The Intellect of Women” which reads as if it were written yesterday. Said she with spirited determination, “Woman should be free as the air to learn what she will and to devote her life to whatever vocation seems good to her.”

“Being a child of deaf parents was a very difficult thing,” Jones reflected. “We had a very different childhood, and this experience made me keenly aware of the problems of the handicapped. At an early age, mother taught us to be self-reliant. As a result, we learned how to accept responsibility.”

As a teenager, Alice Jones began to earn money to attend college because the family’s income was rather meager. But she was no drudge. Somehow, between studies and summer jobs, she became a mountain climber and scaled Mount Rainier enthusiastically. Her zest for sports has never waned. A member of the Sports and Recreation Advisory Committee at Washington University, she jogs about a mile or mile-and-a-half three times a week. Last year she also was instrumental in persuading the University to purchase expensive exercise equipment for women. Until recently, she was also a devotee of aerobic dancing.

S M A L L, S L I M, A N D Q U I C K, she darts about with a vigor which makes many far younger than she envious. Bounding up the stairs of McMillan Hall to her rather spartan office (brightened with two Jones “originals”) may leave others breathless, but not Alice Jones. Dressed in woolen tweeds and sturdy oxfords, she has the sensible bearing of a genteel but purposeful English woman who has ordered her life according to habit. Her manner is reminiscent of the redoubtable “Miss Marple” of Agatha Christie’s mysteries, as depicted by Margaret Rutherford.

Trudging through the snowy banks in late January, she was faithful to her self-imposed schedule which calls for her to arrive at the University early most mornings and to work until about five o’clock. Currently, she is revising several chapters in her forthcoming book and preparing the addresses she will give at various universities, including Harvard, this spring.

Although she no longer teaches, she is still so active that her colleagues find it difficult to imagine life without her. And, yet, had it not been for fate and the prescience of Werner Hochwald, then WU economics chairman, Alice Jones reminded him just before coming to St. Louis, she had been working on a special project with Raymond Goldsmith, who was at the time chairman of a committee of the National Bureau of Economic Research. The two had asked Hochwald and other prominent economists what they found lacking in the Government’s figures on national accounts. Not long afterwards, Hochwald asked her to teach an evening and a day course in American economic history at this University. “I thought, well, why not?”

Reminded of this arrangement a few weeks ago, Hochwald smiled warmly and said, “It was one of the best appointments I ever made. She is an unusual personality with a rare combination of qualities including patience, creativity, and discipline.” When Barnett succeeded Hochwald as chairman, he asked her to stay on, and, in addition, persuaded her to teach a course in economic systems. “Being a busybody, I inquired about her degrees, and urged her to resume her study for the doctorate,” he recalled.

I T W A S Q U I T E A N U N D E R T A K I N G, for as Barnett pointed out, “Economics has been a fast-moving discipline. In our age group, we are semi-obsolescent in terms of modern training. That doesn’t mean that we are unproductive. What it does mean is that to write her dissertation, Alice had to move into a discipline which has become mathematical and quantitative. She was fortunate to find Fogel. He’s a modern economist who also happens to be an excellent economic historian.”

As for Fogel, he thanked her personally for her contributions to the world of learning in his address last September as outgoing president of the Economic History Association. Said Fogel to Jones, vice-president of the group, and other assembled members, “Alice Jones taught me about probate inventories.” Today, he adds: “Alice Jones’s work has encouraged several major new trends in research. Scores of scholars following her lead are in the process of giving us a far more detailed picture of the social and economic development of America during its first 150 years than anyone ever thought we would have. Probate records have also proved to be a major source of evidence in the study of American slavery and in tracing changes in wealth distribution from earliest times to the end of the nineteenth century.”

This tribute, her colleagues agree, could not have been bestowed on a nicer nor abler septuagenarian.
Washington University's 125th Anniversary celebration last fall brought to campus an array of speakers and programs so diverse as to defy classification. And thus, the celebration reflected the institution it honored.
Following the modern fashion in funding research on a customer-contractor basis, if somebody asked: What, pray tell, is the genetic basis of the manifest differences in susceptibilities to multiple sclerosis and juvenile diabetes? How would you answer them? ... By the ordinary processes of scientific research — faulty, expensive, longwinded, and indirect — the differences came to be recognized and defined. ... This makes nonsense of the idea that discovery can be premeditated.

Nobel Laureate Sir Peter Medawar
Head of the Division of Surgical Sciences
Medical Research Council
Middlesex, England
"Theory of Tumor Immunity"

When the next condensed history of the human race is set out, I hope and trust that the influence of birth control and education on the lives of women will be ranked equal in importance with the influence of the wheel in the lives of men.

Lady Jean Medawar
Coauthor with her husband:
The Life Science: Current Ideas in Biology
"What Does Science Have to Say About Women?"

Washington University Magazine
The Company We Keep

Since this is a 125th anniversary, one thinks back to 1853. [That year] was in the middle of the first wave of useful discoveries on muscle. The first useful paper was that of Sir William Bowman in 1840. ... Muscle research at present is in an exciting state; one can speculate with hope and fear that what one may be proposing will either be confirmed or disproved.

Nobel Laureate Andrew Huxley
Professor and Head of Physiology
University College, London
"Muscle Contraction"

The curious thing is that we do drug trials to answer a question: Is this drug different from cold tea in its effect on patients? ... but we don’t ask the question on an individualized basis, that is: On what basis shall I treat this person in front of me?

James Black
Director of the Therapeutic Research Division
Wellcome Research Laboratories, Kent, England
"Pharmacology"

[There is an] important application of the techniques of somatic cell genetics which allows [us] to develop cell lines that make unlimited amounts of a single antibody of a defined specificity. This technique makes antibodies in a way quite impossible using conventional approaches. ... Working with these antibodies is a great advantage because of their unlimited availability, purity, and specificity.

Walter Bodmer
Professor of Genetics, Oxford University
"Genetics"
Biomedical research is the most important activity of mankind. Our future will depend on it. Science has to grow, but it has to do so selectively. America has been very generous in research. Perhaps we are in a time when we have to stop expanding.

