Frigoletto were fearful that the law as originally drafted by Delahunt and Smith would preclude their work in prenatal diagnosis of genetic blood diseases, particularly sickle cell anemia and thalassemia. Prenatal diagnosis, in these cases, is possible only if the physicians can obtain samples of fetal blood. To do so, they need to use an amnioscope, a long cannula with a tiny lens that, when inserted directly into the uterus, allows them to literally see the fetus and, presumably, draw blood without harming it. But amnioscopes, as they presently exist, are imperfect instruments, too rigid, affording too limited a view of fetus inside the womb.

Delahunt and Smith understood the problem Nathan and Frigoletto had. They thought they had written a bill that would let their work proceed. But not everyone reads the bill the same way, and confusion had now gotten in the way. Nathan and Frigoletto submitted a research protocol for developing a flexible amnioscope to the human experimentation committee at Harvard-affiliated Boston Hospital for Women. They were turned down.

According to Frigoletto, the committee thought the situation too risky with respect to the law. Among the members of the committee is a judge; even he, apparently, thought the law sufficiently unclear to be sure that the two researchers could conduct their study in certainty of not being prosecuted. And, at the moment, none of them is willing to risk prosecution, even as a test case with the full support of his institution. As Nathan put it, "A hospital can't keep a doctor from going to jail."

A third example of the effect of the law was put before the state commission by Harvard Law School professor Charles Fried, who had come to say that he thinks it is a bad statute. When asked by Delahunt whether he knew of any research that had been stopped because of the law, Fried replied that an investigator (unnamed) working in bowel cancer research had put aside a study that involved use of dead fetal tissue.

Delahunt and Smith were both upset to hear that research that is unquestionably allowed was being stopped. They were upset because no one had intended to preclude research on or with dead fetal tissue. And they were upset because Fried seemed to be reporting that at least some scientists couldn't read. "Have they read the law?" Delahunt asked. "Aren't there people in your research institutions to whom you can go for advice about this sort of thing? I find it very annoying that what is allowed is being stopped." Said Fried, who testified against having any law governing fetal research and who particularly opposes this one because it is a criminal, not civil, law, "Research is being stopped because of fear."

It is likely that the fetal research law will be modified—to make its language more clear to the medical scientists who must be able to understand it, if for nothing else—but there is really no way of knowing whether it will be more congenial to the scientists' point of view. Whatever happens, it seems certain that it will do little to relieve the "chill" felt by Boston's research community. That is going to get worse, not better, when the grave-robbing trial starts.—BARBARA J. CULLITON

Maharishi International University: "Science of Creative Intelligence"

Out on the plains in Fairfield, Iowa, lies the campus of the ill-fated Parsons College, an experiment in all-tuition supported higher education that, during the student glut of the 1960's, came to be known as "flunk-out U."

Perhaps modest Fairfield is the weathercock of national trends in education. For Parsons, which lost its accreditation and folded a few years ago, is now reborn as Maharishi International University (MIU). The campus has been purchased at the bargain price of $2.5 million by the followers of Maharishi Mahesh Yogi. Maharishi, remembered by some for his stint as the Beatles' guru, is the Indian sage who brought Transcendental Meditation (TM), a practice now engaged in by some half million Americans, to these shores. The university represents an attempt to incorporate the enlightenment supposedly gained through TM into the process of higher learning.

The Fairfield operation is only a part of a global network Maharishi and thousands of devoted adherents are in the process of building. The keystone of the structure is TM. The philosophical framework is something Maharishi himself put together, combining ancient Indian Vedic wisdom with universal principles and truths culled from philosophy, religion, science, psychology, and common sense. It is called the "science of creative intelligence," or SCI. The avowed purpose of the movement is the achievement of world peace.

Few people have any quarrel with the value of transcendental meditation. TM is a method for achieving a deep kind of mental and physical relaxation, different from that experienced during sleep. TM has been introduced into prisons and rehabilitation centers and has been useful in helping people overcome drug addiction, alcoholism, and emotional problems. Many average citizens have found it calms them and enhances their ability to cope creatively with everyday life.

TM is also a method for utilizing the discovery (new to the West, old hat to Yogis) that people can learn voluntary control of their autonomic nervous systems. A number of biomedical researchers say it holds promise for relief of hypertension, migraine headaches, epilepsy, asthma, and numerous other nervous and cardiovascular problems.