Donald S. Fredrickson
Director of the National Institutes of Health

"Minding the Biomedical Continuum"

I think of Washington University with great sentiment. Late at night I used to walk across Forest Park to relax because Professor (Arthur) Kornberg put us all to very hard work.

The history of molecular biology is dramatic; it is a forceful example of the importance of interaction between disciplines. Indeed, the most exciting phases in development of many disciplines are characterized by such interactions.

Nobel Laureate Gobind Khorana
Research Professor in the Department of Biology and Chemistry Massachusetts Institute of Technology "Molecular Biology"

If we accept the growth of membranes by expansion... as true for cells in general, we must realize that these membranes have been in the process of expansion since the archeozoic age and that the original membrane, continuously expanding and dividing in this process in a multitude of bubbles, is what we have at present in the biosphere."

Nobel Laureate George Palade
Director of the Division of Cell Biology, Yale University
"Membrane Structure and Function"

When we look at most of the ocean, which is that below 15,000 feet, we realize that organisms living there have to survive a long time before they find food. The important thing about the oceans is that there are practically no nutrients near the surface. We would like to think of the ocean as an infinite resource but most of it is desert.

Andrew Benson
Professor of Biology Scripps Institution of Oceanography University of California at San Diego
"Food for Thought from the Sea"
The Company We Keep

Some reduction of standards, perhaps an appreciable reduction, is a price we have to pay, but ... we [should] recognize that and, over the years, do what we can to restore the highest standards. . . . In the long run, greater "equality of opportunity" through the Bakke decision need not result in the deadening absolute of egalitarianism. But there is a risk; and we must watch.

The Honorable Erwin N. Griswold
Former Solicitor General of the United States and former Dean of Harvard University Law School
"Racial Preferences and Scarce Resources: Implications of the Bakke Case"

In its simplest terms, I am proposing as the first objective, a single loan program with debt ceilings that vary according to the level of education obtained and a repayment schedule that is sensitive to the borrowers' income.

Robert H. Stroiz
President
Northwestern University
"Who Will Pay? Tuition and Debt Financing for Higher Education"

The Constitution and the statutes had taken cognizance only of persons. The rulings after 1965 treated groups, that they therefore had to define. Before very long, numerous claimants to underprivileged status joined the blacks. . . . Elaborately calculated goals, the euphemistic term for quotas, produced a situation in which inequality of access became a necessary condition of equal results. . . .

The [first] problem of equality is to choose for comparison an appropriate grouping ... the individual or some category of individuals; second, a question of equality is enmeshed with other ideals . . . competing claims of equality, other values such as liberty, other norms such as authority . . . ; and, third [it] is also enmeshed in the concrete conditions of a given society.

Paul A. Freund, Professor of Law Emeritus, Harvard University
"Philosophy of Equality"

Oscar Handlin, Professor of History, Harvard University
"Equality in American History"
We [The Department of Health, Education, and Welfare] are currently inclined to continue a dual course: advocating assertively for the poor as HEW has and ... encouraging those movements which increase the understanding that all Americans are potentially direct recipients of social and rehabilitation services, even as they naturally have recourse to publicly provided, assisted, or regulated education, housing, and health care opportunities.

Arabella Martinez
Assistant Secretary for Human Development Services
Benjamin E. Youngdahl Lecture on Social Policy

In interactions between the federal government and universities, the problem is not that federal personnel are aggressive, ill-informed, or ill-tempered. In fact, they are rather sympathetic. ... There has, however, been a breakdown in the assumption that the government should tread softly with universities. They are regulated without proper regard to the complexities at issue. While taking account of social problems, we need to reassert the value of maintaining independent and autonomous universities.

Jack Peltason
President, American Council on Education
"Policies of Higher Education"

What ultimately became the Petition of Right was intended as a declaration and re-enactment of the fundamental ancient law of the kingdom. The liberty of the subject and his propriety in his goods were not merely cardinal points in the law; they were its essence — all justice was meum et tuum, as all common law was law of tenure, and ... all liberty, ... inheritance.

J. G. A. Pocock
Professor of History
Johns Hopkins University
"Propriety, Liberty and Valour: Ideology, Rhetoric and Speech in the 1628 Debates"
The Company We Keep

Ransack the apertures of night
for crumbs
a cricket
poised on the wall like a porcelain spider

the print of a naked human foot
a girl's
the shape of her passage
crisp as a leaf in the still cave air

Donald Finkel
Poet in Residence
Washington University
From Going Under

I make no charges. I got no proof, but a thing like that — all that wrath,
those terrible swift sword arrangements — that’s the M.O. of God
Himself.

God overhead Quiz’s complaints. They were true and, briefly, surprised
Him, which also surprised Him, who, unaccustomed to surprise, did not
immediately recognize the emotion.

Stanley Elkin
Professor of English and Novelist
From The Living End, a triptych
"The State of the Art"

The instructor we hire
Because she does not love you
Leads you into deep water,
The deep end
Where the water is darker.
Her open, encouraging arms
That never get nearer
Are merciless for your sake.

John Morris
Professor of English and Poet
From
"For Julia in the Deep Water"
Thought takes thought, not things. For substance, language replaces life. History usurps the past and we make sounds about sounds without limit. We steeple up a church to worship all the names we've given time.

William H. Gass
Professor of Philosophy and Novelist
From The Tunnel, a novel in progress

You read the clicking keys as gibberish, Although they strike out sentences to sense. So in the fluttering leaves, the shoaling fish. The continuum nonenumerable and dense, Dame Kind keeps rattling off her evidence.

Howard Nemerov
Edward Mallinckrodt Distinguished University Professor and Poet
"Analog"

Washington University Magazine
Yves Idzerda was not a typical Washington University freshman. He came to the University last year as an Alexander S. Langsdorf Fellow in the School of Engineering and Applied Science, one of four students selected in national competition. He is a bright student even among bright students. He was enrolled in engineering, but the engineering freshman year is not very different from that of an arts and sciences freshman. Yves is a lean and lanky six-footer who stands eye to eye with Chancellor William Danforth. He is Dutch-Indonesian in heritage, Dutch by birth, an Oregonian by immigration and habitat.

His family lived in Indonesia before his birth, when it was a Dutch colony. They were expelled by the nationalization. Fortunately, Yves's grandfather was on leave in Holland at the time of the takeover and the family was able to join him. Yves was born in Amsterdam in 1959. The following year, however, the collapse of a dike flooded his grandfather's farm. Rather than begin again there, the Idzerda clan—about fifty in number—immigrated to Beaverton, Oregon, near Portland.

In August 1977, Yves flew from Portland to St. Louis, caught an airport limousine that dropped him in the reception area of the Washington University Residence Halls, found his room in his freshman suite in Dorm K, and began his freshman year at Washington University.

It was, he knew, the beginning of a new adventure, but the excitement would not come. In its place was an aching sense of loss, a gnawing small fear that what was to come would never replace what had been. Intellectually, he knew that he would succeed, that he would master the academic matter, that he would make a place for himself socially at Washington University, that there would be a whole world here; emotionally it didn't help.

"Why do I feel so rotten? Why am I so depressed?" he asked in his second week of school. "Maybe it's the rain," we ventured. It had been wet and soggy for days, raining out freshmen barbecues, soaking small queues of students waiting in lines for everything from registration to books to lunch. Then we both laughed, realizing that in Western Oregon only one day in four is clear.

"The dorm is really nice and the only trouble with food service has been technical things like not having enough knives or not being able to find a tray. We're overcrowded right now; we have a person living in our living room, but they say that will be changed soon. Anyway, Tony (Travis) is really interesting. He is a black artist from East St. Louis; boy, is he good! I didn't know that an eighteen-year-old could paint that well.

"Meeting different kinds of people, from different places with different interests is really happening to me for the first time here. I've been sheltered. Everyone I've known has come from almost the same background and culture. The things
that were important to me were also important to them. In Oregon, for instance, ecology is a big thing. We’re all sort of earth people; in fact my major extracurricular activity in high school was involved with recycling. Here, students are so diverse; no one is like another student. It’s going to be good for me, I know . . . .

As a new freshman, Yves asked himself and his world a host of unanswered questions, but two fundamental concerns underlay all: In college, would he find friendships to replace those he had left behind? And, at the same time, would the friendships of home stand the test of separation? The latter applied most prominently to his relationship with Karen O'Neal, a special friend who was then attending Seattle University. As the year progressed, they wrote less, but the telephone bill climbed and they exchanged tapes. After a few weeks, Karen began dating; Yves did not. By mid-winter he was to say, “It bothers me, but that’s all right. Our relationship is going to be okay.”

Even in September, Yves knew that home would never be the same. His letters and telephone calls from other friends took on a bittersweetness accentuated by the fact that he had no one here with whom to share those tender personal feelings of happiness and sorrow.

The competitiveness of the University’s academic atmosphere, which had been a vague buzz early in the year, began to hum in and out of his conversations with more frequency by mid-November. In September, he complained. “I’m really beginning to be bugged by all of these people who are telling me they’re going into AP (advanced placement) in calculus and in chemistry and in . . . . Okay, they’re smarter than I am; but do they have to tell me about it?

“You realize the competition is there. John Russell, assistant dean in engineering, told us at orientation how rotten we’d feel because we were all in the top 10 percent of our high school class, but here only fifteen of us were going to be in that group. In the beginning, that’s exactly how I felt — rotten.”

“We’re coping,” Yves said rather tight-lipped at the opening of a conversation just after mid-term. And that was that for a little while. We turned to other subjects, then to specific s. In opening of a conversation just after mid-term . And that was that class; he’s usually there until 5 p.m. and I’m often there too.”

The paper due in his Shakespeare class was Yves’s first real college paper. He worried and thought about it for weeks and then called Karen in Seattle because that was more her field than his. “She told me my topic was too broad and so we narrowed it down to the dramatic function of one character in Twelfth Night. Two days before it was due, I started. I thought it was pretty good, so I called Karen and read it to her. She said it was okay and then we had a long talk about how she would do it.”

Yves spent the night revising, finishing up his last corrections at 6 a.m. The first time he had spent the night studying! He showered, dressed, and went off to classes, exhausted but determined to see the morning through. In Calculus he closed his eyes because it hurt so much to keep them open; then reopened them with a start. He was fearful that he’d been asleep for minutes and was reassured when he glanced at his watch. One repeat and he dared not rest his eyes again. He made it through Calculus and Shakespearre and then crashed.

By mid-fall, Yves felt that finding a social life was going slower than he had hoped, but was progressing. He was a representative from his dorm to the resident student governing board and was making some contacts that way. At the urging of an engineering upperclassman, he also joined an intramural basketball team composed mostly of engineers. That was great fun. “Till then, I really didn’t know many other engineering students, because we don’t collect as an academic group until about the junior year.”

He and his suitemates formed a core group. They always went to dinner together and ate together in smaller groups at other meals. Yves worried a little about that, as he had about his own interaction in the group, since he occupied one of the two single bedrooms in the suite. “I’m never sure if I’m shutting myself in or out,” he had said introspectively in September. He broadened that question to apply to the whole group as the semester advanced. He wondered if wider social groups were built by students with one roommate or by students who roomed alone, because they were forced to. (In the spring, the question was to broaden that question to apply to the whole group as the semester advanced. He wondered if wider social groups were built by students with one roommate or by students who roomed alone, because they were forced to. (In the spring, the question was to engage the whole suite in lengthy discussion as they considered the next year’s room assignment alternatives. In the end they decided to split up to force themselves out of what had become a cozy little nest. By then, they were comfortable enough with themselves and with each other to speak frankly and to dare to challenge themselves and others.)