But to Maharishi and his adherents TM holds much grander potential. As his following increased, Maharishi in 1972 unveiled a World Plan for peace to be implemented by a highly structured (at least on paper) global network of centers. Overseeing it all is the World Plan Executive Council, a body that was formally established last year. The headquarters for the movement is the World Plan Administrative Center, located in Seelisberg, Switzerland. This is where Maharishi sits surrounded by flowers when not engaged in his Kissinger-like travels, lecturing and or-

ganizing. Under the administrative center are 36 "international coordinating centers" (some extant, some planned), one for each 100 million of the world's population. Each center will oversee 100 World Plan centers, which means one for each million of the population. There are now about 400 such centers in the United States.

These centers are designed as "external learning centers," and their primary purpose is the teaching of TM and SCI. Maharishi has a theory: if 1 percent of a given society is made up of meditators, this will effect a fundamental alteration of the society. (So far, nations with the largest proportion of meditators are said to be the Scandanavian countries, Canada, Australia, and the United States. The denouement of Watergate and the departure of Nixon is regarded by some as an example of the kind of "purification" to be expected as meditators proliferate.) If 1 percent of the people in the world meditate, Maharishi's prediction goes, they will form the critical mass needed to bring world peace.

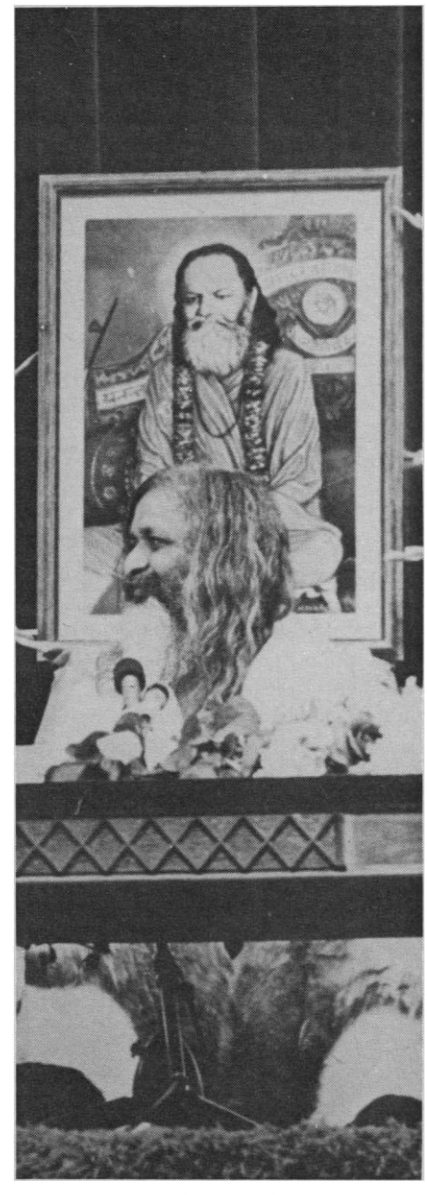
A great fan of science, Maharishi often couches his teachings in analogies drawn therefrom. For example, he speaks of a "phase transition" in society. This is a phenomenon common to most branches of science that describes the transformation of a substance from one state to another—such as water to ice or the magnetization of a piece of iron. Maharishi, with the aid of his disciples, has thus parlayed a simple meditation technique into an institution designed to bring about nothing less than a revolution in world consciousness.

According to MIU president Robert Keith Wallace, a young physiologist who was engaged in some of the early research on TM, the idea for the university arose out of a series of international symposia on SCI in which a number of notables from science and academe participated.

The purpose of MIU, which is now seeking accreditation as an undergraduate university, is to show how the principles made manifest by SCI apply to all knowledge. It is also a training institute for teachers of TM, most of whom have had to go to Switzerland for their 3-month indoctrination. (There are now almost 5,000 TM teachers in this country and people are learning TM at the rate of 10,000 a week, according to Wallace.)