Yves still got homesick. By the end of October, he was counting the days to Christmas vacation. Unlike most other freshmen, he did not go home for Thanksgiving. Instead he considered visiting a friend at Bryn Mawr, who was in the same position. “I had a long talk with her one evening. She said she was having trouble academically too and I advised her that when
Yves and a special friend, Karen O'Neal, who came to visit during her spring vacation from Seattle University.
I’d gotten behind last month, I’d found that I couldn’t just work to catch up, but had to work to get ahead. I told her it was like hiking: when you fall behind the group, you’ve got to turn on the speed until you’re up front or you’re constantly struggling.’’

Resolution of the Thanksgiving question found both Yves and his Bryn Mawr friend visiting roommates’ homes. ‘’We figured the other would make us more homesick. That’s one of the things that helps, remembering that the people you miss are not together; that you are all dispersed.’’

Yves was haunted through the late fall by an encounter he had on campus with a student in his anthropology class. ‘’At first in class, she just didn’t seem to understand. She would ask questions that had already been answered, and we all felt concerned for her.’’ Then one day he had found her on a campus walkway, sobbing. He stopped to help and stayed until the campus police brought a nurse. ‘’She said that she was on her way to a test and that she just couldn’t make it; she couldn’t take the pressure. After that she dropped out. What really bothers me was that she was a junior.’’ This year he was heartened to find this classmate had returned to school and was apparently doing well.

THREE DAYS BEFORE Christmas vacation began, amid finals, Yves could hardly sit still for excitement. He’d planned his trip home down to the hour he would take his Dramamine to stave off air-sickness. As he was on firm ground. He’d found some special people he was confused; everything had been wonderful; nothing had changed.

Back at school, he was feeling some guilt that he had spent so much time with friends and perhaps not enough alone with his parents. "I’ve been feeling some guilt that he had spent so much time with friends and perhaps not enough alone with his parents."

Early in January, he had gone to Seattle with Karen, who returned to school earlier than he. He had flown directly back to St. Louis from there, stopping only to call his folks from the airport.

‘’That’s when I got my finals grades and I could tell from the sound of my father’s voice that he was pleased. They’d said earlier that they would understand if I got a C. I’d said, ‘I don’t intend to,’ but I knew that my father felt that I might not make the grades in college I did in high school.’’

Yves’s first semester grade-point average was 3.85. In high school he had done slightly better, ranking ninth in a class of 500, but Yves was the first member of his immediate family to attend college. No one had known what to expect.

Yves settled into his second semester more confident of his ability to handle the academic material, more at home socially, anticipating a week’s visit from Karen during her spring break. When, on his second chemistry test, he scored 72, he was stunned and outraged.

‘’I knew everything. I thought I was really going to have a high score. Then came the grade. I had made a wrong assumption at the beginning of a question worth 40 points. At first I thought, that’s one wrong assumption and they are killing me for it, so I went to talk to Professor (Alfred) Holzer. He said it was unfortunate that it had turned out that way. My assumption had changed the question into another question which was asked in only a slightly different form later in the test, so I couldn’t be given credit twice for knowing the same material.

‘’I understand that now, but I feel frustrated because I spent time on the test that I didn’t have to. At the same time, I know that I shouldn’t feel frustrated because I know the stuff and therefore I am doing here what I should be doing — learning. I guess the grades are still important to me, even though my scholarship doesn’t depend on them. I think I’m depending too much on the grades to reflect how much I know, instead of saying, ‘I know how much I know.’ I’m getting too competitive.’’

Spring semester progressed. Karen came when the first breath of spring softened the Midwestern air. Yves felt they spent an idyllic week; for the most part he took her to his humanities classes with him. They even went off campus to see a little of St. Louis, something Yves had not found time for before. They talked of the future, trying not to be too optimistic.
Freshman Year

Yves ran for and won the post of treasurer of the Congress of the South Forty for the next year. He was being groomed for campus government by senior Langsdorf scholars, who have a tradition of student leadership, as well as scholarship.

During spring break, Yves stayed in the dorm with a handful of other students. They did the most preposterous, spontaneous things they could think of. One morning while he was having breakfast with girls from the next suite, they all decided to drive to Chicago. They went for two days, poking around museums, standing on the lakefront watching the waves, trying to be lazy and decadent.

In mid-March, students settled in to work with only small concessions acknowledging that spring had come. They sailed frisbees across the greening lawns and went for walks. Yves explored parts of campus he had never been to before, finding pleasure in discovering quiet lounges and social places he did not know existed. But mostly students studied.

By then, even the freshmen know the routine, know what is expected of them. The beginning of the semester is the worst — leaving home and friends and familiar ways, with no intellectual excitement yet generated, no friendly routines to cover the separation. Then the pressure builds and they respond, hitting the safety valves as well as they know how during appointed breaks. Pillow fights in the winter and water fights in the spring offer small outlets. Extemporaneous social events happen on weekends; these help.

They go to counseling service or talk to now established friends to discover that they are not alone. They work hard and worry about papers and finals, knowing that this pull fits into a neat little time box imposed by the system, so that self-discipline has its limits. They regret that each semester gets good only at the end.

The beginning of reading week takes on a rowdy atmosphere. They stay up all night, partying, dancing, talking, catching breakfast at a pancake house, where they help the waitress clear all the tables before giving up, heading for home and bed. They have blown the next day. They settle in when they have to. The rooms and suites, even the halls grow quiet. The library is full.

Yves had learned the system and grown within it.

I’ve learned to trust myself to interact with people. I don’t know when it happened. I feel really grown up. Last year in high school I began understanding how friendships work. Now I know that all of your friends don’t have to be the same; they don’t have to like each other. I know that it’s good to say to a friend, ‘I love you.’ I know that you don’t have to hide getting choked up and teary over that feeling or over the feelings of loss or frustration.

‘When I feel lonely, I begin to worry about the people who are really lonely — the old people, the people who don’t know how to develop good friends. It’s so ominous, I can’t talk about it.’

In mid-May, parents came to pick up two of Yves’s suitemates — Eugene Gragg and Steve Tarleton; Pat Scarbrough, Yves’s roommate for the coming year, drove back to his home in Kansas City; Larry Rosen rented a car to drive home to New York; Steve Lobue took the train to Chicago. Yves stayed on a few days to work on business for the Congress of the South Forty.

On May 13, he caught the plane for Seattle to see Karen for a few days. He invited his parents to drive up to pick them up so that they could see Karen’s college. ‘I’m trying to make my relationship with my parents more of an adult relationship, to think about them and their needs. I thought it might help them understand if they could see her college, since they can’t come to mine.

‘I know now that my parents are letting go, cutting ties. That’s good. But now I care about keeping up the relationship. I care about the ties. I see my mom in a different way. I know that she needs to and wants to do things for us. We can’t stop her because that is her way of loving. I know that I have to take that love, but I have to return it too.’
In August 1977, Margarethe Cohn Steinberg, who had worked in the catalogue department of Washington University Library between 1948 and 1962, died at the age of 93. Her death left a void in the University’s life. As a treasured member of this cultural community, Mrs. Steinberg had come to matter much to many persons – coworkers, friends, scholars whose work she had aided, and fellow lovers of music, art, and literature.

In the months that followed her death, her friends were painfully aware of her absence in the life they shared outside of classroom and office. David Bronsen, professor of German, first voiced the need felt to transcribe their best memories of Mrs. Steinberg in tribute to her and as an expression of their loss.

The short reminiscences that follow honor a woman of remarkable intellect, education, scholarship, warmth, and humor, upon whom age rested lightly until the last. They comment, as well, upon the presence here of that intellectual fellowship without which no gathering of scholars can truly be a university. They comment — always gently — on the community’s egalitarianism and its elitism, its values, supports, and rewards. And, quite aside from that, these shared memories hold a lesson on growing old gracefully.

DAVID BRONSEN
Professor of German

I have heard it said that people past the age of sixty stop making new friends. If there is truth in this, it did not apply to Margarethe Steinberg. Her warmth and interest in others and her sense of humor attracted people effortlessly almost to the end of her life.

My first encounter with her was in 1964. She approached me in a classroom where I had just delivered a public lecture, introduced herself, and made some insightful remarks on my subject. That done, she remarked with an ingratiating smile that surely I would not take it amiss if an old woman pointed out that when I was engaged in thought, I had the habit of looking over the heads of my audience. I laughed and promised to mend my ways. Never was criticism conveyed so appealingly.

That exchange led to a friendship that was to span more than a dozen years. Her advanced age brought me the title of “boyfriend” and the privilege of chauffeuring her regularly to open houses at the home of Professor and Mrs. Albert William Levi. There I never failed to marvel at the ease with which Margarethe initiated conversations and found common ground with students sixty-five years her junior.

I cannot remember her ever complaining about her lot or her infirmities. The day after her ninety-third birthday, she asked with a wonderment tempered by a special twinkle, “Is it possible that you know anyone else as old as I?”

FRANCES KERY
Library Assistant
Olin Library

When I joined the staff of Olin Library in 1963 (coming from behind the Iron Curtain), Mrs. Steinberg had just retired, but
Margarethe

was still working part time. Everybody referred to her as a "phenomenon," so I was eager to meet her.

I soon found that we shared many interests: art, literature, and, not least, music. Mrs. Steinberg held the Ph.D. degree in art history from Breslau University and had been art critic for a daily newspaper in Breslau from 1916 to 1933. But she was equally versed in literature, and her knowledge proved a great help to students, staff, and faculty. In addition, she had apparently been a good pianist in her youth. For years, as fellow season ticket holders, we went together to symphonic and chamber music concerts.

Although our seats were not adjoining, I looked forward to our meetings and discussions on our way home. She could be a sharp critic of a concert that had not been flawless, but oh so enthusiastic after a beautiful performance. "Ich bin so aufgeregt" ("I'm all excited"), she often used to greet me. She was a great champion of modern music, which I found quite remarkable.

Among the soloists, her special favorite was pianist Rudolf Serkin, whom she had known in her youth. Whenever he came, I had to escort her to the Green Room after the concert. No matter how many people were surrounding Serkin, he left them all to welcome his old friend. I was amused, but also moved, watching Mrs. Steinberg blush like a young girl when the great artist hugged and kissed her.

SAUL ROSENZWEIG
Emeritus Professor of Psychology
and of Medical Psychology

My relationship with Margarethe arose from her own generous initiative. After she retired, she learned that I was doing research which involved German authors. She volunteered to help with translations, including idiomatic correspondence. Though she was modestly compensated, it was obvious from the start that she attached little importance to this reward.

She never made any financial conditions; her work was contributed as a scholar and a humanitarian. In our association, which soon ripened into a personal friendship, she exhibited a spirit of dedication to cultural, scientific, and artistic life. For me she came to represent the ideal kind of education and inspiration that existed in pre-Hitler Europe. Her loss is greatly felt.

ANDREW EATON
Emeritus Director
Olin Library

I first met Mrs. Steinberg in 1953, when I came to the University as director of libraries. Over the years I discovered that just being in the library surrounded by books was a source of so much pleasure to her that I think she would gladly have paid for the privilege. She did indeed give generously of her wide-ranging knowledge and inexhaustible energy.

She took great pride in the accomplishments of her two sons. Michael is a renowned music critic formerly with the Boston Globe and Franz is a physician practicing in St. Louis. In 1969 I wrote her a note on the occasion of an award which Michael had received for his work. She replied characteristically: "Of course I am very much satisfied with Michael's success, especially as he can do the work he wanted to do. It is amazing enough considering the situation in which we were when we came to this country. It is almost an 'American success story' and we have all reason to be very thankful to this country.'"

BONNIE PAULSON
A personal friend

She told wonderful stories. Even her familiar tales came out fresh every time, enlivened by her telling, until it seems to me that I knew Margarethe her whole life long. Growing up in Breslau before the turn of the century, Margarethe was a precocious pretty girl, the apple of her father's eye. A cultivated and well-to-do merchant, Hugo Cohn expected no less of his daughter than of his son and offered her no less. And she, disciplined and energetic as well as intelligent, thrived on living up to his expectations, neither unmindful of the slightest felicity to come her way nor lacking the will to make the most of it.