MIU is one of five entities involved in the World Plan. The other four, all of which have more or less the same purpose, are the International Meditation Society (IMS), whose national headquarters are in Los Angeles; the Students International Meditation Society; the Spiritual Regeneration Movement; and the International Foundation for the Science of Creative Intelligence. MIU started out as a rented facility in Santa Barbara, and it is now in its first year of operation in Fairfield. Currently it has some 700 students, most in their first or second year. The university operates year-round, and students take quarters off for meditation in rural retreats called "forest academies," vacations, and outside work. The first year subjects students to a rapid succession of 24 different courses to give them a taste of a broad spectrum of disciplines, all of which are taught "in the light of SCI." Everyone, of course, studies SCI itself, taught with the aid of videotapes of Maharishi explaining it all. And everyone does TM, which is called "the practical aspect of SCI." It is hard to tell from the pretentious and blissful verbiage of the MIU catalog just what SCI is. But according to Demetri Kanellakos of Stanford Research Institute, a member of the "international resource faculty," SCI is an analysis and synthesis on how all things work in nature. It purports to show how certain fundamental principles govern all physical and biological phenomena and are paralleled by the workings of the mind. Maharishi says, for example, in one of his less opaque pronouncements: "During Transcendental Meditation, the whole nervous system pulsates between deep rest and activity. This natural process within the individual is just an image of the natural process of expansion and contraction in the physical universe." Once these principles are perceived, intellectually through SCI, experientially through TM, students are said to develop an intuitive understanding of how nature works. Wallace calls it a "powerful systems approach to knowledge." As students progress, their curricula narrow to areas of specialization, but interdisciplinarity and decompartmentalization of knowledge are emphasized. The university offers standard college courses, although some disciplines, history and economics for example, are conspicuously lacking.

The MIU people are very big on science, though. The catalog waxes ecstatic over the theory of relativity or the structure of DNA, extolling the universality of the laws to which these phenomena adhere. Einstein, Wordsworth, and Christ, to name just a few, knew this sort of thing intuitively. MIU's aim is to let everyone in on it.



Maharishi Mahesh Yogi

At present, according to Wallace, senior faculty numbers 19, and there are 20 junior faculty members. Tuition is relatively low ($600 a quarter), room and board is $1200, and teaching salaries are not exactly competitive. The MIU technique is to get professors from other universities to videotape lectures for courses. Then the faculty members, most of whom are graduate students or teaching assistants, show the tapes and conduct classroom discussions.

The Maharishi people are clearly intent on establishing the legitimacy of the movement by demonstrating that all its teachings are solidly grounded

in scientific fact. Not only do they harp on the measurable physiological changes that occur during meditation (heartbeat, body temperature, blood lactate levels, skin resistance, and so forth) but they even strive to describe the state of consciousness in scientific terms. Thus meditation is described as a way to achieve "minimum entropy" which, as scientists know, is consonant with maximum order. As Wallace observes, superfluidity and superconductivity occur at temperatures near absolute zero. During TM, when mental activity is at a minimum, the brain achieves a state of superconductivity, so to speak, allowing the inner springs of creativity and truth to surge up through it. On such reasoning does Wallace base remarks such as, "it will not be very long before the neurophysiological standards for the state of enlightenment are firmly established," and "the widespread use of TM is a scientific basis for world peace."

However this may sound, the Maharishi approach does hammer away at one undeniable fact—that a student must become receptive to knowledge before he is to learn anything.

The people involved in MIU believe they have hit on an approach to learning that produces the results educators have for decades sought in vain. One proponent is John Lewis, professor of earth and planetary sciences at the Massachusetts Institute of Technology, who has taped lectures for MIU. Lewis explains that TM breaks down

Briefing

Future of Private Laser Fusion Research in Doubt

The chairman of KMS Industries, the only private company conducting experiments in laser fusion, died in Washington, D.C., on 14 March, following a stroke suffered the previous afternoon as he was testifying at a hearing of the Joint Committee on Atomic Energy.

The death of Keeve M. Siegel, who was president and chairman of KMS Industries, leaves the future of the company in question. KMS Industries, which is based in Ann Arbor, Michigan, has been almost continually short of money since it embarked on a program to demonstrate the feasibility of laser fusion for power production in 1971, and Siegel was the supersalesman upon whom the company relied to attract and hold financial support. In 1972 Siegel convinced Burmah Oil Co., Ltd., the huge British petroleum concern, to guarantee loans for $12.5 million devoted to ongoing research in laser fusion. This year he obtained a promise from the Texas Gas Transmission Corporation to fund half the cost of an $80-million pilot plant, which KMS proposed to finish by 1980, for the production of hydrogen and methane from laser fusion.