Gretel, as she was called, had a piano teacher who demanded that she measure up to her musical gifts. Perfect pitch was only the most obvious among them. She worked hard, but her teacher was a stern uncompromising sort and she rarely succeeded in pleasing him. She told of a time when she had practiced especially fervently, finally achieving a "Für Elise" she thought quite perfect. As she played, her teacher leapt from his chair shouting, "No, no, no; you must play this with your soul!"

Gretel wailed, "But I was!"
He sat down and said, quietly, "Oh, I'm so sorry. I didn't realize."

Years later, her fingers long since too stiff for piano playing, she laughed at the thought of her plucky serious self up against that temperamental old musician. She was sure, later, that he had been right, and she laughed at her young solemnity.

Margarethe became my friend late in her life. By then, she had suffered the lingering deaths of husband and a son, had endured Hitler's Reich, had twice abandoned home and possessions to settle among foreigners. She had not worked for forty years as either the art critic or art historian she was educated to be.

But the good in her life weighed more heavily with Margarethe. She had two fine sons who were uncommonly
successful at work they enjoyed, she had grandsons and a great-grandson. She had many friends, some intellectual, some musical, some to reminisce with, some slightly crazy ("I've always liked people who are a bit crazy"). She had an orderly active life.

Margarethe delighted in her connection to Washington University, its library, its people. She delighted in books and ideas; she delighted in art, in music. She enriched my life.

ALBERT WILLIAM LEVI
David May Distinguished University Professor
In the Humanities

WHATEVER a university is, it should be a cultural community. Frau Steinberg was an active and inspiring part of ours.

When I came to Washington University more than twenty-five years ago, I became aware of her without knowing her. She was seen at the best campus concerts and the most interesting campus lectures. Later we met informally.

Since we both belonged to the small band of those without automobiles, we often met mornings on the way to campus. Invariably we talked of favorite painters, symphonies, and pianists. When this reminded her of her past she would have something pertinent and appreciative to say. During her last years, she was a faithful attendant of our regular open houses. She was quintessentially a "Kulturmensch," and I miss her quiet presence in our midst. Unobtrusively, she was a bright thread in the fragile fabric of our intellectual and artistic life.

EGON SCHWARZ
Rosa May Distinguished University Professor
In the Humanities

I knew Margarethe well. I liked and admired her. To describe her numerous talents would require more space than I am allowed here. The quality in her that I most admired was curiosity. It was a curiosity of the heart, one which enabled her to do with eagerness and dedication jobs far below her extraordinary intellectual abilities and remarkable education. Her curiosity endowed everything she touched with magic qualities and turned every activity into an adventure. Had her been a curiosity only of the mind, it might have assisted herself, but because it was of the heart, you were uplifted as well! This curiosity caused Margarethe constantly to give more than she received, and it changed her environment into something a little more exciting, a little more dignified than it had been before she entered it.

HERBERT SPIEGELBERG
Emeritus Professor of Philosophy

EVEN in her nineties, Margarethe was no nonagenarian in spirit. Obviously she no longer had the physical stature of her active and productive years. She walked with a cane, but still briskly. Her spatial world was restricted to a kitchenette apartment on Delmar Boulevard, but her real-life world was that of the places and people she carried within her.

She revived her past in daily morning readings, which included the works and letters of Thomas Mann that she had shared with her husband. Yet she did not hanker back to vanished Europe but sank new roots in the New World with cheerful humor. Above all, she continued to make friends, taking warm interest in their lives by pointed questions, often repeated since she could no longer rely on her memory for recent information.

One of her ambitions was to help friends by meaningful work she could still do. For me, she did unique salvage work by transcribing on her old portable typewriter handwritten German letters, most of them in obsolete German script, deciphering the pale words painstakingly and ingenuously with her one good eye. Until her last year, she set an example of a brave humanist who without mental crutches made new sense of her restricted life by reshaping it and sharing it with her old and new friends.

Margarethe Steinberg was born in Breslau in 1884. She attended high school there and in Dresden. In 1909 she received the doctor of philosophy degree summa cum laude from the University of Breslau. Her thesis was Franz Krüger, Leben und Werke (Breslau, 1909). In 1912 she married Siegfried Steinberg, M.D., and from 1916 to 1933 she was art critic for the Breslauer Neueste Nachrichten.

When she lost her position during the Hitler era, she wrote on various subjects in the history of art for the Jewish press. In 1929, she moved to Cambridge, remaining there until 1943, when she came to St. Louis, where she had relatives. During her years in St. Louis, she made a number of contributions of art criticism to the publications of the Leo Baeck Institut.

In 1944, Margarethe began working in the book department of a St. Louis department store. In 1948, she came to Washington University Libraries.

Washington University Magazine
Accelerating Research

In August, Washington University School of Medicine accepted its second cyclotron, which had been under construction at Barnard Hospital in the Medical Center for a year and a half. It had been sixteen years since the original small cyclotron installed here became the first one in the country used exclusively to support medical research. Now the School is the first to have two.

Unlike the cyclotron on the main campus, the medical accelerators are not used for research per se. It is their products (particularly several very short-lived isotopes) that aid an amazing variety of procedures which further the School's pioneering biomedical research.

Much of this work weds the cyclotrons to a series of new radiological scanning devices developed by Mallinckrodt Institute of Radiology, an institute within the Medical Center that is already world renowned for its research. "Mallinckrodt Institute can probably be regarded as the cradle for a new technology which permits in vivo, regional, and non-invasive assessment of several biochemical processes fundamental to biology and medicine," explains Michel M. Ter-Pogossian, Ph.D., professor of radiation sciences. "This approach combines the use of a small number of radionuclides which, through their chemical nature, permit the assessment of most of the biochemical activities essential to life. The nuclides are either of importance in biochemistry themselves or are useful in labeling analogs of metabolic substrates."

Ter-Pogossian points out that the technology rests on three components: the availability of radionuclides whose presence can be detected external to the human body, the ability of the chemist to incorporate these into molecules of importance in the study of desired variables,
and the ability to map the distribution of these nuclides. This mapping is done by positron emission transaxial tomography on devices known by the acronym PETT.

Researchers within Mallinckrodt Institute, in the University's physics department, in the University's Biomedical Computer Laboratory, and clinical researchers within other medical divisions, have developed the unique PETT scanners to perform specific diagnostic functions. The progression of the scanners — from PETT I and II through the presently used PETT III, IV and V — has been a rewarding exercise in refinement and sophistication.

PETT IV is currently used in the Department of Medicine's division of cardiovascular disease to study heart attacks. PETT V is used by Mallinckrodt for imaging of the brain in humans and in experimental animals (chiefly pigtailed monkeys). Their predecessor, PETT III, has been sold and is in use at Brookhaven National Laboratory.

In the cardiovascular study, the cyclotron bombards boric oxide to produce radioactive atoms of carbon-11 ($^{11}$C) from the boron. These form carbon dioxide which is quickly transported to Michael Welch, Ph.D., professor of radiation chemistry. He and his colleagues, working in Mallinckrodt, have developed rapid methods for converting the radionuclides into complex molecules for PETT scanning. In this instance, the carbon-11-labeled carbon dioxide is incorporated into molecules of palmitate, the main energizer of the heart muscle. A solution containing the radioactive palmitate is then injected into a patient, who is positioned in PETT IV, where forty-eight detectors trace the uptake of $^{11}$C-palmitate by the heart. PETT IV scans seven slices of the heart simultaneously, giving a three-dimensional image of the damage induced by myocardial ischemia or infarction.

Milton Klein, M.D., assistant professor of medicine and radiology, and Burton Sobel, M.D., professor of medicine, are chief investigators for the clinical research. Klein explains, “PETT IV gives us a tool to tell immediately the quantity of cells damaged during the heart attack. Dead tissue will not metabolize the palmitate (a natural, circulating substrate that provides 80 percent of the heart’s energy), so the presence of the palmitate, now tagged with $^{11}$C, can immediately be quantified and correlated with the palmitate absorption in regions of the heart not affected by the attack.

At Mallinckrodt Institute of Radiology on the Washington University Medical School campus, a promising new diagnostic and research technique is being developed, refined, and applied. The new research combines the use of cyclotron-produced radionuclides, new chemical incorporation methods, and a series of sophisticated, newly developed radiological scanning devices.
Accelerating Research

attack victims into categories to enable clinicians to establish a categorical diagnosis through more conventional biochemical studies and then to know what treatment should be used for each patient. As a first step we need biochemical studies of victims at admission, forty-eight hours later, four days later, four weeks later, and so on to characterize the natural history of evolving heart attacks. We then may be able to determine whether treatment is effective in beneficially altering the natural history.

"There are really no alternatives to PETT IV. This is a very sophisticated cousin to heart scanners already in use."

Ter-Pogossian's brain studies with PETT V are of similar nature. The cyclotron uses a target of nitrogen-14 (nitrogen gas) to produce the radioactive oxygen-15 ($^{15}$O). In its gaseous form $^{15}$O is bubbled into a sample of blood drawn from the human or the monkey being studied. The irradiated blood is sent by pneumatic messenger to the site of the scan and injected into the subject. PETT V uses particularly fast positron imaging designed specifically for brain scans. This ability permits the study of dynamic processes in the brain and three-dimensional reconstruction of the distribution of radionuclides. Marcus Raichle, M.D., professor of neurology who holds joint appointments in radiology and biomedical engineering, is associated with Ter-Pogossian in this work.
Michel Ter-Pogossian, Ph. D., and the PETT V brain scanner. Ter-Pogossian is one of the nation's foremost authorities on the use of radionuclides in biomedical research.

Raichle explains that PETT V provides an exciting interface between laboratory studies in animals and clinical studies in humans. "On PETT III, we devised measurements of a number of basic brain processes such as the metabolism, blood volume, and chemical composition of the tissue itself. Now we can make these measurements in humans with almost no risk.

One area of particular interest is in identifying patients at risk for a stroke who might benefit from surgical procedure to improve brain blood flow and metabolism. The PETT V system seems uniquely capable of providing information to make such judgements intelligently. In addition, these techniques should make it possible to assess the effect of radiation therapy on a brain tumor. In humans we have had to rely on physical evidence—waiting until X-ray confirmed a decrease in tumor size. Now we should be able to analyze the metabolism of the tumor tissue, assessing changes long before we can see them.

"Two major areas of brain research seem especially suited to PETT V studies. We know that the brain has a unique system of transmitters and receptors (such as the opiate receptor) which somehow regulate its function. Now we may be able to discover where these receptors are in humans and how they work. Studies in this area may increase our knowledge about Parkinson's disease or schizophrenia.

"We also know that the metabolism of areas of the brain is altered, moment by moment, by function. We used to think that brain blood flow and metabolism were constant, but that is not true. The brain actually changes its metabolism in a specific region to enable one to think, speak, move a hand, listen. The possibilities of studying these changes and thus identifying the specific regions of the human brain responsible is immense.

"These studies would not only aid us in understanding the organization of the human brain, but should also permit an understanding of specific disturbances, for example, in speech.

"All of this work needs to be done in humans. We have been able to do some of it, but have been very limited because of the risk of the previous techniques. With PETT V the yield will be high and the risk trivial. It's very exciting. That's why I'm here and not in Seattle, where I came from."

In addition to the volume of work involving the cyclotron-produced radionuclides being carried on at the medical school, the presence of the cyclotrons there is made necessary by the short life of the nuclei used. Although the radioactive carbon ion needed for cardiovascular research has a half-life of twenty minutes (and PETT IV's capacity to scan seven sections requires six minutes), the radioactive oxygen for brain tracing has a half-life of only two minutes. For this reason and others, the PETT V scan-time has been telescoped to seconds.