While the promises of the company for rapid commercialization of laser fusion technology have met skepticism from almost every quarter, the company's progress in the basic research associated with laser fusion has recently been acknowledged by scientists in many countries. The Energy Research and Development Administration had just awarded KMS the company's first government research contract (*Science*, 7 March). According to the information that is publicly available, KMS leads the national research efforts of both the United States and the Soviet Union in the number of fusion neutrons that it can produce from the compression of a fuel pellet by laser beams, and KMS alone claims to have a process for producing hydrogen directly from laser fusion, bypassing the step of making electrical power.

Along with representatives from other laser fusion research programs, Siegel was testifying before the JCAE in its hearings room on the second floor of the Capitol on 13 March. As he neared the end of a prepared statement, which requested $59.5 million over the next 3 years, he stopped speaking in midsentence. As a hushed audience in the hearing room waited for Siegel to continue, he uttered the word "stroke" and slumped forward. The hearing was immediately halted and Siegel was rushed to the George Washington University Hospital, where he died at 5 o'clock the following morning. The announcement of his death was made by R. A. Olsen, executive vice president of KMS Industries. Trading of KMS stock was suspended for 10 days in all over-the-counter markets.—W.D.M.

A Helping Hand for Saudi Arabian R & D

U.S. government officials and nongovernment scientists will assist Saudi Arabia in setting up its first national laboratory, to be called the Center for Science and Technology, according to a communiqué issued recently at the close of general talks between representatives of the two countries in Washington. Unlike so many other cases where the United States is supplying money as well as know-how to enhance other nations' scientific capabilities, Saudi Arabia will pay all the bills—even travel and time for American government and nongovernment participants in the effort.

Implementing the plan to establish a center will be a so-called "working group" for science and technology, which is now being appointed. The American chairman will be Alfred J. Eggers, assistant director for research applications of the National Science Foundation, and the membership will include Saudi and American scientists from industry, universities, and government.

The science working group is only one of four aiding the Saudis under the auspices of a Joint Economic Commission, which met in Washington on 26 and 27 February. The United States helped establish the joint commission last year with the aim of promoting long-term economic cooperation between the two countries—but obviously one unstated goal was to provide some security against the recurrence of another Arab oil embargo. Joint commissions of a similar sort, having science and technology as one of their thrusts, have also been set up in the last year with Israel, Iran, Egypt, Jordan, and India.

Saudi Arabia, richer than ever as a result of recent oil price increases, is about to start a 5-year modernization program estimated to cost $60 billion. What the Saudis want from the United States, according to U.S. officials who have participated in the recent meetings, is agricultural aid, assistance in improving their health care and educational systems, and even help in devel-

students' psychological barriers to learning and unblocks the natural pathways that conventional education fails to open.

Maharishi's global organization is—just like the universe—in constant flux. Last year it seems the idea was to develop 3600 Maharishi International Universities around the world. Now the emphasis is in the direction of external degree programs. The Maharishi people put high priority on the development of teaching materials and videotapes that can be disseminated to their centers as well as to other universities (courses in SCI are available off and on at various colleges around the country). A global television network is planned so that peoples in the far corners of the earth can achieve enlightenment. An MIU station is now being constructed in Los Angeles which, says Lewis, will transmit lectures over the local educational television station.

The backbone of Maharishi's movement is made up of young people, most of them volunteers, who are ardently devoted to the guru and his principles. MIU tries to give the impression that it has the endorsement of great minds in scholarship and science, many of whose names are scattered about the catalog. But such is not quite the case. Chemist and Nobel prizewinner Melvin Calvin of the University of California at Berkeley says he addressed one of the SCI symposia, but he considers use of his name in the catalog as coming "perilously close to false advertising."

Briefing

oping energy technology. The Saudis have said they would like to process methane, which they now burn as waste when it emerges from their oil wells.

The planned Center for Science and Technology would eventually have a staff of 1000 persons. It would work on applied problems related to national needs, such as arid lands and desalinization of water, as well as on basic research. It would also provide work space and equipment for graduate students at the country's three universities, but would not be part of the university system.

U.S. officials estimate that some 1000 Saudi Arabians are studying in the United States. One of the Saudi government's problems is that it doesn't know the composition of the work force within its own borders. Last year, the government conducted its first national census; it has now asked the United States for assistance in methods of statistical analysis so it can learn more about its people.—D.S.

Social Scientist Nominated NSF Deputy Chief

Richard C. Atkinson, chairman of the psychology department at Stanford University, has been nominated by President Ford as the new deputy director of the National Science Foundation (NSF). Atkinson would fill the vacancy left by Raymond Bisplinghoff who left to become chancellor of the University of Missouri at Rolla last November. At the age of 46, Atkinson is a member of the National Academy of Sciences and the National Academy of Education and has worked primarily in the fields of cognition theory and computer-aided instruction.

If his nomination is confirmed by the Senate, as seems certain, he will be the first social scientist to hold one of NSF's two top jobs. This in itself is of some consequence for an agency primarily devoted to the support of the physical sciences and whose funding of social sciences has been criticized most frequently vocally by Senator William Proxmire (D–Wis.), who oversees the NSF budget from an appropriations subcommittee (*Science*, 16 August 1974). Proxmire, peering at NSF's social science budget request of last year, announced that "the American taxpayer would get a better return on his money if he put it into White Russian bonds." Presumably, one of Atkinson's jobs would be to counter such barbs.

The NSF also has acquired a new assistant director for national and international programs—Robert E. Hughes, a physical chemist who was formerly director of the Cornell University Materials Science Center. Both the Atkinson and Hughes appointments differ from those of a few years back, which drew on the engineering and aerospace community for filling NSF's top posts.—D.S.

EPA Grants Reprieve on Auto Emissions

As expected, Environmental Protection Agency (EPA) administrator Russell Train on 6 March granted auto makers a 1-year suspension of emission standards scheduled to go into effect in 1977.

More significant were the recommendations Train made covering the subsequent 5 years. EPA has decided that the potential health hazards of sulfuric acid emitted by cars equipped with catalytic converters are great enough to warrant substantial delays in implementing the emission standards mandated for hydrocarbons (HC) and carbon monoxide (CO). With the oxidation catalysts now in use, the more efficient the catalyst, the more sulfuric acid is formed. Train therefore recommended that current interim standards for HC and CO be extended through 1979, with a reduction in 1980 to conform with standards now applicable in California (*Science*, 7 March). The statutory standards for 1977 would not go into effect until 1982, if Congress can be prevailed upon to amend the Clean Air Act.

Train, who called his decision "the most unhappy one" he has made as EPA administrator, made it clear that his agency had moved somewhat rashly in compelling auto makers to adopt catalysts before the sulfuric acid problem had been properly assessed. Although the hazards of that substance have still not been determined, EPA plans to set an emissions standard for sulfuric acid starting in 1979. A tight standard would probably mean the demise of catalyst technology, said Train. In any case, his proposals are designed to encourage the phasing in of noncatalyst technology.

Train's proposals were criticized by a public interest lobby group, the Clean Air Coalition, which contended that sulfates could be reduced by blending and eventual desulfurization of gasoline. This, they said, would lead to an immediate reduction in sulfuric acid emissions and permit currently mandated standards to stand unchanged.—C.H.

Calvin, who says he practiced meditation long before he heard of TM, asserts, "Maharishi's principal business is collecting money from new acolytes. He doesn't know anything about science," but does know that cloaking his dogma in scientific jargon is the only way to gain legitimacy. In the 1960's, says Calvin, Maharishi helped hundreds of students kick drugs—"if it weren't for the rescue job he did around here he'd have absolutely no sympathy from me at all." Mael Melvin, who teaches quantum mechanics at Temple University, used to give lectures at one of the IMS New York centers, but has since disassociated himself from the movement, saying, "Maharishi is flexible in what he considers truth." Harvey Brooks, dean of engineering at Harvard, also participated in an SCI symposium. He thinks TM is fine but that it is being surrounded by a lot of mystical nonsense, and "all the scientists I know who have had some contact with SCI hold about the same view. Like virtually every scientist who has attended or spoken at SCI conferences, I was 'roped into it' by my children," Brooks wrote in a letter. Buckminster Fuller, whose name is also thrown around by the MIU people, related through his secretary that he had little knowledge and no opinions about the organization.

None of those who question Maharishi deride TM. In fact, many of them do it. In the early days of scientific research on TM, Wallace worked for a while with Herbert Benson, a cardiologist at Harvard who is perhaps the foremost TM researcher in the country. But Benson and Wallace haven't seen each other for a while. Benson will not speak for attribution but one of his professional acquaintances says he and his colleagues are disturbed at the mystical aura with which Maharishi and his followers have shrouded the practice. Anyone wanting to learn TM from IMS pays $130 for a series of three lectures, and several hours of personal instruction in meditation. There he is assigned his own mantra, custom fit to his personal nervous system. The mantra is very powerful, and therefore must be kept secret.