"PETT appears to be extremely promising for the study of various organs and diseases (including psychiatric diseases and cancer), because it permits the in vivo assessment of biochemistry, the alteration of which always accompanies pathology," says Ter-Pogossian.

To satisfy present and projected needs, the installation of the second cyclotron at Barnard Hospital was supported by the National Institutes of Health. "The new cyclotron is much better designed than our first, which is, after all, sixteen years old. It has several advantages for us. Our first cyclotron accelerated only deuterons; our new one produces four particles — deuterons, protons, alpha particles, and helium-3 — and we have need for protons in some of our present work. In addition, the new accelerator gives us three beam lines so that we can switch production very quickly. We use four radionuclides at present — carbon-11, oxygen-15, nitrogen-13, and fluorine-18. Previously, to switch production, technicians changed the targets manually. To do this we had to wait as long as two hours until the radioactivity in the cyclotron bunker cooled and our technicians could go down.

"We probably will not continue operation of both cyclotrons indefinitely, although there is a great demand for research time. We are upgrading and replacing a system that is very old. It is not going to be possible to continue to get replacement parts for the old machine. The technology of the industry moves very fast."

Ter-Pogossian points out that an interesting facet of this work is the collaboration of many scientists, including engineers, physicists, mathematicians, chemists, physiologists, and physicians. Mechanical design for PETT V, for instance, was done by John Hood, director of operations for the University's cyclotrons, who is an electrical engineer; electrical design was by Nizar Mullani, a research associate with the department of radiology; software design was by Carol Higgins, also a research associate.

"Historically," relates Ter-Pogossian, "our involvement in this field started with a few experiments carried out with the physics department's cyclotron. These clearly demonstrated the usefulness of cyclotron-produced radionuclides in biological research. Indeed, a number of our measurements were unattainable by other means. The success of this research led to the installation of our cyclotrons, the development of our rapid chemical procedures for labeling, and the development of our scanning instrumentation."
IN ANY WEEK of the academic year, Washington University's calendar lists a half-dozen gatherings which beg participation. Among these was a set of winter lectures, sponsored by the School of Continuing Education, entitled "Patterns, Puzzles, and Plots: Two Evenings with Alice." On the first, philosophy professor William Gass spoke on the verbal enigmas in the Alice stories; on the second, mathematics professor Robert McDowell dealt with Lewis Carroll's mathematical puzzles.

Gass explored Carroll's application of the philosophical tenets of his time to Alice, remarking that Carroll often carried them to their nonsensical extremes. In discussing Carroll's concerns with literalism and nominalism, Gass cited Alice's encounter with the White Knight in Through a Looking Glass, in which she must deal with a literal language. The Knight proposes to sing Alice a song. "The name of the song is called 'Haddocks' Eyes.'"

"Oh, that's the name of the song, is it?" Alice said, trying to feel interested.

"No, you don't understand," the Knight said, looking a little vexed. "That's what the name is called. The name really is 'The Aged, Aged Man.'"

"Then I ought to have said 'That's what the song is called?,'" Alice corrected herself.

"No, you oughtn't: that's quite another thing! The song is called 'Ways and Means'; but that's only what it is called, you know."

"'Well, what is the song, then?' said Alice, who was by this time completely bewildered.

"'I was coming to that,'" the Knight said, "'The song really is 'A-Sitting on a Gate,' and the tune's my own invention.'"

McDowell, noting the difficulty of following Bill Gass on the program, proceeded to do so with verve. He spoke of Carroll's fascination with games and puzzles, remarking that Carroll could have been the father of modern probability theory had he taken his mathematical exploration beyond games.

McDowell began with Carroll's word games. In which words in the English dictionary, McDowell asked, do you find the following letter combinations — wkw, dhp, riju, aghe, kta, neci, hq?* He progressed through paradoxes and syllogisms, noting Carroll's system of mathematical annotation to clarify the logical sequence of syllogisms.

McDowell concluded with puzzles requiring probability computations, remarking that the compulsive Carroll (who not only kept notebooks diagramming the seating at his dinner parties but also annotated the conversational flow with arrows) played these as mental bedtime games.

McDowell and Carroll, Gass and Carroll—company which left the mind racing.

As PUBLISHERS' notices accumulated in our office recently, it became apparent that we can say several times over, "You saw it first in the Washington University Magazine." That is only natural.

A primary product of a good research university is publication; Washington University faculty and students—and later alumni—generate a great many works.

In winter 1978, Professor Robert C. Williams wrote an article about his research on the Soviet sale of Romanov art treasures. Now his complete manuscript, Russian Art and American Money, 1900-1940, has been accepted by Harvard University Press for spring 1980 publication.

In winter 1975, graduate students Andrew Young and Eugene Provenzo, Jr., did a piece on the St. Louis Car Company, a foremost manufacturer of public transit vehicles for world use. Young and Provenzo painstakingly studied and catalogued the company records given to Washington University archives. Last year, the authors appeared in our doorway lovingly clutching a large volume and rather breathlessly announcing that "the book" had at last been published. The History of the St. Louis Car Company (Howell-North Books) surely will be on the reading list of railroad buffs, though the authors have privately reproduced their material in toto. This work is available from them.

Meanwhile the authors have related above speak of the vitality of the Washington University community and of its contribution — through its members at large — to our overall culture.

*L A DW

*A clue: Several are English words of foreign derivation.
Those alumni who played football under Weeb Ewbank in 1947 and 1948 at Washington University knew what the football world was later to discover: that Weeb Ewbank knew football—knew how to teach it, coach it, teach the coaching of it. But Ewbank's place in football was hard won. He taught John Unitas and Joe Namath pro quarterbacking. He trained Don Shula, Chuck Noll, Bud Grant, and Chuck Knox (in fact, one quarter of the head coaches in the NFL in 1977-78 played for or coached under Ewbank). He was the only coach to win titles in both leagues before he retired in 1973. Ewbank teams had won three championships—Baltimore Colts, 1958 and 1959; New York Jets, 1968 in Superbowl III. Last summer Weeb Ewbank was inducted into the Pro Football Hall of Fame.