It has been said this is just a cute way to elicit $130 from someone. Benson says TM is only one of many ways, including prayer, to achieve what he calls the "relaxation response." He has written papers in which he says he has found that silent repetition of the word "one" while a person is exhaling achieves the same result. Maharishi's followers disagree. They say nothing achieves the same results as TM. As for the complaint that the religious overtones of TM impart an undesirable ideological tang to it, Lewis argues that Maharishi has taken meditation—practiced in many forms by many religious—out of any particular philosophical or religious construct and has liberated it as a truly nonideological practice. Many would argue with that point, but certainly it is true that most people who learn TM don't give a hoot about the Rig-Veda or Oriental mysticism.

The prospect of MIU, rising Phoenix-like from the ruins of old "flunk-out U" is certainly a sign of the times, and an indication of the scope of the relentless pursuit of inner peace going on these days.

But if MIU can become self-supporting (it is starting up with income derived from TM learners) then, assuming it gains accreditation, it will have something on many institutions of higher learning in America today.

—CONSTANCE HOLDEN

APPOINTMENTS

Harrison Brown, professor of geochemistry and science and government, California Institute of Technology, also to president, International Council of Scientific Unions. . . . **Richard Trumbull**, deputy executive director, AAAS, to executive director, American Institute of Biological Sciences. . . . **Robert E. Leestamper**, president, Worcester State College, to president, Southeast Missouri State University. . . . **Howard E. Petch**, academic vice president, University of Waterloo, to president, University of Victoria, Canada . . . **Frederick S. Humphries**, vice president, Institute for Services to Education, to president, Tennessee State University . . . **Warren W. Brandt**, former president, Virginia Commonwealth University, to president, Southern Illinois University. . . . **James A. Robinson**, president, Macalester College, to president, University of West Florida. . . . **Douglas T. Kenny**, dean of arts and sciences, University of British Columbia, to president of the university. . . . **Ronald G. Petrie**, chairman, elementary education department, Utah State University, to dean, School of Education, California State College, San Bernardino. . . . **John B. Harley**, assistant dean, School of Medicine, University of North Dakota, to dean, School of Medicine, University of South Carolina. . . . **Don L. Allen**, acting dean, College of Dentistry, University of Florida, to dean of the college. . . . **Elmer Washington**, dean, natural sciences and mathematics division, Chicago State University, to dean, College of Arts and Sciences at the university. . . . **Henry J. Hermanowicz**, dean, College of Education, Illinois State University, to dean, College of Education, Pennsylvania State University. . . . **Edward C. Melby**, director of laboratory animal medicine, Johns Hopkins University, to dean, New York State Veterinary College, Cornell University. . . . **Gordon A. Haaland**, chairman, psychology department, University of New Hampshire, to dean, College of Arts and Sciences, University of Maine, Orono. . . . **Perry G. Rigby**, acting director, School of Allied Health, University of Nebraska, to dean, College of Medicine at the university. . . . **Marshall Falk**, medical director, George J. London Memorial Hospital, to dean, Chicago Medical School. . . . **Lawrence Solomon**, acting head, dermatology department, Abraham Lincoln School of Medicine, University of Illinois, to head of the department. . . . **Carlton S. Koehler**, entomologist, University of California, Berkeley, to head, entomology department, Oregon State University. . . . **Phillip J. Stiles**, professor of physics, Brown University, to chairman, physics department at the university. . . . **Charlotte C. Campbell**, professor of medical sciences–mycology, Southern Illinois University School of Medicine, to chairman, medical sciences department at the university. . . . **Roderich W. Walter**, professor of physiology, Mount Sinai School of Medicine, to chairman, physiology department, School of Basic Sciences, University of Illinois College of Medicine. . . . **James H. Korn**, associate professor of psychology, Carnegie-Mellon University, to chairman, psychology department, St. Louis University. . . . **Richard B. Knapp**, associate clinical professor of anesthesiology, New York Medical College, to chairman, anesthesiology department, West Virginia University. . . . **Henry A. Thiede**, chairman, obstetrics-gynecology department, University of Mississippi, to chairman, obstetrics-gynecology department, University of Rochester. . . . **Joseph Landin**, professor of mathematics, University of Illinois, Chicago Circle, to chair-

(Continued on page 1216)